Economic Openness and Growth of Sectoral Output in Nigeria

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Being MSc Thesis Submitted to the Department of Economics and Development Studies, Faculty of Management and Social Sciences, Lead City University, Ibadan, Oyo State, Nigeria.

In Partial Fulfillment of the Requirements for the Award of Master of Science Degree MSc in Economics

2022

Certification

This thesis entitled "Economic Openness and Growth of Sectoral Output in Nigeria" was carried out by Abdulsalam Idowu Sulaiman with Matric No: LCU/PG/001312 in the Department of Economics and Development Studies, Faculty of Management and Social Sciences, Lead City University, Ibadan, under my supervision.

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Dedication

This work is dedicated to Allah for his mercy and protection throughout my course of study.

Acknowledgement

I have acquired many intellectual knowledge while written this thesis from various individuals in order to make this research a reality.

Firstly, my appreciation goes to Almighty Allah who has always been my guidance and provider. All glory, honor and adoration unto Him.

My profound appreciation goes to my amiable supervisor Dr. O.O Adesina for his constructive advice and promptness to guide me whenever the need be. I owe him an immense debt of gratitude. Also, am deeply grateful to the Head of Economics department Dr Ogunjimi O.O and my other mentors; Prof. Campbell O.A., Prof. Akerele W.O., Dr Oyaromade .R., Dr Ogunro T.T., Dr Aderinto E.R., Dr Alimi Y.O and Mrs Oduyoye-Ejumedia O.A. Their comments and suggestions have greatly shaped and make this work meaningful. May the Lord reward you all.

It is mandatory to acknowledge the impact and perseverance of my soul mate Mrs. Rabiat Aderonke Abdulsalam and my children Abdulsalam, Ibrahim, Abdulbaasit and Aishah for their support and understanding. I cannot forget to appreciate my elder brother and sister, Mr Hassan Oloba and Alhaja Husseinat Adedokun for their financial and moral support.

Finally, I return all glory to Allah who has made it possible for me to complete my programme.

Abstract

The study examines the relationship among economic openness, agriculture, industry, finance and service sectors in Nigeria covering the period 1985 to 2019. The data were analyzed using descriptive statistics, Toda and Yamamoto causality test, Autoregressive Distributed Lag (ARDL) co-integration test, impulse response functions and error correction mechanism. The study found that the data for some variables were fixed at level while others were integrated at first differentiation. Findings from the study reveals that causal relationship exist only between service sector and trade openness. Furthermore, the study describes a long-term relationship between economic openness and sectoral output growth in Nigeria. However, there were mixed results in the short run, from the impulse response pictures, it shown that most of the variables fluctuated along the periods.

The study therefore recommended that government should diversify Nigeria economy away from oil, provision of sophisticated farm tools and infrastructural facilities, formulation and implementation of fiscal and monetary policies among others.

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Acronyms

Abbreviation	Meaning
AOPCG	Agricultural Output per Capital Growth
FDG	Financial Depth Growth
FOPCG	Financial Output per Capital Growth
GATT	General Agreement on Tariff and Trade
GEG:	Government Effectiveness Growth
GIRF:	Generalised Impulse Response Function
IMF:	International Monetary Fund
IOPCG:	Industrial Output per Capita Growth
SOPCG:	Service Output per Capita Growth
SAP:	Structural Adjustment Programme
VD:	Variance Decomposition
WTO:	World Trade Organisation

Appendices

Appendix	Title
Appendices:	Trade Openness Performance
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Chapter One

Introduction

1.1 Background to the Study

Output covers the transformation of raw materials into finishing (consumable) and semi-finished (inputs for another production) goods (services) inclusive. This output especially consumables with which the population of a country can use for the betterment of life. The amount of these commodities available determines the level of development of an economy. Hence, the aim of the government is to seek how the economic output of its economy would be expanded. Since there are several goods to be produced, different sectors are involved. Therefore, several ways, programs and policies are undertaken by the government to secure the increase of these goods across the economic sectors of the economy. Every sector of any economy contributes to the development of that economy, this implies no matter how small any sector contributes to the national income of that nation, the sum is the total income of the that economy and its directly or indirectly contribute to the gross domestic product of such nation. The Gross Domestic Product (GDP) is a fundamental measure of a country's overall economic performance[1]. It is the market value of all final goods and services made within the border of a country in a year and are often positively correlated with the standard of living. GDP is the most frequently used indicator of economic activity and is most often measured annually or quarterly to gauge the growth of a country's economy between one period and another[2].

A country is said to have a good economy if its GDP is relatively high. GDP is important in determining if an economy is growing quickly or slowly than the same quarter in the year before, it is used to compare the size of economics that is relative growth rate of economies throughout the world[3]. Also, for investors, the GDP is used as a means of adjusting their assets location and

to decide where the best opportunities lie. The Nigeria's Gross Domestic Product (GDP) is made up of multiple sectors such as; Agriculture, Industry, Services, etc. Agriculture is one of the dominant sectors of the Nigerian economy. Though, its downward trend especially its contribution to GDP. The sector includes crops, livestock, fishing and forestry[4]. It involves cultivating land, rearing and of animal for human consumption, animals feed and industrial raw materials. This is critical for increasing employment opportunities, reducing poverty and increasing income contribution to accelerated industrializatio[,5,6]. In Nigeria, Service sector comprises of trade; accommodation and food services; transportation and storage; information and communication; arts, entertainment and recreation; financial and insurance; real estate; science, professional and technological services; administrative and support services; public administration; education; health care and support services for human beings; and other services[7]. The industrial sector comprises of the crude petroleum and natural gas, solid mineral and the manufacturing industries. Industrial sector contributes to economic growth by increasing industrial output, innovation promotion and the uses of resources for optimal production[8].Scholars believe that the industrial sector is a growth driver due to the multifaceted benefits it has provided to growth and development[9].

The expansion process in the agricultural, service and industrial sectors would lead to a targeted growth rate[10].A number of fiscal and monetary policies together with institutional reform measures have been undertaken since independence. Right from the first national development plan (1962-1968) to the fourth national development plan (1981-1985) rapid industrialization received priority in Nigeria's development objectives. In essence, government seeks to facilitate both output generation by ensuring the promotion of finance and distribution of the goods produced. Also, since the economy may not have capacity to produce all it needs by itself, as

well as providing all the funds by itself. The government embarks on opening up its economy for the flow of both trade and finance.

Trade which is refers to as the buying and selling of goods and services is classified into two categories; Domestic or internal trade and foreign or external trade. Domestic trade is the exchange of goods and services within a country's geographical boundaries. It provides economical goods, less competitive, elimination of trade barriers, low transportation cost, mobility of factors, etc. On the other hand, foreign trade is the trade between one country and other countries of the world. In many developing countries in which Nigeria is inclusive, trade is considered to be an important aspect of growth. It is widely believed that trade creates jobs, expands market, promotes competition; transfer knowledge and increases income among individuals, company and government. Foreign trade expands the market of a country's output while export can lead to an increase in a country's output, which can be an engine of growth. In many countries, international trade has brings together remote parts of the world and different civilization; it helps to improve the dissemination knowledge and ideas, shapes regional and national processes. Furthermore, it helps to stimulate production, improve efficiency and reduce production costs thereby enhancing international confidence in an economy's market mechanism[11]

Trade openness which suggest how opened an economy is to international trade is measured as the sum of export and import divided by Gross Domestic Product (GDP). The trade openness table on the appendix shown the trends in the average growth rate (imports and exports) and real GDP over the period of 1981-2019. The sample size was averaged over the period of ten years. Hence, the trend is to provide an insights on the performance of trade pattern in Nigeria economy. From the above table, the average trade opening between 1981-1990 was $17.25 billions. It rose

to $38.60billions between 1991-2000. It further increase to $40.61billions between 2001-2010. Indicated that the country improved in the involvement of trade with other countries in those periods. While average trade openness decline to $32.80billions between 2011-2019, this could be traced to economic recession and policy instability. A nation cannot survive economically without interdependence on one another, since no country exists in isolation, A country cannot produce all the basic necessities of life, hence there is a need for a strong economic interdependence .For instance, a situation where a reasonable quantity of goods and services can be obtained economically through the form of trade with other country, this would be irrational to exploit all the available resources to produce it locally even at a more expensive costs instead of trading with a country that has comparative advantage of producing such goods and services. The main issue is how the available resources can be used to obtain each product at the lowest possible cost. If a country that trade with one another uses all there available resources to produce a product that they have comparative advantage over, they can produce at larger output which could be beneficiary to both countries that trade with each other. Trade with one another could also results in a gain from the competitive process which is essential to both innovations and efficient production. International competition helps to keep local producers on their toes and provides them with a strong inducement to improve the quality of their products.

Trade liberalization has been used as a key component by most countries in their development agenda as well as stimulating economic growth and overall economic well-being. In the last two decades, researching on the relationship between trade openness and economic growth has long been a major subject of concern for most trade economists. Proponent of the trade liberalization concept argue that liberalization brings in new technology and attracts Foreign Direct Investment (FDI) resulting in efficient resource allocation and increased consumer welfare. Some scholars

observed that trade liberalization can help to boost economic growth by supporting nations to specialize in the production of goods in which they have comparative advantage and transferring resources across different nations[12]. Research carried out by International Monetary Fund (IMF) in 2015 also pointed to the fact that further trade liberalization can help developing countries to benefit from technology transfer as well as integrating them into the global value chains system, which can create more jobs in the economy. Other scholars submitted that trade allows countries to have access to contemporary technology and supports foreign direct investment flows, which lead to development of clean industries[8].

It has shows that trade liberalization is lauded for its productivity benefits across sectors of the economy. The use of better technology and promotion of investment is the medium for stimulating economic growth. In addition, trade liberalization may yield significant benefits, thereby promoting a country's economic improvement. This lower price of imported goods and services also prevents price increase, which in turn prohibits monopolies. The country's diverse resource can place Nigeria among emerging economies, and the country should also specialize in certain products to keep prices at a competitive and minimize production costs.

Trade restrictions such as hike in import and export tariffs, import substitution, licensing rules and quota have proved to hinder improvement in industrial productivity and economic growth. Based on this, the trade barriers of developed and developing countries are also falling rapidly, and the liberalization of trade is increasingly pushing world production to the frontier of universal production. Therefore, countries can increase production levels by importing modern technology, competitively price raw material and efficient labor. The analysis of international trade have received several attention in economic literature[13,14,15].

On the other hand, financial liberalization is the practice of removing credit controls, not restricting interest rates, banks' free access to the banking industry, bank autonomy and international capital openning[16]. An open financial sector is essential for better economic conditions while a repressed financial sector hinders a country from achieving economic growth[17]. Therefore, financial repression, such as controlling interest rate may hinder economy stability. In a developed and liberalized financial system, financial intermediaries play a vital role in achieving economic development.

Financial openness is measure as financial depth divided by Gross Domestic Product (GDP). The financial openness table on the appendix shown that the trends in the performance of financial openness in Nigeria between 1981-2019. The sample size was averaged over the period of ten years. The result shown that the average financial openness between 1981-1990 was $3.00billions. It rose to $3.44billions between the period of 1991-2000. It further increase to $8.33billions between the period of 2001-2010. However, the average financial openness felt to $2.46billions between 2011-2019 as a result of the global financial crisis. Financial liberalization has become an important package of economic policies for both developed and developing countries. To revive their economies ,developing countries have implemented economy recovery programs called Structural Adjustment Programs launched by the Bretton Woods Institutions (World Bank and International Monetary Fund) to liberalize prices in troubled and collapsing economies. The adoption of the program marks the gradual end of financial repression in the economy.

Relevant bodies in many developing countries have make rules and policies governing financial services in their regions, and factors such as long periods of economic growth, financial deepening and consistent an increasing commodity prices have contributed to the resilience of

African banking sectors[18].Processes which financial liberalization enhances economic growth were identified. These include improve in allocation of capital, increase in savings mobilization, greater diversification of investment risk, overcoming the problem of indivisibility of large capital projects, enhance monitoring and management discipline, facilitate entry of new firms, increase innovation and competition among the existing ones[19]. Structural reforms for sound macroeconomic policies and improved regulatory frameworks have also supported the banking sectors in the continent[20]. Financial liberalization and its capital inflows can stimulate growth by increasing the local investment rate and the investments connected with positive spillovers, thus increasing the domestic financial intermediation role which will mostly considered the intermediation of foreign resources by the domestic financial system. Consequently, the existing financial system development is reflected in its ability to discharge roles such as mobilizing savings, allocating capital to most productive use and facilitating risk diversification management. This could play important role in determining the extent to which financial opening could affect technological progress and organizational knowledge brought about by capital inflows due to the results of gradual evolution of institutions which provides a conducive environment for international capital accumulation through a developed financial system that leads to higher saving rate which in turn increases growth[21,22,23,24].

Thought, the inefficient use of resources indicated that the private sector could not be further invested as a result of financial repression from regulatory bodies, mismanagement and governance problems. However, there are still gaps remaining in financing and investment decision interactions, the competitive environment, organizational structure, sustainable investments, technologies and strategies. Risk management policies became a priority[25]. Thus from the above, issues relating to whether trade and financial (economic) openness has led to

production in the sectors emerges. Also, to what extend have these openness impacted sectoral output and should there be an impulse from these openness, to what extent will output respond? These issues are of concern to the study.

1.2 Statement of the Problem

Economic openness was proposed by the World Bank (WB) to correct the ongoing balance of payment deficit of the developing countries and to promote trade. It was expected that a liberalized trade regime would expands agricultural and other sectors output and as well enhance a better performance of the economy. Scholars argued that free trade promotes efficiency, the more countries embrace open trade, the higher the growth rate and their national income increases[26]. It was observed that over the years, Nigeria government has implemented considerable trade and financial measures including reductions in the average tariff rates and effective rates of protection as a means of stimulating sectoral output. This has arise from the needs to promote a diversified economy which relying on crude oil alone and portends a great risk to the economy[27].

There are mixed reactions from scholars on the effect of economic openness and growth of sectoral output in Nigeria. Some are of the opinion that economic growth is significantly influenced by non-oil exports sector. Based on this result, the study concludes that agricultural sector, manufacturing sector and service sector of non-oil export component has been contributing significantly to the economic growth of Nigeria[28]. Results from studies reveals that there is a long-run relationship between economic growth and financial liberalization[29,30]. Openness has a positive and significant influence on industrial sector[31,32,33]. However, the results from the studies conducted by other scholars shown a negative relationship. Despite the demonstrated and the potential gain from free trade by classical, the Nigeria agricultural term of

trade with other countries have not been too favourable, the domestic supply is poor, the balance of payment is negative, export performance is very poor and negatively affected the level of food production, provision of jobs and raw materials for other sectors and general food insecurity[34]. A study tested the impact of trade openness, exchange rate, volume of exports/imports and balance of payment on the sectoral output. Their results ponted out that the short run effect of trade openness, exports and balance of payment have negative relationship[35]. Also, non-oil exports prices have fallen since Nigeria gained independence in 1960.For this reason, a robust but strong export trade is a good indicator that show the level of a country involvement in economic opening with other countries and how large the industrial base of a nation's economy[36]. Despite efforts by various governments to boost non-oil export, crude oil still dominates the attention governments and policymakers[37]. Furthermore, the comparative advantage theory suggested that countries should only export those commodities where they have comparative cost advantages over others and import those commodities where they have comparative cost disadvantage[38]. This suggests that existing building distortions need to be corrected, for stable economic growth as well as the need to put the company on sustainable growth path. This prompted another question of what else needs to be done so as to diversify Nigeria's economy and develop its non-oil industry to fully exploit the sector's potential. Although are a number of studies on the relationship between sectoral exports and economic growth, these studies are not exhaustive as they face a number of methodological problems as well as conflicting results. These concerns underpin the study's necessity. Hence, the current study aims to determine the impact of sectoral output on Nigeria economy.

1.3 Research Questions

1. What causal relationship exists between economic openness and growth of sectoral output in Nigeria?
2. How does economic openness affect growth of sectoral output in Nigeria?
3. How does growth of sectoral output respond to shocks in economic openness in Nigeria?

1.4 Aims and Objectives of the Studies

The main objective of this study is to ascertain whether economic openness has impact on the growth of sectoral output in Nigeria. The specific objectives are to;

1. Assess the causal relationship between economic openness and growth of sectoral output in Nigeria.
2. Evaluate the effect of economic openness on growth of sectoral output in Nigeria.
3. Analyze the response of growth in sectoral output to shocks in economic openness in Nigeria.

1.5 Hypotheses

1. Ho1: There is no significant relationship between economic openness and growth in sectoral output in Nigeria.
2. Ho2: There is no significant effect of economic openness on growth in sectoral output in Nigeria.
3. Ho3: Growth in sectoral output does not significantly respond to shocks in economic openness in Nigeria.

1.6 Significance of the Study

This study is essential and significant since it meant to analyze, show the effects of Nigeria participation in the economic openness trend and provides way out on how the nation could feel positively the benefits of economic openness in almost all the sectors in the country and the economy of the nation at large. The study could also provide relevant information for government and policy makers in order to formulate policies and strategies that can improve the performance of various sectors in the country. The research is also relevant as it provides suggested solutions to the problems confronting the economy and make recommendations on how the economy could growth. This paper work will be anchored on economic openness and the challenges confronting economic growth in Nigeria with focus on sectoral output. Also this research will be ascertain whether with the abundant human and natural resources, Nigeria is competing in the global economy agenda and how it has improved the Nigerian standard of living.

1.7 Scope of the Study

The sample of the study covers the period 1985 - 2019. This period was selected in order to cover the era of Structural Adjustment Programme (SAP) under which the economy liberalized and opened its sectors. This study used secondary data sourced from World Development Indicators (WDI) of the World Bank and Central Bank of Nigeria. The research examines the relationship among economic openness, agriculture, industry, financial and service sector in Nigeria.

1.8 Limitation of the Study

The decision of the period considered in this study depends on the accessibility of data. Its of the view that this research is in no way shape or form a comprehensive treatment of the link between economic openness and growth of sectoral output in Nigeria. Although, the endeavors made in bringing together the macroeconomic variables, some may at present be overlooked. The study will likewise be constrained by the disparities in data from different local and international sources, and this may as well constrain the discoveries.

1.9 Operational Definition of Terms

Agricultural Sector: The sector comprise establishments primarily engaged in growing crops, raising animals and harvesting fish and other animals from a farm, ranch or their natural habitats.

De Facto and De Jure: de facto is a Latin word and means "actually". In law, it means "in practice but not necessarily required by law". De jure, on the other hand, means "concerning the law" especially when it comes to legal matters, standards and governance. In the legal parlance in particular, de facto defines the act of practical occurrence, while de jure describes what the law stipulates.

Economic Growth: This is defined as the increase or improvement in the inflation-adjusted market value of the goods and services produced by an economy over time.

Economic Openness: This is refers to as the degree to which non domestic transactions (imports and exports) take place and affect the size and growth of a national economy.

Exports: These are goods or services sold from a domestic country to other countries[39].

Financial Openness: This is calculated as the sum of net inflows, foreign direct investment net outflows and net portfolio investment to Gross Domestic Product (GDP).

Financial Sector: This are the economic services provided by the finance industry, which encompasses a broad range of businesses that manage money, including credit unions, banks, credit card companies, insurance companies among others.

Imports: These are goods or services imported by a domestic country from other countries[39].

Industrial Sector: This is the segment of the economy made up of businesses that aid other businesses in manufacturing, shipping or producing their products. Its refers to as secondary sector.

Service Sector: This is refers to as the tertiary sector of the economy. It consists of the production of services instead of end products. Service sector also involves the provision of services to other businesses as well as final consumers.

Trade: The exchange of goods and services within a country (domestic or internal trade) or between countries (international or foreign trade).

Trade Openness: The ratio of exports plus imports over Gross Domestic Product (GDP).

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Chapter Two

Literature Review

This chapter includes the review of the relevant literature by various authors related to this study. Reviewing the work of various scholars as a guide, in order to establish the state of the debate on the subject matter. The literature review would be divided into different sections as follows: conceptual review, theoretical review, empirical review and the summary of the gap in the reviewing literature.

2.1 Conceptual Review

2.1.1 Economic Openness

Existing measures of economic openness is generally refers to as the degree to which non-domestic actors do participate in a domestic economy. This can be grouped in two ways: firstly, according to the type of openness-'real' or 'financial'-they aim to measure, secondly, according to the sources utilized in composing the openness measure. The sources are either aggregate economic statistics (de-facto measures) or assessments of the institutional foundations of economic openness, which is the legally established barriers to trade and financial transactions (de-jure measures).Also, 'hybrid' measures aim to incorporate information on both real and financial aspects, while "combined" measures also strive to integrate information on de-facto as well as de-jure aspects of economic openness.

Economic globalization and economic openness are often used interchangeably by most of the scholars. However, economic openness is the most common term for capturing the phenomena of increasing international integration in trade and finance. Economists prefer using openness to the term "globalization". Economic openness which can be described as the degree to which

non-domestic transaction (imports and exports) take place and which affect both the size and growth of the national economy. This is measured by the actual size of the registered imports and exports within a national economy. Economic openness allowed the government of a nation's to measure the economic impact of their market distortions. This would enable the government to assess either there is improvement or not, which can only be assess through the level of the citizen standard of living. Countries that are more open have greater advantage to develop and compete with the rest of the world. Economic openness promotes efficient allocation of resources through comparative advantage and also it allows competition in domestic and international markets.

Trade Openness

Trade openness refers to the extent to which a country or economy allows or engages in trade with other countries or economies. The trade activities which includes import and export, foreign direct investment (FDI), borrowing and lending and repatriation of funds abroad. In the global economic theory, it is generally accepted that trade opening may assist to improve economic growth quality[1].The protection of economic transactions is a primary condition for creating enabling trade and investment environment[2].The issue has gained traction in the recent periods due to the large disparity in the economic performance of country's majorly emerging nations as a result of global integration[3]. Economists had different view on the relative importance of various economic policy and institutional factors that explain the differences in meeting up processes across transition economies. This is complicated because many transition economies have already key into trade liberalization measures. The relationship between trade openness and economic growth has been on debates by different school of thought. The mercantilism suggests that economic activity is a zero sum game in which a nation's economic benefit is at the cost. It

is been argued that exports should be more than imports and the domestic industry should be protected from import competition in order for a country economy to be at picked[4]. The classical economists are of the opinion that a country cannot continue to maintain a positive trade balance steadily. They opined that nations produce and export goods which they have low cost advantages and import goods which they have absolute cost disadvantages. They believe that a nation involving in international trade can posses a positive growth strength for its economic growth[5]. While Heckscher-Ohlin argues that two nations with the intention of engaging in trade with one another must have the same level of technology, constant returns to scale and a given factor-intensity relationship between the final products.

Financial Openness

This can be described as the willingness of a nation to adopt liberalized policies regarding business and commerce. Financial openness allows people to trade and carry out various financial transactions in its domestic market, which is called financial market openness and financial transaction admittance. It also allows residents and domestic institutions to participate in the transactions of international financial markets. The widely supported theoretical position of positive links between financial opening and growth in the developed and developing countries have been challenged by the re-occurrence of the world financial crisis, most importantly in the mid-1990s and 2000s. This has spite the quest to narrate the nexus between financial opening and growth in developing nations, mostly in Africa. Majority of the African nations were believed to be insulated from the world economic and financial crisis due to relatively limited openness to the world financial markets, however, the role of the world economic and financial crisis declined the growth rate of the African economy from 6.2% in 2007 to 5.2% in 2008 and 3.1% in 2009, although, Africa's economies aptly recovered to 4.9%

in 2010[6]. World economic and financial crisis severely affect the financial sectors of majority of countries in African due to a reduction in foreign investment, trade and remittances. This also led to a rising budget and trade deficits, high rate of inflation and dwindling foreign reserves. Furthermore, the world financial crisis revealed the reason to bail majority of the banks in the continent out of financial repression.

The vulnerability of African economies to the world financial crisis due to financial opening was not the same across the board. For instance, some countries in African where vulnerability to the contagion effect is high include central Africa Republic, Cote d'ivore, Lesotho and Botswana as a result of foreign ownership of banks in these countries[7]. However, scarcity of foreign finance and low capital inflows was the prime effect of the financial crisis on South African and Nigeria, while fragile countries like Burundi and Liberia were found vulnerable as a result of their heavy dependence n concessionary financing[8,9]. All the negative effects of financial opening mentioned above had slowed down the pace of economic growth and banking sector development in the African continent by weakening banks' balance sheets through an increase in under-performing loans and drying up of liquidity[7]. At the end of the financial crisis, stakeholders have lay emphases on the need for a reassessment of the linkages among financial openness, institutional development, capital inflows and the major determinant of long term growth. The development economists in the recent times have shifted interest from narrating general growth effects of microeconomic policies towards explaining the effect of these policies on the key determinants of growth, most especially Total Factor Productivity (TFP) which describes the variable that accounts for the change in output which does not depend on factor inputs such as labor and capita[10], describes TFP as the main source of growth for many countries in the long term since the TFP growth mostly overshadows other inputs' contributions to aggregate growth regardless

of the types of the production function. Among the structural economic determinants of TFP as identified in the literature include education, financial opening, trade opening, technology, financial development, research and development (R&D) expenditures, institutional development, capital inflows[11,12,13]. Financial opening is the integration of the financial activities and transactions of a particular nation into world financial markets. It provides opportunities for nations to increase their competitiveness by making more resources available by facilitating capital inflows, human capital development, technologies and innovations these include physical capitals in terms of infrastructural development. Financial openness facilitates the free flow of capitals that contribute to TFP growth through knowledge and technology transfers from foreign countries also face many challenges in explaining the observed macroeconomic imbalance caused by capital inflow volatility, sudden halt in foreign capital inflows, unguided exchange rate appreciation, risk of capital reversals and co-integration effects[14].

Sectoral Output

A sectoral output measure is conceptually different from measures of gross output. While gross output for the sector consists of sales or receipts and other operating income plus commodity taxes and changes in inventories. Sectoral output on the other hand is the measure of output used in "KLEMS" used in multifactor measures of productivity which attempts to account for all the directs inputs to production: Capital (K),Labor(L), Energy (E), Material purchased (M) and Service purchased (S). Sectoral output can also be described as the value of the output sold outside that sector. This can be measured as the value of the sector's gross output minus the value of shipments within the sector from one establishment to another.

Agricultural Sector

Nigeria is one of the largest countries in Africa, with a total geographical area of 923,768 square kilometers and an estimated population of around 250 million (2019 estimate). The country lies within the tropics along the Gulf of Guinea on the western coast of Africa. It has a highly diversified agro-ecological condition, which makes it possible the wide production of agricultural products. Hence, the sector's constitutes one of the major sectors of the economy. Agricultural sector is particularly important in terms of its job creation and its contribution to the Gross Domestic Product (GDP), also generation of revenue. It is an important sector of the economy with a high potentials for employment generation, food security and poverty reduction. However, this potentials h remained untapped which is led to the dwindling performance of the agricultural sector both locally and at the global market over years. Nigeria was the leading exporter of groundnut in the early 1960s with a world's share of 42%. Nigeria equally had 27% of the world's palm oil export, 18% of cocoa and 1.4% of cotton as the major exporter of cotton in western Africa. Agricultural sector has been a sector where more than 60% of Nigerian population and the proportion of the Gross Domestic Product (GDP) attributed to the sector hold about 40%[15].In Nigeria, the non-oil sectors drive the growth with 2.0% increase, while the oil sector output grew by 1.1%. The services, agricultural, industrial and construction sectors contributed 1.1%, 0.5%, 0.3% and 0.1% respectively to GDP growth, while the trade sector contributed negative growth of -0.1%[16]. This shows that, the agricultural sector contributed significantly to recent growth in the nation's economy beside the services sector, where the growth in output was attributed to sustained implementation of the Anchor Borrowers' Programme and fiscal stimulus which led to increased infrastructural spending following sustained implementation of the Economic Recovery and Growth Plan. The sector's contribution

to the growth of the Nigerian economy in 2012 was 39.21% and 41.93% improvement in the third quarter of 2013. This is because the sector's output continued to experience improved production in 2013. The sector recorded growth rate of 3.83% in the fourth quarter of 2012 as against 5.68% in the fourth quarter of 2011. Also, output in the third quarter of 2013 stood at 5.08%up from the 3.89% recorded in the corresponding period of 2012 and also higher than the 4.52% recorded during the second quarter of 2013 with a low level of employment generation to education, financial intermediation among others[17]. The sectoral GDP growth of the major real sectors of Nigerian economy as revealed by the Central Bank of Nigeria Annual Report (2018), indicates clearly that, the agricultural sector grew with 2.9%, 4.3%, 3.5%, 4.1% and 3.4% of the year 2013, 2014, 2015, 2016 and second quarter of 2017 respectively. This indicates that, agricultural sector has not recorded any negative growth in comparison with industrial sector that recorded -0.1%, -3.8%, and -9.4% of year 2013, 2015 and 2016 successively. Also,the construction, trade and services sectors recorded negative growth in 2015 and 2016, 2016 and second quarter of 2017, and year 2016 and second quarter of 2017 respectively[16].

Several argument were make on the impact of agriculture in industrialization, most especially, in developing economies[18,19,20]. In some quarter, it is believed that improved agriculture will provide the necessary raw materials for industries to strive[21]. However, other sides of the debate views increased agricultural productivity as a result of technical progress driven by industrial innovation[22,23]. Either way, agriculture and industrialization seem to be strongly interdependent on one another. The link between rural income through agriculture and the demand for manufactured goods in Africa account for why increases in agricultural labour productivity could lead to positive changes in employment in agro-based manufacturing[18,19]. Suffice to say that agriculture provides the raw material for the industrial sector, while industrial machines are

needed for extraction which imbues a bi-directional causality on the relationship between the sectors. The process of agro-industrialization leads to employment generations, improvement in income generation and increased earning for farmers. Thus make it possible for the employed to purchase necessary food items and increase available food for the economy. Furthermore, as agricultural productivity increases, export increases thereby improving the balance of payment, increasing foreign reserve and stabilizing the exchange rate[24]. But this can only be achieved with the provision of necessary infrastructure that supports the development of the sector such as good road system, transportation and communication, provision of water, credit, rural electrification and a competitive market structure coupled with the human capacity which includes policy makers, researchers, farmers, entrepreneurs and extension workers. Neglection of the agriculture sector in favour of the industrial sector will only lead to slow economic growth and inequality in income distribution. Despite the fact that agriculture may not be able to transform an economy single-handedly, the sector's still remain necessary and sufficient condition in kick-starting industrialization in the early stages of development.

Industrial Sector

Industrialization is the transformation of a society or country from a primarily agricultural society into one based on the manufacturing of goods and services. In an economy, industrial sector plays a significant impact in the development of a country. The industrial sector represents group of firms which involves in the transformation of factors of productions to finished goods and services. The sector serves an instrument of sustainable growth and development through which it increasing productive capacity, enhancing revenue, generation of employment opportunities, ensuring effective distribution of income, reduction of poverty rate, contribution to export and Gross Domestic Product (GDP)[25]. In order to facilitate industrialization in Nigeria,

different industrial policies and strategies as well as policy reform measures have been formulated and implemented over the years. Since the country independence in 1960, major African continent perceived industrialization as a tool of promoting self-reliance and discouraging over dependency on advanced nations[26].Industrial policy involves government intervention in embarking various reforms that could assist widening sectoral base of the economy. It is an instrument for resuscitating and enhancing industrial sector performance so as to stimulate rapid economic growth and development through efficiency and effective utilization of the resources capacity of the economy[25].Before her independence, Nigerian economy has been anchored upon industrial led economy based on the fact that well industrialized country has the capacity of promoting growth and development. Then, since 1960s Nigerian government has adopted various strategies and industrial reforms so as to enhance the growth and development of the industrial sector. Some of the strategies embarked by the various government includes Import Substitution Strategy, Export Promotion Strategy, Local resources-based Strategy, Nigerian industrialization Policy, trade policies among others were targeting at opening the Nigerian economy to the rest of the world, enhancing industrial production capacity and positioned the industrial sector as driver of growth and long term development.

Despite all the policies, strategies and reforms of various administration in the country, there are still growing concern on sector's contribution to the nation's gross domestic product[27].

Financial Sector

The need for interdependency and cooperation among the countries of the world has led to the need to open an economy to their foreign counterpart. As a result of increasing interdependence among countries of the world, due to economic opening, the link between local financial system and the global financial system has grown in the recent years[28]. The opening of the banking

system has resulted in the bridging of the gap between a nation and other countries of the world concerning foreign trade, international investment inflow and foreign exchange market and the facilitation involvement and volume of these trades, investments and exchange rate market have a significant effect on the banking system of an economy with an open policy framework[29].The financial sector provides an enabling environment for economic growth and development, productive activity, financial intermediation, capital formation and management of the payments system. The extent to which the financial sector of a nation's would impact on the real sector of the economy would however depend on the nature and magnitude of the innovations in the financial sector, within the context of the financial sector, these innovations can could be in terms of stability in the key performance indicators of the market, which play a major role in the process of financial intermediation. For instance, the stability of the money, capital and foreign exchange markets which are reflective of innovations in the financial sector thus, this can be measured by the key performance indicators in these markets. Capital money and foreign exchange markets indicators like the oil share index(ASI), banking system liquidity and exchange rate volatility are suggestive of the level of the financial sector growth or development which could transformed to the enhancement of financial intermediation and consequently economic growth[30].

Several policies, reforms and laws were put in place in Nigeria to regulate and stabilize the economy. The CBN Decree No. 24 of 1991 and the Banks and Others Financial Institutions Decree (BOFID), No. 25, 1991laws were declared with impact from June 1991.The interest rate liberalization reform was introduce in 1989 when banks were approached to pay enthusiasm on current record stores. Other reforms introduce were the open-market operations (OMO) in June 1993. The motive of the reform was to substitute the use of direct to backhanded arrangement of

fiscal control in managing liquidity in the economy. Rationalization of credit controls, elimination of exceptions within the ceiling on bank credit expansion and other reforms were embarked in the financial sector of the economy. Inflation rates is one of the main objective of Central Bank of Nigeria. The motive is to achieve and maintain stable prices at single digit rate. However, the objective has not being accomplished over the past years. The country's inflation has been fluctuating at 5.4% experienced in 2007 and the lowest attained was 16.6% in 2017[29]. The country has experienced volatile and high rate of inflation since 1970s. However, recapitalization was embarked in 2004 to strengthen the capital base of Nigerian banks. The capitalization was moved from #2billion to #25billion which resulted in placing Nigerian bank among the top banks across the globe in terms of capitalization. The financial sector has grown smoothly in Nigeria in the recent times, albeit, the socio-economic peculiarities of the nation, coupled by weak institutional quality, poor governance, corruption and insurgency in some parts of the country. For the past few years, the stock market has been very active with high performance ratings, reflecting a steady increase in margin loans to customers.

Service Sector

This is a sector of an economy where businesses, companies, enterprises and organization provide services and employment. Some scholars have earlier developed the model of three sectors in which the model classified the economic activities into primary, secondary and tertiary. Under primary production, economic activities such as agriculture and mining were the leading economic activities, while the secondary component comprises of manufacturing and construction. The tertiary production involves economic activities like transportation, trade, government, communication and personal services.[31]A service is any activity or benefit that one party can offer to another, which is essentially intangible and does not result in the ownership of

anything. The production may be or not attached to a physical production[32]. Service sector is view as an economic activities that create value and provide benefits for customers at a specific period and place as a result of bringing about a desired change in or on behalf of the recipient of the service. The sector provides a service such as; education, health, transportation, communication, government, finance, etc, that satisfied a need. Unlike the agricultural and industrial sector that produce tangible goods, the service sector produce intangible goods. It rendered services which is much needed globally for a rapid economic development[33].

In Nigeria, the service sector consists of electricity; water; building and construction; road, rail, ocean and air transport; communication; wholesale and retailing business; hotel and restaurants; financial services; real estate; housing (dwelling); private charitable activities; as well as repairs and other services[34]. The service sector makes a direct and significant contribution to Gross Domestic Product (GDP) and employment generation, and provides crucial inputs for the rest of the economy, thus having an important impact on the overall climate of investment, which is key to economy growth and development[35]. In Nigeria, there have been improvements in some service components like accommodation and food services along with human health and social services[36].

2.2 Theoretical Review

There are many theories that are used to analyzed and explain economic growth. Theory is a set of believed or general principles that is intended or guide to explain a given economic or related phenomenon. Therefore, theory is a guiding tool of analysis. However, this work will review the following theories namely; The Harrod-Domar growth model, Solow neoclassical growth theory, Endogenous growth theory, Two Gap economic growth model and Traditional (old) neoclassical theory.

2.2.1 Harrod-Domar Growth Model

Two great economists, Roy Harrod (1939) and Evsey Domar (1946) separately independently combined elements of both classical and keynesian economic growth theories such as investment, capital and imperfect markets, to develop what later came to be known as Harrod-Domar growth model. This model argues that a country's economic growth dependent not only on its saving rates but alsoon its ability to minimize its current level of consumption. In this case, economic growth is viewed as a direct result of a country's ability to increase both its savings and its capital-output or GDP ratio. An illustration of the model is shown in the equation below. Where, Y stands for the GDP of national production, ΔY for the change in GDP, s for the savings and k represent capital-output ratio.

$$\Delta Y/_{Y} = s/_{k}$$

The basic idea behind the model is pretty obvious: the more countries saves and invests part of their GDP, the more it grow and vice versa. The experience of many developing countries, such as Nigeria, has lent great credence to the applicability of this growth model. A scholar study showed that low saving rates and high level of ongoing consumption in these developing countries have reduced their GDP growth rates and therefore prompted them to seek financial loans and foreign aid to meet their acute resources shortages. However, with rampant economic mismanagement in these countries, external debt has reached unsustainable levels shifting growth and creating debt traps and vicious cycles of poverty. In response to this model, some economists have argued that foreign trade can play a significant role in solving this problem by increasing foreign exchange earnings from exports. They continued, since a country's ability to service debt is directly proportional to its level of export and interest rates on foreign loans,

export promotion can help narrow the gap between interest rates on foreign loan and foreign exchange earnings, thereby improving its debt-servicing position. This would accelerate long-term GDP growth in developing countries where debt servicing is one of the main obstacles to economic growth[37]. Imports under the Harrod-Domar model can also contribute to growth when a country imports capital goods and technology that can increase the country's capital stock resulting in growth of GDP over time. These capital goods can be in the form of productive system and machines.

The Harrod-Domar growth model suggests that foreign trade could positively impact economic growth through export earnings that complements savings in financing development. In addition, the model also leaves room for imports-induced economic growth through the import of capital goods from abroad which improves productivity and GDP.

2.2.2 The Solow Neoclassical Growth Theory

Solow's growth model essentially follows the neoclassical economic tradition by analyzing economic growth (Y) as arising froma production function that includes factors such as labour (L), capital (K) and the level of technology (A) contains. More importantly, Dasgupta notes that the model assumes diminishing returns of inputs to output as shown by the elasticity of labour (β) and capital (1-β) with respect to output. This function is presented in the formulation below[38].

$$Y = K^{\beta}(AL)^{1-\beta}$$

With constant elasticity, economic growth (represented by productivity growth) is viewed as consequence of changes in the factors of production. However, this productivity is also influenced by other exogenous (external) factors such as government policies, technological change, market concentration and human capital (Ray, 2003). This is shown in the following equation.

$$\Delta Y/_Y = \beta(\Delta K/_K) + (1-\beta)(\Delta A/_A + \Delta L/_L)$$

Solow's theory states that, foreign trade plays a role to play in achieving economic growth. Many arguments have been advanced in support of both the export-led growth (ELG) and import-led growth (ILG) hypothesis. Researchers supporting ELG, found that exports raise the level of a country's GDP by increasing returns on divisibility of scale and encouraging competitive domestic activities. Furthermore, the foreign exchange earnings generated from exports not only prop up the country's foreign exchange reserves, thereby stabilizing the value of the nation's currency, but can also be used to service foreign debt and import technologies that would further boost GDP growth[39]. Consistent with this analysis, open economies are more likely to benefit from the ELG than closed economies. Higher returns to scale, mean that open economies converge at higher income levels than closed economies. Coupled with this, both exports and imports are viewed as factors of production that, if used efficiently, can generate greater return of an economy, increasing productivity and economies of scale[40].

Foreign trade is also characterized by the import of foreign technology and skill transfer also improves the effectiveness and efficiency of domestic labor and capital enabling a country to maximize its comparative advantages thereby enabling it to maximize its trade gains which ultimately increases GDP Endogenous Growth Theory[41].

2.2.3 Endogenous Growth Theory

The theory of Endogenous growth arose out of frustration with earlier neoclassical approaches to growth. The failure to identify the causes of the massive inequalities in national income levels between developing and developed countries as evidenced by the emergence of the Latin American debt crisis in the early 1980s. Dasgupta notes that this growth model differs greatly from neoclassical growth theory which emphasizes the principle of diminishing marginal returns

of inputs to output levels. Rather, it argued that the factors of production show constant marginal returns for productivity and capital formation[37].

The theory of endogenous growth considers an increase in GDP to be the result of internal production processes. Unlike neoclassical theories of economic growth, which assume that technology is given, endogenous growth theory argue that the level of technology in the economy presupposes international capital transfers between developed and developing countries[42]. Therefore, through these international capital movements, the role of international trade (imports and exports) becomes more pronounced. Developing countries trade their export products, mainly commodities, for capital injections such as foreign direct investments, and technology from rich countries. For imports, the transmission mechanism for trade growth mainly concern technology[43]. Imports contribute to economic growth by acting as a conduit for technological spillovers effects and knowledge transfers from developed to developing countries, increasing output level in the former.

2.2.4 Two Gap Economic Growth Model

The two gap economic growth model is a variant of the Harrod-Domar, it argues that economic growth arises from filling in two gaps that exists in the economy, namely the savings gap and the foreign exchange gap. In other words, for an economy to grow, it must generate not only sufficient savings for investment but also foreign exchange earnings from international trade. The amount of exports and foreign capital flowing in and out of the economy represents an economy's total capacity to purchase goods and services from abroad to fill the foreign exchange gap. The gist of this theory is given in the following equation[44].

$$g = {}^{s}/_{k} + {}^{f}/_{k}$$

From the equation above, g represents GDP growth, s represents the savings rate, f represents the foreign exchange rate and k is the amount of capital stock given. Essentially, the theory argues that growth in g results primarily from increases in the level of s and f.

In most Less Developed Countries, it is very difficult to achieve economic growth because either the savings and/or the foreign exchange gap is very large. Therefore, international trade (exports and imports) is advocated as a solution to close the foreign exchange gap. In fact, export-orientation generates the much needed resources to finance a country's development process, repay foreign debt and build up a country's foreign exchange reserves, all of which are prerequisites for economic growth. On the other hand, imports can also help fill the savings gap by bringing in productive capital machines and foreign capital which can not only increase the country's overall capital stock, but also increase productivity which is essential for growth. However, for those imports to be profitable, they must be productive capital goods and not consumption goods which can actually widen the gap[45].

Likewise open economies that engage in international trade are more likely to reduce their savings gap through foreign capital inflows than those that do not engage in any form of external trade activity. These countries can also reduce their foreign exchange gap through capital gain on their foreign investments[46].

2.3 Review of Empirical Studies

There are mixed reaction to the relationship between trade and economic growth. For instance, the studies of scholars reveals favorable relationship between trade openness and economic groth[47,48]in the same direction, a significant and positive relationship between trade and economic growth both in the long and short run was observed. The significant relationship

between trade openness and economic growth solidify outward-oriented policies efficiency. Also, trade openness influences the host economy's economic growth in many ways. It enhances foreign reserves by increasing exports, creating access to a larger market and increasing productivity, all of which influence total economic growth[49]. A study was conducted using a Cross Sectional Augmented Autoregressive Lag (CS-ARDL) panel data approach to consider the relationship between trade, economic growth and growth volatility in 73 countries between 1960 and 2011. The findings reveals that in the long run, more trade improves economic growth while amplifying growth volatility[50,51].

The interaction that exists between trade opening and economic growth in Cote d'Ivoire between 1965-2014 was examined, using a multivariate framework that incorporates the role of capital stock and labor. The results showed that openness to trade promotes economic growth in the country[52]. Also, the positive growth effects of opening up the economy to trade also remains significant over the long-term, a positive and strong complementary interaction between trade openness and capital formation is promoting of economic growth in the country has also been documented using four estimators; pooled OLS, Fixed effects model, Random effects model and dynamic panel regression model to analyzed the impact of trade on economic growth in ECOWAS members countries between the period of 1990-2013. The dynamic panel data estimator was preferred to handle the problem of endogeneity, the results showed that exports, exchange rate and investment were significant determinants of real income growth per capita and exports were consistently positively correlated with growth. This shown that trade has a significant positive impact on economic growth in ECOWAS member countries[53].

The relationship between trade openness and economic growth in Mauritius for the period of 1963-2013 was examined. The results showed that open trade contributes to the country's

economic growth[54]. The situation in Ghana was also observed from 1984- 2018 including the role of institutional quality. Short-term, long-term and e Autoregressive Distributed Lag (ARDL) estimates show that trade openness and institutional quality have a significantly positive impact on economic growth while the interaction between the two variables has an insignificant impact[55]. Using the Cross Sectional Autoregressive Distributed Lag (CS-ARDL) panel data approach between 1960-2011 to study the relationship between trade, economic growth and growth volatility. Consider a sample of 73 developing and developed countries to account for the potential dynamic heterogeneity and cross-section dependency in trade impacts. International trade has been shown to boost economic growth and amplifies growth volatility over the long-term. The result also proves that is very heterogeneous depending on a country's level of development, financial system, macroeconomic policies, human capital, corruption and labor regulation[56,57].

Considering the impact of digital economy and international trade on the economic growth of Africa's country, POLS, random and fixed effects and sys-GMM models were adopted. Using merchandise trade as proxy for trade openness, the results showed that trade has a large positive impact on economic development in Africa[58].

The results of a study carried out by researchers reveals that trade openness has an indirect effect on economic growth through different channels. Using the GMM estimation approach to study the openness-growth connectivity in and un-balanced panel comprises of 169 countries from 1988 to 2014, the scholars adopting quality exports and variety exports as openness channels. From their findings, the GDP effect of trade openness shown a non-linear way. Furthermore, their findings also reveals that the positive impact of trade openness on economic growth is reliant on the quality and diversity of a nation's export basket[59].

The role of openness on economic growth in 82 countries was carried out between 1980 and 2014. The results reveals that the economic growth process is reliant on total factor productivity. Due to this, economies with higher total factor productivity may take the advantage to reap the benefits of trade openness than economies with lower total factor productivity[60]. The impact of trade on economic growth in ECOWAS countries was conducted FROM 1975 TO 2017. The findings showed that trade openness has good long run effects on the economic growth of the ECOWAS countries. However, the result is undefined in the short run[61]. Using panel data to examined the effect of economic openness on economic growth. Their findings reveals that trade openness has no direct impact on Gross Domestic Product (GDP) growth, but it is influenced by the extent of stock market development[62]. The short term result shows that foreign direct investment hurts economic growth[63].

In Nigeria, many scholars conducted studies on the relationship between trade liberalization and economic growth with difference submmition[64,65,].Most of the studies have concluded that trade liberalization has positive and significant impact on the economic growth. For instance, a recent study on the impact of trade liberalization in Nigeria. Using the Auto Regressive Distributed Lag (ARDL) method, the researchers found that oil export and non oil export have positive and significant impact while oil and non oil lag growth both in the short and long term[64]. Some scholars have adopted Ordinary Least Squares in estimate the impact of trade liberalization on economic growth in Nigeria between 1970 and 2012. To examine whether there is a long term relationship between the two and also to examine whether structural change may have occurred with the implementation of a free trade regime in 1986. Trade liberalization was understood as openness and was given as the ratio of total trade to GDP. Time series data from the World Development Indicator (WDI) and the Central Bank of Nigeria (CBN) Statistical bulletin and

annual reports were analyzed. The result shows that liberalization supports economic growth in Nigeria with evidence of a long term relationship. Strong evidence was found of a structural change that took place in 1986 with the introduction of free trade policies. However, it has been reported that export is negatively related to growth[65]. The study of scholars using the ratio of total trade to GDP for the period 1970-2011 concluded that trade openness has a significant positive impact of economic growth in Nigeria[66].

A study was conducted using the Autoregressive Distributed Lag (ARDL) bound test approach to investigate the dynamic effects of open trade on economic growth. According to the long term empirical results obtained, it was found out that trade openness has a positive and significant effect on economic growth when the ratio of total trade to GDP is used as a proxy only, but not when the three other proxies are employed. However, in the short term, when the first three proxies of openness are used, the study found trade openness to impact economic growth positively, but not so when the trade openness index is employed[67]. Researchers adopt real and nominal openness as indicators to conduct a study between 1977 and 2011 in 87 countries. Both developed and developing countries were considered. The finding reveals that there is a bidirectional causal relationship between openness and economic growth. These findings are in line with the endogenous theory that openness creates higher growth opportunities, also economic growth supports trade openness[68]. In the model developed on the impact of openness on economic growth in the BRICS countries (Brazil, India, China, South Africa and Russia), the results reveals that in these large countries, there is a unidirectional causal relationship from economic growth to openness. Also, openness along with the development of technologies and labor strength has a positive effect on economic growth[69].

A study was conducted by other scholars on the relationship between openness and value added in the manufacturing industries in Asian countries. The results reveal that the positive effectof openness on the manufacturing sector is due to curbing inflation, increasing exports, foreign direct investment, research and development costs[70]. The effects of openness on the performance of Deposit money was conducted between 1986 and 2015 in Nigeria. Macroeconomic variables namely foreign private investment policy, foreign trade policy and exchange rate policy was adopted by the scholars to represent openness and profits before taxes which were analyzed using regression pooled technique, it was indicated that foreign private investment and exchange rates had significant and positive effects on profits before taxes of deposit money banks in the country[71]. Similarly, the effect of foreign direct investment on the performance of banking industry was carried out in India. Adopting the multiple linear regression techniques, the findings reveal that foreign direct investment had an insignificant impact on the profitability of deposit money banks in the country[72].

Research carried out by some scholars, using various proxies: foreign banks used for financial liberalization, claims on private sector shares to GDP, and liquidity liabilities used as proxies for financial development. The study found that foreign banking has a negative impact on financial development. The study concluded that more banking openness decreased the economic growth of developing countries[73]. Also, scholars adopted a principal component analysis to create a composite financial liberalization index that used the ARDL technique , which allows a varying order of integration. The results of the study revealed that financial liberalization has a positive association with the growth rate of Pakistan in the long run, while financial liberalization in India has a positive and significant impact to growth in both the short and long run[74].

Using the Mattoo financial liberalization index in Vietnam. To assess the degree of financial sector liberalization. The study that constructed the Mattoo index was actually based on classifying the rules and regulations of banking and insurance directions, in order to investigate the level of financial liberalization in Vietnam. The outcome of the Mattoo index is likely higher than in Asia and the Pacific. The study concluded that banking has a higher liberalization and insurance has a lower liberalization, compared to the average global rate[75]. The important determinants of domestic financial policy variables was considered to construct an index of financial sector liberalization for Pakistan. It captured seven major financial dimensions by using co-integration and VECM mechanisms. The findings attested that the financial liberalization index has a positive impact on economic growth in the long run, while in the short run, the effect was found to be negative. Also, the empirical finding of the study revealed that financial intermediation and financial deepening are the most integral components for further reform implementation in order to encourage growth[76]. Some scholars considered the link between financial liberalization and stock market efficiency. Their findings indicated that financial sector liberalization has a positive and significant impact on stock market informational efficiency, with this, liberalization is contingent on institutional development; according to econometric findings, neo liberalism is one of the major goals of the liberalization context[77].China's financial liberalization index was measured by researchers, using a Principal Component Analysis (PCA) and seven financial policy indicators, the study grouped all of the financial indicators according to their respective outcomes. A comprehensive reflection of China's liberalization index can also expand the financial sector[78].

The Autoregressive Distributed Lag (ARDL) model was use to investigated the influence of Gross Fixed Capital Formation (GFCF) on economic growth. In the short and long term,

investment has a significant and positive relationship with economic performance, according to this study. The recommendation based on the findings is to encourage more activities and projects to keep the business cycle and economic prosperity moving[79]. In the same direction, other scholars found a similar outcome. Increasing economic growth, on the other side, may result from improving the financial system to boost investment[80]. Also, emphasized that GFCF can have a positive impact on economic growth by increasing investment[81].

The optimal debt/net worth ratio for four Asian economies was estimated. The results of the study revealed that reducing borrowing cost and increasing capital inflow resulted in financial liberalization, which encouraged excessive borrowing. The results confirmed Stein's theory that increasing excessive indebtedness indicates a financial crisis[82].A study was carried out on the relationship among trade openness, inflation and economic growth in nine countries in the West African region. The results revealed that trade openness and inflation significantly reduced the economic growth[83].Scholars submitted that foreign direct investment has a significant source of external capital in developing countries most especially in Sub-Saharan African countries[84]. The impact of infrastructure and foreign direct investment on economic growth in Sub-Saharan African countries was conducted by scholars, their results shown that foreign direct investment has a favourable effect on economic growth when interacting with the host country's infrastructure[85]. Research conducted in Ethiopia using the VAR model revealed that foreign direct investment has a beneficial and considerable effect on economic growth both in the short and long term in the country[86]. Also, another scholar carried out research on a specific country in Vietnam for the period 1997-2018. The results reveals that foreign direct investment has a positive and significant effect on economic growth[87].Using cross country observations from 91 countries for the period 1975-2005.The results of study conducted by scholars shown that foreign

direct investment has a positive and significant effect on economic growth[88].The impact of trade openness on economic growth of China was investigated. The finding revealed that trade openness has a positive and significant relationship with economic growth in China[89]. Using the vector error correction model (VECM) to conduct a study on the relationship between trade openness and economic growth, the results showed a positive relationship[90].

Investigated the relationship between trade openness and economic growth of china, using Auto Regressive Distributed Lag (ARDL) model for the period of 1960-2015. Their result showed a positive correlation between trade openness and economic growth in the long-run[91]. Investigating the relationship among foreign direct investment, trade opening and economic growth in Ghana from 1975 to 2017. Using the Augmented Dickey Fuller (ADF) unit root test, regression analysis, descriptive analysis and pearson correlation, the study reveals that trade opening is the principal factor affecting Ghana's economic growth annually[92].Integrated Foreign Direct Investment (FDI) and the Employment Rate (EMP) as additional variable to build a multivariate framework to analyze the impact of trade opening on economic growth in Switzerland. Using annual data from 1990-2014, the results of researchers' Auto Regressive Distributed Lag (ARDL) model demostrated the existence of a long term relationship between the variables[93].

However, view studies stated that trade openness impedes economic growth. assessing the impact of trade liberalization on the Nigeria economy. Assumption of trade openness, dummy variable for type of administration regime, exchange rate and dummy variable for structural adjustment program (SAP) Periods. Using the Ordinary Least Square (OLS) method, researchers find a negative relationship between trade openness and economic growth in Nigeria[67]. The extent to which trade openness influences the economic growth of Ghana and Nigeria were observed. Considering data from 1980-2016, their results showed that trade openness has a

positive and significant impact on the economic growth of Ghana, but a negative impact of trade openness on the economic growth of Nigeria[94]. Conducted a study on the impacts of international trade in Nigeria's economic growth between 1985-2015. Using interest rate, the balance of trade, export and trade openness as the analysis controlled variables, adopting test of unit root, test of Johansen co-integration and vector error correction models as analysis techniques. The result showed that in the long run, there is an insignificant relationship between the imports and the opening up of the economy; while there was a one-way relationship between economic growth and trade openness[95].

A simultaneous equation model was performed to study the impact of trade liberalization on agricultural and manufacturing sectors in Nigeria. Adoption of a generalized method of moment technique. Their study found that trade openness exerts a positive and significant impact on agricultural and export production, while there is a significantly negative relationship between trade openness and manufacturing performance in Nigeria. The study further showed that the exchange rate has a positive but not significant impact on agricultural output while the exchange rate and inflation have negative and significant impacts on manufacturing[96].

Investigating the determinants of Ghana's real exchange rate and its overall economy performance between 1998 and 2016.The finding revealed that trade opening and GDP are the main factors affecting the Ghana's exchange rate[97]. Similarly, investigating the relationship among foreign direct investment, trade opening and economic growth of selected four West African countries (Cote d'Ivore, Ghana, Nigeria and Senegal) from 1998 to 2017.Employing the static panel regression techniques to assess the causal link of the regressors namely; Foreign Direct Investment (FDI), trade opening, investment and inflation and the economic growth

measured by GDP. The results revealed that aggregate trade opening have a significant and positive impact on economic growth in Coted'ivore, Ghana, Nigeria and Senegal[98].

2.4 Methodological Review

Quantitative research technique based on ex-post facto research design was adopted for the study. It involves the use of available data on research variables to explain the extent to which they relate to the event. Data on exchange rate, interest rate, inflation rate, foreign direct investment and trade openness (sourced from the publications of the Central Bank of Nigeria) were used to explain the growth of the Nigerian economy over the period 1985-2019.

The study used the ordinary least squares (OLS) econometric method to determine the impact of economic opening and sectoral growth in Nigeria. The study look at trade and finance as two main areas of economic openness. The components of financial liberalization used in the study are the exchange rate, the interest rate and foreign direct investment (broadly expressed as the ratio of the private sector to GDP). Trade openness was adopted as proxy for trade liberalization while inflation was introduced as a control variable. The static vector auto-regression model (VEC) was used to determine the short term dynamics of the model while the OLS was used for long term estimation.

2.5 Summary of Literature Reviewed

Due to diversity in the findings and methodologies adopted by various scholars who researched on the work. Most of the researchers emphasized on trade openness than financial aspect. Also, majority of the studies review more on the developed countries than the developing countries which Nigeria is inclusive. Although, few of the studies considered the two aspect of economic

openness. Therefore, this study has attempted to look into the sectors vis-à-vis, in order to come up with more clear and plausible results for the considerable variables.

2.6 Theoretical Framework

The endogenous growth theory holds that investment in human capital, innovation, and knowledge are significant contributors to economic growth[99]. The theory also focuses on positive externalities and spillover effects of a knowledge-based economy which will lead to economic development. The endogenous growth theory primarily holds that the long run growth rate of an economy depends on policy measures. For instance, subsidies for research and development (R&D) or education increase the growth rate in some endogenous growth models by increasing the incentive for innovation.

Traditionally, the Cobb-Douglas production function is given as follows:

$$Y = K^{\beta}(\mathrm{AL})^{\alpha} \quad \text{3.1}$$

Where Y represents the total output produced in an economy, A represents factors affecting a country's level of technology, K represents a country's total available capital stock (both physical and human) L represents the total productive labor force in the economy, β represents the elasticity of capital with respect to national output, α represents the elasticity of labor with respect to national output.

Scholars explained that the elasticities measure the responsiveness of the dependent variable to a change in the levels of the independent variables used in the production process[100,101]. Furthermore, they asserted that another feature of the Cobb- Douglas function is the concept of returns to scale; constant, increasing and decreasing returns to scale[101]. Constant returns to scale means that the proportional change in inputs and outputs is equal represented as

$\beta + \alpha = 1$

The constant return-to-scale function is presented in the following formulation.

$\beta + \alpha = 1$ 3.2

$l_n\, y_t = \beta l_n\, k_t + \alpha\, l_n\, (AL_t)$ 3.3

$= \beta l_n k_t + \alpha l_n A + \alpha\, l_n\, L_t$ 3.4

Let $\emptyset = \alpha l_n A$

$l_n y_t = \emptyset\, \beta l_n\, k_t + \alpha\, l_n\, L_t$ 3.5

Comparing two periods t and t – 1

Where $y_{t-1} = \emptyset_0 + \beta_0 l_n\, k_{t-1} + \alpha_0\, l_n\, L_{t-1}$ 3.6

Therefore subtracting equation 3.3from equation 3.2

$l_n\, y_t - l_n\, y_{t-1} = (\emptyset - \emptyset_0) + (\beta l_n\, k_t + \beta_0 l_n\, k_{t-1}) + (\alpha l_n\, L_t - \alpha_0\, l_n\, L_{t-1})$ 3.7

$g_y = 3_0 + 3_1 g_k + 3_2 g_L$ 3.8

.

End Notes

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Chapter Three

Methodology

This chapter provides the general analytical framework adopted in collection and processing of data, method of analyzing and interpreting the data collected. It further explains the model specification, definitions and measurement of variables, sources of data and techniques of estimation.

3.1 Model Specification

To achieve the objectives of the study, equation (3.8) will be focused on. However, the growth in the output of the different sectors of the economy is not determined by the growth in capital and labour alone.

Thus, prior authors hence suggested that others variables likely to affect these growth include; financial depth, economic openness, government effectiveness and so on. Therefore, the econometric form of equation 3.8 become

$$g_{yt} = 3_0 + 3_1 g_{kt} + 3_2 g_{Lt} + 3_3 F_{dt} + 3_4 EO_t + 3_5 GE_t + 3_6 INF_t + + 3_7 EXR_t + 3_8 INT_t + \mu_t$$

where;

g_{yt} = Sectoral output growth per capita

g_{kt} = growth in capita

gl_t = growth in labour

FD_t = Financial depth

EO_t = Economic openness

GE_t = Government effectiveness

INF_t = Inflation rate

EXR_t = Exchange rate

INT_t = Interest rate

β = Coefficient of capital per capita

α_1-α_6 = Coefficient of FD, EO, GE, INF, EXR and INT respectively

μ = Stochatic error term

Apriori Expectation

The apriori expectation for the parameters for the variables are summarized below

Table 3.1: Aprori Expectation

Parameters	α_1	α_2	α_3	α_4	α_5	α_6	α_3
Expectation	+	+/-	+	+/-	+/-	-	-

Operationalization of Variables

3.2 Description, Measurement of Variables and Sources of Data

Variables	**Description**	**Measurement**	**Source**
Capital	This is the amount of physical investment as well as infrastructure deployed for production process	This is measure using Gross Fixed Capital Formation	World Bank Development Indicator

	in the economy.		
Economic Openness	This has to do with how open an economy is to trade and finance to the rest of the world.	The ratio of imports plus exports over the GDP.	World Bank Development Indicator
Exchange Rate	This is the price at which a given unit of the domestic currency is exchange for one unit of a foreign currency.	Rate at which one currency will be exchanged for another.	World Bank Development Indicator
Expenditure	This is the payment of cash or credit for goods or services, often by a business, organization or corporation.	C+I+G+(X-M)	World Bank Development Indicator
Financial Depth	This is the size of banks, other financial institutions and financial market in a country. **Money Supply:** The total volume of currency held by the public at a particular point in time.	This will be measured using $\frac{M2}{GDP}$	World Bank Development Indicator
Financial Openness	This is the extent to which an economy is		World Bank Development Indicator7

	open to finance from foreign countries. This will be proxy using foreign direct investment openness and foreign portfolio investment openness. **Foreign Direct Investment:** An investment from a party in one country into a business or corporation in another country with the intention of establishing a lasting interest. **Foreign Portfolio Investment:** It consist of securities and other financial assets held by investors in another country	$\frac{FDI}{GDP}$ $\frac{FDI}{GDP}$	
Government Effectiveness	This is the efficiency with which government undertake its	$\frac{\text{Government expenditure}}{\text{Government revenue}}$	Central Bank of Nigeria Statistical Bulletin

	activities.		
Growth of Sectoral Output	The year on year increase in the output of the sector of the economy.	Output=$\left(\frac{output_t output_{t-1}}{output_{t-1}}\right)\ x\ 100$	Central Bank of Nigeria Statistical Bulletin
Inflation Rate	The persistence rise in the general price level of goods and services in a country over a long period of time.	It is measured as the percentage change in the price index.	World Bank Development Indicator
Interest Rate	The percentage of principal charged by the lender for the use of its money	It is measured by multiplying the principal(money) by the period involved.	World Bank Development Indicator
Labour	Exertion of mind or body undergone partly or wholly with a view to earning some good other than the pleasure derived directly from the work.	Value of goods and services/Total number of hour worked.	World Bank Development Indicator
Revenue	This is refers to as the earning that an enterprise has from its normal business pursuits, usually from the sales of commodities and services to	Number of units sold multiplied by the selling price.	Central Bank of Nigeria Statistical Bulletin

	consumers.		
Trade Openness	The extent to which any economy is open to trade from other countries. The sum of inputs and exports normalized by GDP.	$\frac{\text{Trade}}{\text{nGDP}} = \frac{Import + Export}{nGDP}$	World Bank Development Indicator

3.3 Pre Estimation Test

3.3.1 Unit Root Test

It is often assumed that time series data is non-stationary and therefore, it is necessary to perform unit root test ensure that the data is stationary. The test would be used to avoid the false regression problem. In conducting the test, the augmented Dickey-fuller (ADF) unit root test would be used to determine the stationarity of data.

The decision rule is that Augmented Dickey-Fuller (ADF) text statistic must be greater than Mackinnon critical value at 5% and to the absolute concept i.e, ignoring the negativity of both the ADF text statistics and critical Mackinnon value before the variable can be adjudged stationary, otherwise we accept the null hypothesis (H_2) i.e. the data are non-stationary, reject the alternative hypothesis (H_1) i.e. the data are stationary.

3.3.2 Co-integration Test

The concept of co-integration is relevant to the problem of determination of long-run equilibrium relationship, co-integration is the statistical implication of the existence of long-run equilibrium relationship between variables.

The condition for a long-run co-integration vector is that the trace statistics must be greater than 5% at critical value. The result of the Johnson co-integration shows the existence of long-run relationship among the variables. The co-integrating equation is chosen based on logarithmic ratio, if the logarithmic ratio has positive sign, we choose the equation with the lowest logarithmic ratio an if it has a negative signs, we chose the highest logarithmic ratio of absolute term.

3.4 Estimation Techniques

Subject to the outcome of the unit root test and the co-integration test, the appropriate econometric analytical tools will be employed to achieve the set objectives.

3.4.1 Causal Relationship between Economic Openness and Growth of Sectoral Output in Nigeria

In order to establish the causal relationship between economic openness and growth of sectoral output for objective one. Toda and Yamamoto (1995) causality test was used. This utilizes a modified Wald test for restrictions on the parameters of a VAR (k) model (where k is the lag length in the system). The model proved that this test has an asymptotic X^2 distribution when a VAR (k + d max) model is estimate (where d max is the maximized order of integration suspected to occur in the system). The advantage of this procedure is that it does not require knowledge of integration properties of the system. This test can be done even when there is no co integration and/or stability and rank condition are not satisfied[3].

$$SEG_t = \beta_0 + \sum_{j=1}^{k+d_{max}} \beta_1 SEG_{t-j} + \sum_{j=1}^{k+d_{max}} \beta_2 EO_{t-j} + \sum_{j=1}^{k+d_{max}} \beta_3 K_{t-j} + \sum_{j=1}^{k+d_{max}} \beta_4 FDG_{t-j} + \sum_{j=1}^{k+d_{max}} \beta_5 GE_{t-j} + \sum_{j=1}^{k+d_{max}} \beta_6 INF_{t-j} + \sum_{j=1}^{k+d_{max}} \beta_7 EXR_{t-j} + \sum_{j=1}^{k+d_{max}} \beta_8 INT_{t-j} + \varepsilon_{1t} \quad 3.9$$

$$EO_t = \alpha_0 + \sum_{j=1}^{k+d_{max}} \alpha_1 EO_{t-j} + \sum_{j=1}^{k+d_{max}} \alpha_2 SEG_{t-j} + \sum_{j=1}^{k+d_{max}} \alpha_3 K_{t-j} + \sum_{j=1}^{k+d_{max}} \alpha_4 FDG_{t-j} + \sum_{j=1}^{k+d_{max}} \alpha_5 GE_{t-j} + \sum_{j=1}^{k+d_{max}} \alpha_6 INF_{t-j} + \sum_{j=1}^{k+d_{max}} \alpha_7 EXR_{t-j} + \sum_{j=1}^{k+d_{max}} \alpha_8 INT_{t-j} + \varepsilon_{2t} \quad 3.10$$

where the error terms, c_{2+} and E_{1+} the different equations and within equations are uncorrelated, dmax is the maximum order of integration. The log length in above equations can be determined by using Akaike information criterion (AIC) and Schwarz Bayesian Criterion (SBC). In the first equation in equation (3.10) sectoral output (S0) ganger causes Economic Openness (EO) if B_{3j} for j= 1….k are not jointly equal to zero . Also (EO) granger causes (SO) if d_3, for j = 1, …. K is not jointly equal to zero. The tests on coefficients are derived by a standard wald test.

3.4.2 Effects of Economic Openness on Growth of Sectoral Output in Nigeria

In order to empirically examine the effect of economic openness on sectoral output growth, the long-run relationship between the variables of Economic Openness and sectoral output growth is analyzed. This model estimated using the bounds testing method (or the Autoregressive Distributed Lag (ARDL) co-integration method, using E view's 2022 economic software.

The procedure is adopted for the following three reasons; First, the bounds test procedure is simple unlike other multivariate co-integration techniques such as, Johnson and Juselves, bounds allows OLS to estimate the co-integration relationship once the Lag order of the model is

identified unlike others. Also, techniques pre-test the variables included in the model for roots of unity. It is valid whether the regressors in the model are purely 1(0), purely 1(1), or mutually co-integrated. Finally, the test is comparatively more efficient with small or finite sample data sizes. However, procedure crashes in the presence of 1(2) series.

The ARDL procedure involves two stages. Firstly, the existence of the long run relation between the variables under study is tested by using the F-statistic to test the significance of the reported levels of the variables in the error correction form of the underlying ARDL model is calculated. Second, the analysis consists in estimating the co-efficient of long term relationship and drawing conclusions about their values.

The first step assumes that the (asymptotic) distribution of this F-statistic is non standard irrespectively of whether the regressors are 1(0) or 1(1). Pesaran, et al (2001) tabulated the appropriate critical values for different numbers of regressors (k) and determined whether the ARDL model contains an intercept and/or trend. To obtain the vital F-statistics, the ARDL model based on the optimal lag length of equation (3.8) is estimated by the OLS methods the related variable addition test is subsequently conducted to obtain the related F-statistics from the results[4]. Thus, the hypothesis that will be tested relates to the null of the non-existence of a long-run relationship defined below:

$H_o : \beta_1 = \beta_2 = \beta_3 = \beta_4 = 0$

There is no long run relationship existence

$H_o : \beta_1 \neq \beta_2 \neq \beta_3 \neq \beta = 0$

There is a long-run relationship on existence

The existence of a long run relationship gives room to proceed with the analysis. One can only proceed to the next stage only if there is a satisfactory long-run relationship existing between the variables to be estimated. In that, it is not spurious. The error correlation model associated with the long run estimated may be estimated to determine the stability of the long run relationship.

If there is evidence in support of a long run relationship or co-integration among the variables included in equation (3.8), the following long run model will be estimated

$$SEG_t = \alpha_0 + \alpha_1 K_{t-1} + \alpha_1 L_{t-1} + \alpha_2 FDG_{t-1} + \alpha_3 EO_{t-1} + \alpha_4 GE_{t-1} + \alpha_5 INF_{t-1} + \alpha_6 EXR_{t-1} + \alpha_7 INT_{t-1} + \mu_{t-1} \quad 3.11$$

Thus the ARDL specification of the correlation representation of the form:

$$\Delta SEG_t = \alpha_0 + \sum_{t=1}^{p} \alpha_1 \Delta SEG_{t-1} + \sum_{t=1}^{p} \alpha_2 \Delta EO_{t-1} + + \sum_{t=1}^{p} \alpha_3 \Delta FDG_{t-1} + \sum_{t=1}^{p} \alpha_4 \Delta GE_{t-1} + + \sum_{t=1}^{p} \alpha_5 \Delta INF_{t-1} + \sum_{t=1}^{p} \alpha_6 \Delta EXR_{t-1} + \sum_{t=1}^{p} \alpha_7 \Delta INT_{t-1} + \alpha_8 ecm_{t-1} + \mu_{t-1} \quad 3.12$$

The symbol Δ is the different operator and the error correlation term ecm_{t-1} in this case is defined as:

$$ecm_t = SEG_t - (\alpha_0 + \alpha_1 EO_{t-1} + \alpha_2 FDG_{t-1} + \alpha_3 GE_{t-1} + \alpha_4 INF_{t-1} + \alpha_5 EXR_{t-1} + \alpha_6 INT_{t-1}) \quad 3.13$$

all coefficient of the short-run equation are coefficient relating to the short run dynamics indicating the model's convergence to equilibrium following on shock to the system and the symbol (s) is the speed of adjustment parameter measuring how fast error's generated in one period are correlated in the following period.

3.4.3 Response of Growth in Sectoral Output to Shocks on Economic Openness in Nigeria

In order to carry out the response of growth in sectoral output to shocks on economic openness, the impulse Responses Functions (IRF) and forecast Error Variance Decomposition (FEVD) will be used to assess the shocks.

The IRF is used to shows the effects of stocks on the adjustment path of variables in the VAR model. Graphically, IRF can also be presented by showing the effect of shocks on the current and future path of the variables under consideration. Therefore, IRF show how variables react to different shocks in the model.

$$SEG_t = \alpha_0 + \sum_{i=1}^{k} \alpha_{1i} SEG_{t-1} + \sum_{i=1}^{k} \alpha_{2i} K_{t-1} + \sum_{i=1}^{k} \alpha_{2i} L_{t-1} + \sum_{i=1}^{k} \alpha_{3i} FDG_{t-1} + \sum_{i=1}^{k} \alpha_{4i} EO_{t-1}$$

$$+ \sum_{i=1}^{k} \alpha_{5i} GE_{t-1} + \sum_{i=1}^{k} \alpha_{6i} INF_{t-1} + \sum_{i=1}^{k} \alpha_{7i} EXR_{t-1} + + \sum_{i=1}^{k} \alpha_{8i} INT_{t-1} + \mu_{t-1} \quad 3.14$$

$$EO_t = \alpha_0 + \sum_{i=1}^{k} \alpha_{1i} SEG_{t-1} + \sum_{i=1}^{k} \alpha_{2i} EO_{t-1} + \sum_{i=1}^{k} \alpha_{3i} K_{t-1} + \sum_{i=1}^{k} \alpha_{3i} L_{t-1} + \sum_{i=1}^{k} \alpha_{4i} FDG_{t-1}$$

$$+ \sum_{i=1}^{k} \alpha_{5i} GE_{t-1} + \sum_{i=1}^{k} \alpha_{6i} INF_{t-1} + \sum_{i=1}^{k} \alpha_{7i} EXR_{t-1} + \sum_{i=1}^{k} \alpha_{8i} INT_{t-1} + \mu_{2t} \quad 3.15$$

While the variance decomposition (VD) measure the contribution of each type shocks to the forecast error variance. It reveals how much of a change in a variance is due to its own shock and how much due to shocks to other variables. In the SR, most of the variation is due to own shock. But as the lagged variables, the effect starts manifesting as the percentage of the effect of other shocks increase over time.

Endnotes

1. M. Todaro & P.Smith . *Economic Development*: 11th Ed. 2009.

2. G. Mankiw. *Macroeconomics, European Edition*. Worth Publishers: New York. 2006.

3. H. Toda & T. Yamamoto. "Statistical inference in vector autoregressions with possibly integrated processes**", Journal of econometrics**. 66(1-2), (1995), 225-250

4. M.H. Pesaran; Y. Shin & R.J. Smith. Bounds testing approaches to the analysis of level relationships. **JAppIEconomet** 16(1): 2001, 289-326

Chapter Four

Result and Discussion of Findings

This chapter discusses the presentation of data and analysis of results using respective technique in estimating the objectives of the study. The chapter begins with the analysis of the descriptive statistics of variables and the unit root test for the various time series investigated in this study. This is followed by the co-integration test results using the bounds testing approach. The long and short run ARDL results, estimation tests and diagnostic tests were also performed. The empirical result and discussion were also presented.

4.1 Preliminary Analysis

The various variables employed for this study were described in this section using descriptive graphs on a yearly basis ranging from 1985 to 2019. The trends in various variables were described. The section also presents descriptive statistics namely: mean, maximum, minimum etc. Also, correlation statistic was presented to underscore the bi-relationship between the variables. The graphs from figure 4.1 to 4.11 show the relationship among variables.

From the graphs below, figure 4.1 shows the trend of Agricultural output per capita growth (AOPCG) which rose in the period 1986 through and declined in period 1998. The sector continuing rising in an unstable manner till 1995 before it felt in the period 2000. Agricultural sector rose to the peaked in the period 2002 which might be as a result of the Federal and state government introduction of National Economic Empowerment and Development Strategy (NEEDS) and States' Economic Empowerment and Development Strategy (SEEDS) in 2002. The sector dropped in 2003 due to factors such as policies instability and discontinuity, persistence uses of crude method of farming, poor state of infrastructure and other factors affected the agricultural sector which may have led to its stagnation from 2007 till date.

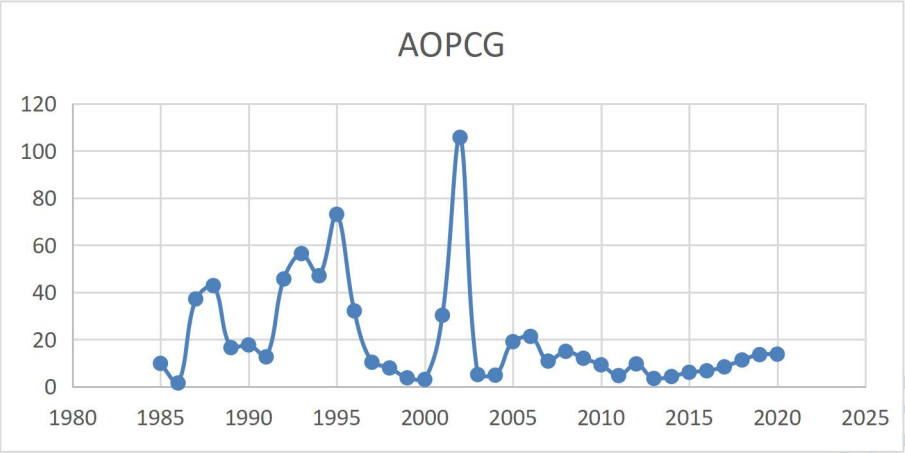


Fig 4.1: Agricultural output per capita Growth

Source: Author's computation from E views 2022

Figure 4.2, depict the trend of Industrial output per capita growth (IOPCG) which plummeted between the period 1985 and 1986. The sector peaked with the introduction of the World Bank (WB) and International Monetary Fund (IMF) economic Structural Adjustment Programme (SAP). The sector continued to increase and recorded its highest in the period 1995. It fluctuates and slumped for years before it sluggishly picked in 1999 when democracy was returned to the country. The sector continue to fluctuate and dropped again in 2017. It sustained the downward movement till date as a result of government diversion of attention from industrial sector to the oil sector and high rate of interest rate for investors.

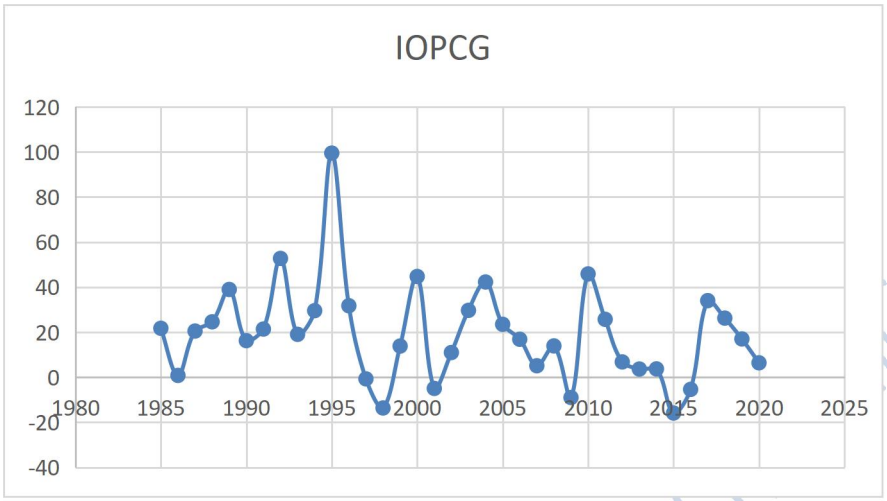


Fig 4.2: Industrial output per capita Growth

Source: Author's computation from E views 2022

The picture in Figure 4.3 indicate that the financial output per capita growth (FOPCG) was very low in 1985. This was traced to systematic problem and other financial crisis. The sector begins to improve from 1986 when the financial system was reformed in line with the Structural Adjustment Programme (SAP) policy which shifted the system from direct control to a market base financial system. The sector experienced a fall in period 1990 and 1994 due to instability of policy. The bank consolidation and insurance policies by the stakeholder in 2005 and 2007 respectively enable the sector to rise and reached its peak in period 2005. Though, the financial sector later witness a fall in the subsequent year.

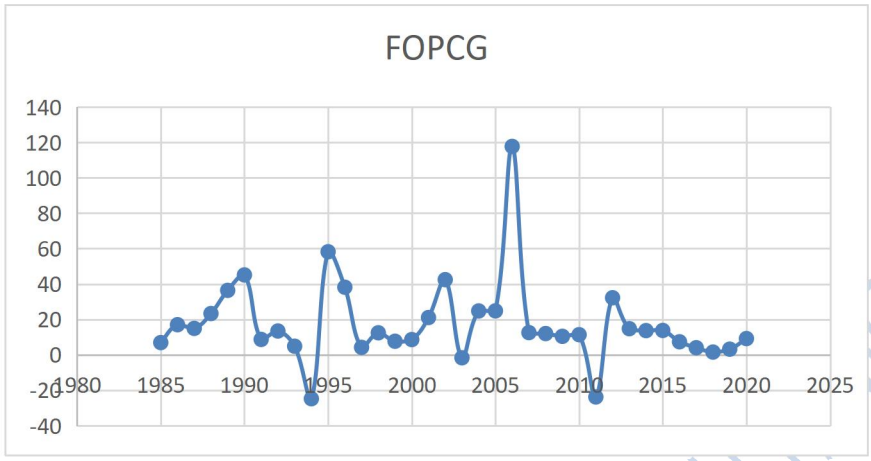


Fig 4.3: Financial output per capita Growth

Source: Author's computation from E views 2022

Consedering the service output per capita growth (SOPCG) presented in figure 4.4, the sector rose from 1986 through the period 1991 before it felt in the later period 1997. It rose again from 2002 through 2005 when the country recorded a rapid increase in the number of mobile telephone subscribers as a result of issuance of cellular telephone licenses in 2002 by the government, resurgent growth in banking sector by the Central Bank of Nigeria consolidation reforms and the introduction of urban transportation services by various tiers of government and other stakeholder. The output in the sector felt and continued fluctuating from 2008 and the fluctuation was sustained till 2019.

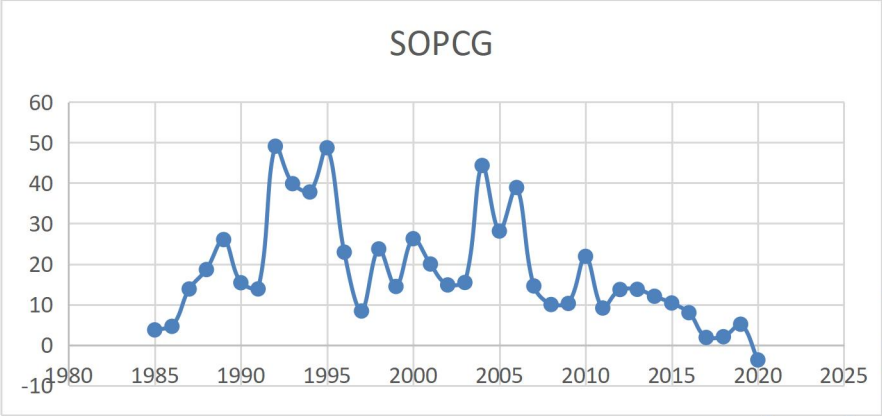


Fig 4.4: Service output per capita Growth

Source: Author's computation from E views 2022

Figure 4.5 depict the Gross Domestic Product per capita growth (GDPPCG).Fro the picture, It increase from 1986 to 1989. The GDPPCG declined in 1990 and rise again in 1992. It reached its peak in the period 1995. The GDPPCG dropped in 1997 and shows a fluctuations in movement. It declined further from 2011 moving the country economy close to recession in period 2016 which coincided with the period of the dropped in global oil price.

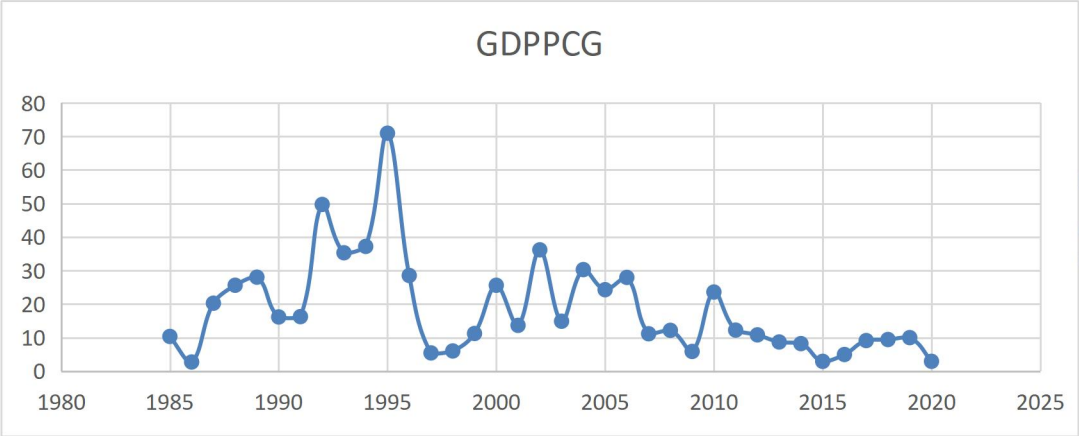


Fig 4.5: Gross Domestic product output per capita Growth

Source: Author's computation from E views 2022

Figure 4.6 reveals that the Nigerian economy has been relatively more open in the mid 80's due to policy measures applied during the period of structural adjustment programme (SAP). As shows in figure 4.6, the measure of economic openness increase from 1986 through 1987 up to 1990. Though, fluctuation was observed. Nevertheless, improvement was recorded probably as a result of deregulation policy and the removal of several trade restrictions.

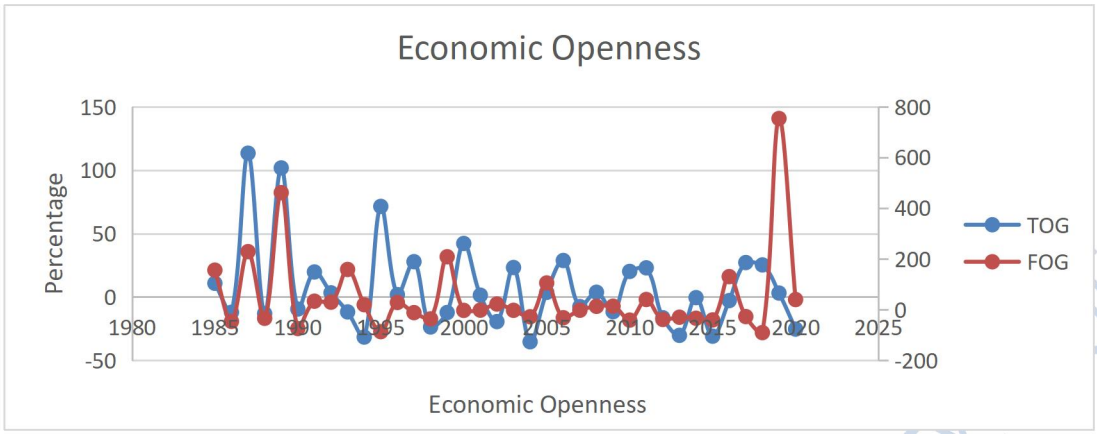


Fig 4.6: Economic Openness

Source: Author's computation from E views 2022

As captured from the picture in figure 4.7, the growth rate of inflation was very low at the beginning of the year under consideration. But started increasing from the period 1986. Though the inflation rate exhibit a cyclical trend under these periods. The least inflation rate was recorded in 2007 as a result of global economic meltdown, while the highest inflation rate was recorded in the period 1995.

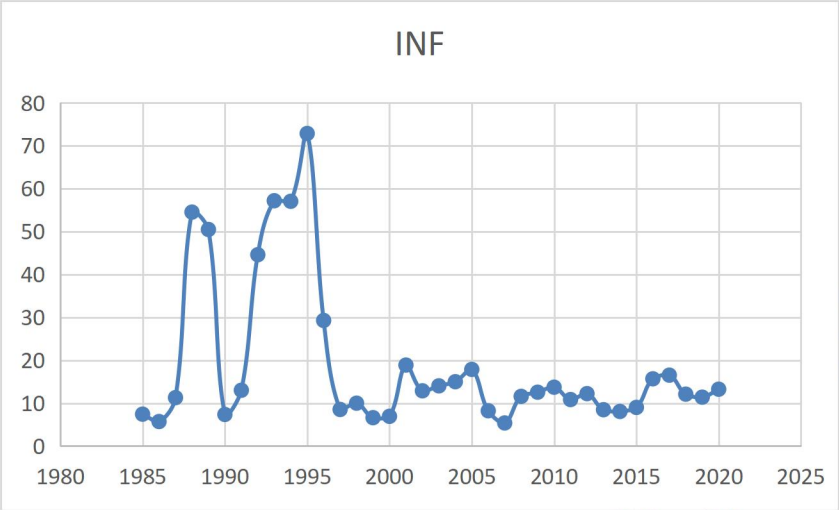


Fig 4.7: Inflation Rate

Source: Author's computation from E views 2022

The picture in figure 4.8 shows that interest rate (INT) was unstable throughout the period under review. It dropped from 1986 till 1989 before it rose in 1990 and decrease again in the early period of 1991. The interest rate reached its peaked in the year 2010as a result of efforts by the Central Bank of Nigeria (CBN) in reducing the rising inflation rate in the country.

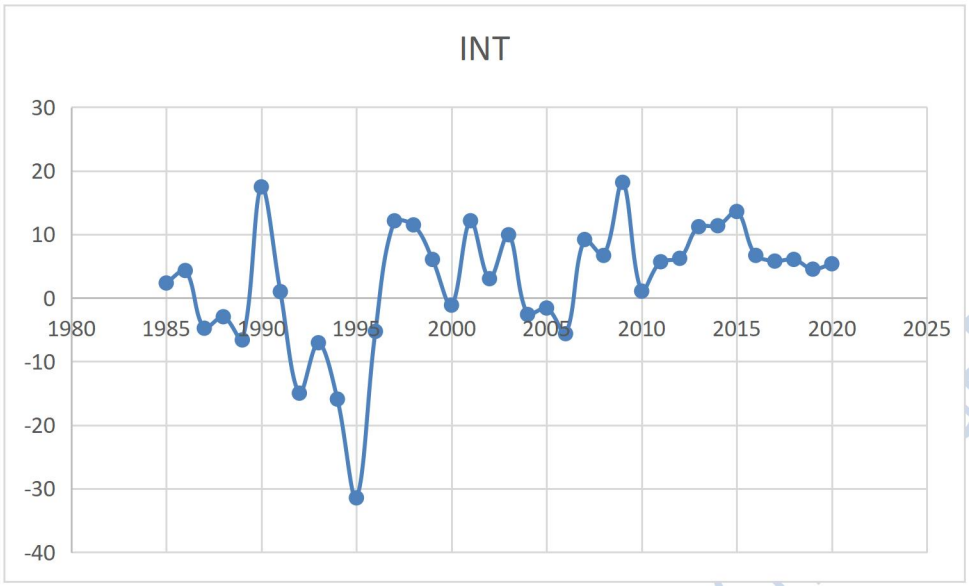


Fig 4.8: Interest Rate

Source: Author's computation from E views 2022

The trend of Nigeria's currency exchange rate against the US dollar from figure 4.9 indicates that there was relative stability in the dynamics of the exchange rate from 1985 to 1990. The exchange rate depreciated and maintain annual average rate between the period 1991 to 1995. This stability was consequent upon the introduction of the Dutch Auction System in order to curb excessive demand during these periods. Also, as revealed from the chart, at the dawn of democratic rule in Nigeria, there was a sporadic rise in the level of depreciation of the exchange rate between 1998 and 1999. This further depreciated from 1999 to 2004. It can also be observed that the exchange rate appreciated between 2005 and 2008. It depreciated in 2009 and maintain a stability trend to the period 2014. The country's exchange rate continue depreciating since 2015 during the period of global financial crises till present moment. And this could be traced to oil price volatility, public debt, political instability, inflation among others.

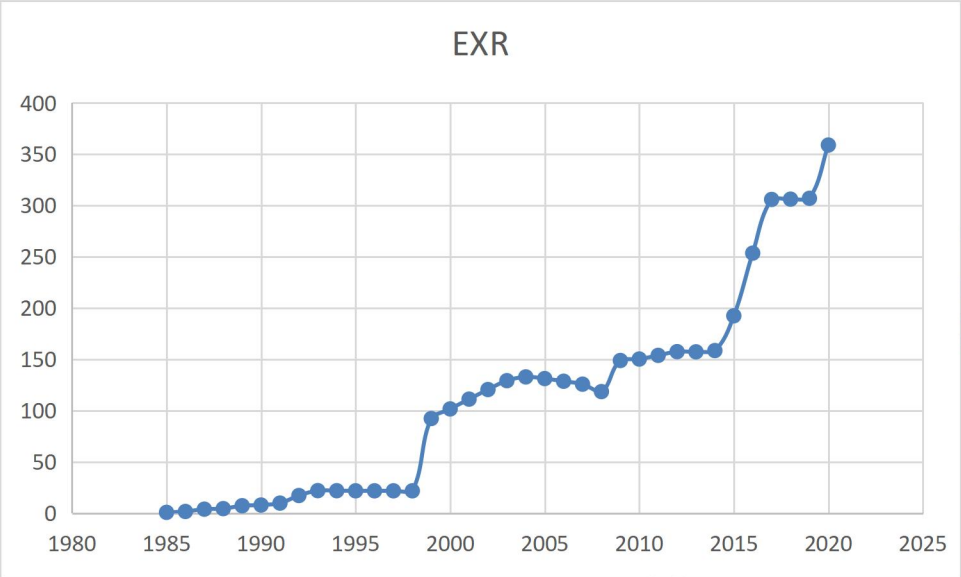


Fig 4.9: Exchange Rate

Source: Author's computation from E views 2022

The Government Policy (GP) in figure 4.10 experienced increase in 1986 as a result of government polices and other intervention. The GP decline and fluctuated in 1987 up till 1992 before it recorded its highest in 1993. The GP witnessed a substantial reduction in 2000 before the fluctuation continued in 2001. These has been attributed to inability of government to respond to public crisis, state of insecurity in Nigeria and inadequate infrastructural facilities such as water, electricity, good public schools and healthcare centre.

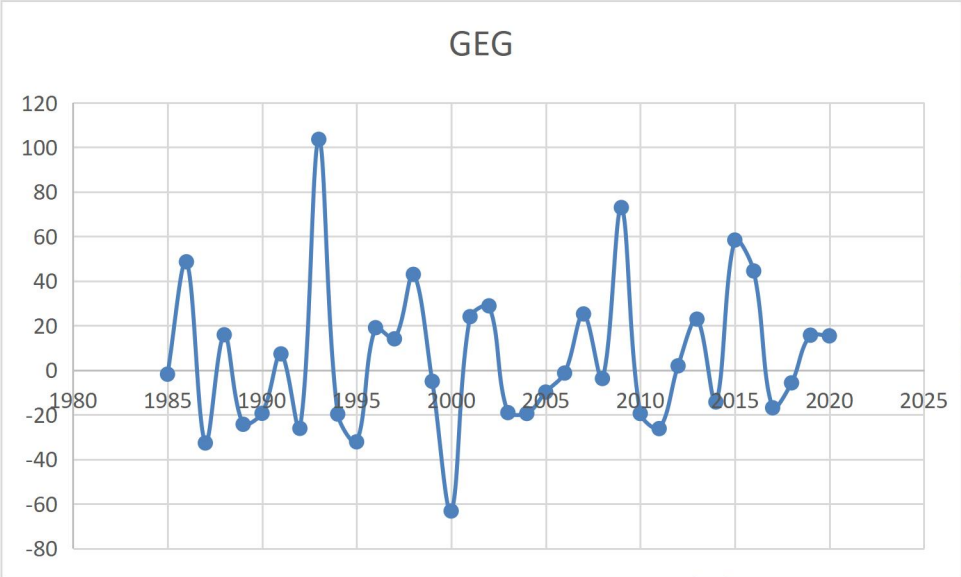


Fig 4.10: Government Effectiveness Growth

Source: Author's computation from E views 2022

From figure 4.11, the financial depth in Nigeria was very low in the early stage of the period under consideration. The financial depth has been on the increase over the year. The highest value for the sector was attained in the year 2007 as a result of financial liberalization policy introduced in the country. The sector drastically declined in 2010 and fluctuations in movement over the years this could be attributed to factors such as under developed financial markets, policy inconsistencies and inadequate financial instruments[1,2].

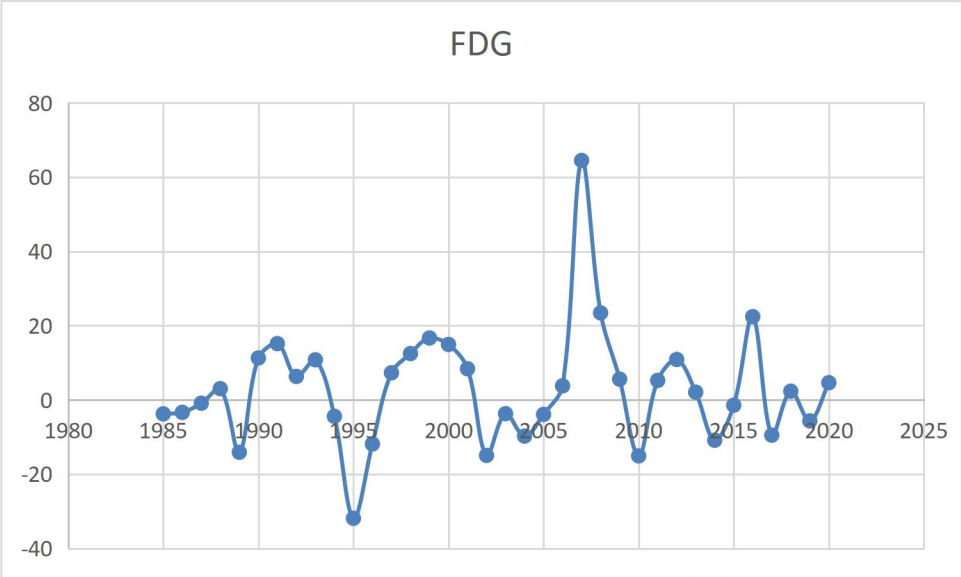


Fig 4.11: Financial Depth Growth

Source: Author's computation from E views 2022

4.1.1 Descriptive Statistics

As depicted in table 4.1, the mean, maximum and minimum value of CPCG are approximately -1.23, 29.48 and -22.88 while it has a spread of 12.70. For EXR they are 111.88, 358.81, 0.89 and 100.17. The value for FDG are 2.96, 64.47, - 31.87 and 15.71.

The mean for FOG is 49.41, maximum is 753.80, minimum is -90.56 while the spread of the data is 161.18. For GE, the mean is 5.61, maximum of 103.59, minimum of -63.16and the spread of data is 33.40.

The mean for INF is 19.18, maximum is 72.84, minimum is 5.39and the spread of data is 17.69. The result shown that INT has a mean of 2.54, maximum is 18.18, minimum is -31.45 and the spread of data is 9.95. The TOG has a mean of 7.14, maximum of 113.39 minimum of -35.35and the spread of data is 33.87.

The mean, maximum, minimum and standard deviation for AOPCG are 20.40, 105.70, 1.60 and 22.36 respectively. 10PCG are 19.38, 99.47, -51.87 and 21.88. For FOPCG, mean of 17.40, 117.69, -24.81 and 23.81.

As for SOPCG and GDPPCG, there mean maximum, minimum and standard deviation results are 18.27, 49.08, -3.69, 13.48 and 18.61, 70.96, 2.77, 14.59 respectively

The analysis of the test showed that all the variables are positively skewed except the interest rate (INT) which is negatively skewed.

Table 4.1: Descriptive Statistics

	CPCG	EXR	FDG	FOG	GE	INF	INT	TOG	IOPCG	SOPCG	GDPPCG	FOPCG	AOPCG
Mean	-1.23	111.88	2.96	49.41	5.61	19.18	2.54	7.14	19.38	18.27	18.61	17.40	20.40
Maximum	29.48	358.81	64.47	753.80	103.60	72.84	18.18	113.39	99.47	49.08	70.96	117.69	105.70
Minimum	-22.88	0.89	-31.87	-90.56	-63.16	5.39	-31.45	-35.35	-15.87	-3.69	2.77	-24.81	1.60
Std. Dev.	12.67	100.17	15.71	161.18	33.40	17.69	9.95	33.87	21.88	13.48	14.59	23.81	22.36
Skewness	0.71	0.79	1.40	2.89	0.77	1.74	-1.21	1.51	1.25	0.84	1.57	2.07	2.11
Kurtosis	3.23	2.88	8.04	12.13	3.80	4.70	5.22	5.37	6.20	2.95	5.93	10.22	7.58
Jarque-Bera	3.13	3.72	49.76	175.18	4.52	22.52	16.11	22.01	24.72	4.26	27.67	103.69	58.14
Probability	0.21	0.16	0.00	0.00	0.11	0.00	0.00	0.00	0.00	0.12	0.00	0.00	0.00

Source: Author's computation from E views 2022

Correlation Analysis

The level at which two variables have a linear relationship with each other is refers to as correlation coefficient. Hence, table 4.2 relates to the correlation among the explanatory variables captured in this analysis. The result of the correlation analysis reveals that CPCG has a weak positive relation with FOG and TOG (0.35 and 0.04) similarly, the correlation analysis depicted that there was a negative and weak correlation between INT and FOG (-0.10) while INT and FDG has a positive weak relation (0.41). The outcome of the analysis showed that only INT and INF have a strong relation. Though, its negatively correlated.

Table 4.2 Correlation Coefficients of Variable

	CPCG	EXR	FDG	FOG	GE	INF	INT	TOG
CPCG	1.00							
EXR	0.38	1.00						
FDG	-0.20	0.04	1.00					
FOG	0.35	0.10	-0.07	1.00				
GEG	0.22	0.06	0.24	0.02	1.00			
INF	-0.08	-0.38	-0.35	0.07	-0.03	1.00		
INT	0.22	0.36	0.41	-0.10	0.35	-0.78	1.00	
TOG	0.04	-0.21	-0.25	0.28	-0.51	0.19	-0.38	1.00

Source: Author's computation from E views 2022

4.2 Pre Estimation Tests

4.2.1 Unit Root Test

This study used the Augmented Dickey-Fuller (ADF) unit root to test the stationarity of variables. The essence of assessing the stationarity property of a variable is to identify its trending behavior over a period of time.

The result of the unit root test is shown in table 4.3

The ADF test results indicate that all the variables except INF and EXR were stationary at levels (1(0)). While INF and EXR became stationary after first differencing (1(1)).

Table 4.3: Unit Root Test (Augumented Dickey Fuller) Result of Variables

Variables	At Levels		At First difference		Conclusion
	ADF Test	Test critical value	ADF Test	Test critical value	
AOPCG	-4.074	-3.633***	-	-	1(0)
71OPCG	-4.6	-3.633***	-	-	1(0)
SOPCG	-2.940	-2.613*	-	-	1(0)
FOPCG	-5.676	-3.633***	-	-	I(0)
GDPPCG	-3.400	-2.948**	-	-	1(0)
INT	-3.588	-2.948**	-	-	1(0)
INF	-2.320	-2.625	-4.633	-3.700***	1(1)
EXR	1.813	-2.613	-3.988	-3639***	1(1)
FOG	-7.348	-3.633***	-	-	1(0)
TOG	-7.459	-3.633***	-	-	1(0)
CPCG	-4.904	-3.633***	-	-	1(0)
FDG	-4.350	-3.633***	-	-	1(0)
GE	-5.891	-3.640***	-	-	1(0)

Note: * ** * denotes significance at 10%, 5% and 1% respectively**

Source: Author's computation from E views 2022

4.3.1 Assessment of Causal Relationship between Economic Openness and Growth of Sectoral Output

The essence of causal testing is to establish a causal relationship between variables. In the study, the causal relationship among AOPCG, IOPCG, SOPCG, TOG and POG were analyzed and presented below. The result in table 4.4 depicts the causal relationship between economic openness and agricultural output per capita growth (AOPCG). The result reveals that there was no unidirectional or bidirectional relationship among AOPCG, TOG and FOG.

Table: 4.4 Table of Causality Test for Agricultural Output Per Capita Growth

Causality test	Chi-sq	Probability	Conclusion
TOG causes AOPCG	1.214	0.5451	No causality
FOG causes AOPCG	0.484	0.7851	No causality
AOPCG causes TOG	2.884	0.2365	No causality
AOPCG cause FOG	2.112	0.3479	No causality

Source: Author's computation from E views 2022

The result in Table 4.5 shows the causal relationship between economic openness(trade openness and financial openness) and industrial output per capital growth (IOPCG). The result depicts that there is no unidirectional or bi-directional relationship among IOPCG, TOG and FOG.

Table 4.5: Table of Causality test for Industrial Output Per Capita Growth

Causality test	Chi-sq	Probability	Conclusion
TOG causes IOPCG	1.548	0.6611	No causality
FOG causes IOPCG	2.682	0.2616	No causality
IOPCG causes TOG	0.331	0.8774	No causality
IOPCG cause FOG	3.739	0.154	No causality

Source: Author's computation from E views 2022

The result in Table 4.6 shows the causal relationship between economic openness (trade openness and financial openness) and financial openness per capita growth. The results depicts that there is no unidirectional or bi-directional relationship among FOPCG, TOG and FOG.

Table 4.6: Table of Causality test for Financial Output Per Capita Growth

Causality test	Chi-sq	Probability	Conclusion
TOG causes FOPCG	2.412	0.2994	No causality
FOG causes FOPCG	1.367	0.5049	No causality
FOPCG causes TOG	1.952	0.3769	No causality
FOPCG cause FOG	0.647	0.7235	No causality

Source: Author's computation from E views 2022

The result in Table 4.7 depicts the relationship between economic openness (trade openness and financial openness) and service output per capita growth. The result reveals that there exists unidirectional relationship between trade openness and (TOG) and service output per capita growth at 10% level of significance. The result also shows that there is unidirectional relationship between service output per capita growth and trade openness at a significance level of 5%. However, there is no unidirectional or bi-directional relationship between FOG and SOPCG and TOG.

Table4.7: Table of Causality test for Service Output Per Capita Growth

Causality test	Chi-sq	Probability	Conclusion
TOG causes SOPCG	10.672	0.0048	No causality
FOG causes SOPCG	1.518	0.4683	No causality
SOPCG causes TOG	6.249	0.0440	No causality
SOPCG cause FOG	0.464	0.7931	No causality

Source: Author's computation from E views 2022

4.4 Effect of Economic Openness on Sectoral Performance

The Autoregressive Distributed Lag (ARDL) estimation technique was used to study effective economic openness for sectoral performance. The bounds test was performed to test whether there is a long run relationship between the variables based on the null hypothesis that the lagged value of the long run variable is zero. This was done by running a wald test on the Autoregressive Distributed lag model which includes both the time lagged long run variables and the short run variable. A confirmation of the existence of a long term relationship provides for

the estimation of the long term model and the short term model. Therefore, the results of the test are presented in table 4.5 and analyzed below.

4.4.1 Effect of Economic Openness on Agricultural Output per Capita Growth

Table 4.8: ARDL Bounds Test for Agricultural Output per Capita Growth

Test statistics	Value	Lag	Significant level	Bounds critical value	
				1(0)	1(1)
			10%	1.95	3.06
F- statistics	5.53	8	5%	2.22	3.39
			2.5%	2.48	3.7
			1%	2.79	4.1

Source: Author's computation from E views 2022

Table 4.5 shows the bounds testing for the ARDL model for agricultural output per capita growth (AOPCG). From the result, the value of the F-statistics is given to be 5.53 approximately. While the bounds critical value of 10% are 1.95 for 1(0) and 3.06 for 1(1), at 5%, the critical value are 2.22 for 1(0) and 3.39 for 1(1), at 2.5%, the critical value are 2.48 and 3.7 for 1(0) and 1(1) respectively, While at 1%, , the critical value are 2.79 for 1(0) and 4.1 for 1(1).

The rule states that if the estimated F-statistics is higher than the upper bound of the critical values, the null hypothesis of no-co integration is rejected and if the estimated F-statistic is lower than the lower bound of critical values, that is, no co-integration relationship between the role null hypothesis cannot be rejected. However, if the calculated F-statistics is between the lower and upper critical value, no precise statement can be made.

As shown in table 4.5, the calculated F-statistics is 5.53, which is greater than the upper bound critical value of 3.39 at 5% level of significance. This reveals there is a long run relationship among AOPCG, CPCG, FDG, TOG, FOG, GEG, INF, EXR and INT. Hence the long run and the short run model are shown below.

Table 4.9: Long Run Regression Model
Dependent Variable: Agricultural Output per Capita Growth

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CPCG	-0.481079	0.309026	-1.556756	0.1312
FDG	-0.317084	0.229179	-1.383565	0.1778
TOG	0.025666	0.118264	0.217025	0.8298
FOG	-0.000166	0.021359	-0.007757	0.9939
GEG	0.221696	0.123269	1.798478	0.0833
INF	0.337155	0.307747	1.095559	0.2829
EXR	0.000812	0.036484	0.022251	0.9824
INT	-0.703598	0.596657	-1.179235	0.2486
C	14.55615	9.544868	1.525024	0.1389

R-squared	0.506864	Mean dependent var	20.39739
Adjusted R-squared	0.360750	S.D. dependent var	22.35733
S.E. of regression	17.87538	Akaike info criterion	8.817044
Sum squared resid	8627.288	Schwarz criterion	9.212923
Log likelihood	-149.7068	Hannan-Quinn criter.	8.955216
F-statistic	3.468961	Durbin-Watson stat	1.775718
Prob(F-statistic)	0.007079		

Source: Author's computation from E views 2022

The table 4.6 shows the result of the long run model of the effect of economic openness on AOPCG. Looking at the result shows that CPCG contributes negatively to AOPCG, a 1% increase in CPCG decrease AOPCG by approximately 0.481. Also a unit change in FDG and INT bring about decrease of 0.317 and 0.704 respectively.

Similarly, a 1% increase in GEG and INF bring about 0.222 and 0.337 increase in AOPCG respectively. The result reveals that only GEG is significance at 10%

The overall tests of the long run model show that the included variables explain only 50.7% of the AOPCG variation and approximately 36.1% are explained when the degree of freedom is accounted for.

The ECM result of short run analysis presented in table 4.7 shows that CPCG is significant with a value of approximately 0.589 and positively correlated with the AOPCG at 5%. This shows that a 1 percent increase in CPCG will result in a 0.589 percent increase in AOPCG. Likewise, TOG with the value of -0.188 is significant and negatively correlated with the AOPCG at 5%. This also showed that a 1 percent increase in TOG produces a 0.188 percent decrease in AOPCG both results were obtained after one lag, while the result is negative and insignificant.

The statistical adequacy of the model is confirmed by the fitted R- squared which is approximately 0.708. This means that 70% of the AOPCG variation is explained by variations in the explanatory variables.

Table 4.10: Short Run Regression Model

Dependent Variable: Agricultural Output per Capita Growth

ECM Regression

Case 3: Unrestricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	29.23442	4.168819	7.012639	0.0000
D(AOPCG(-1))	0.284374	0.117296	2.424405	0.0261
D(CPCG)	-0.513801	0.198173	-2.592685	0.0184
D(CPCG(-1))	0.588582	0.205168	2.868781	0.0102
D(TOG)	-0.035920	0.064565	-0.556331	0.5848
D(TOG(-1))	-0.187702	0.070467	-2.663706	0.0158
D(FOG)	-0.002710	0.011167	-0.242731	0.8110
CointEq(-1)*	-1.200202	0.141582	-8.477107	0.0000

R-squared	0.770227	Mean dependent var	0.358748
Adjusted R-squared	0.708365	S.D. dependent var	26.48293
S.E. of regression	14.30165	Akaike info criterion	8.360952
Sum squared resid	5317.969	Schwarz criterion	8.720095
Log likelihood	-134.1362	Hannan-Quinn criter.	8.483430
F-statistic	12.45071	Durbin-Watson stat	1.935606
Prob(F-statistic)	0.000001		

Source: Author's computation from E views 2022

In assessing the suitability of the model described in table 4.8, three post estimation tests for AOPCG performed namely Normality test; serial correlation test; and heteroskedasticity test. The summary of the tests found that the residuals are not normally distributed as shown in the Jarque – Bera statistics and its associated probability disproving the null hypothesis that error are normally distributed.

The serial correlation test which is performed on the null hypothesis of "No serial correlation". From the test, the null hypothesis was not accepted and therefore discarded and the conclusion that there is no serial correlation in the residual is maintained. For heteroskedasticity test, the tested null hypothesis was "there is heteroskdasticity" therefore the result shows that this null hypothesis was not accepted and the alternative hypothesis was accepted. Hence, it is concluded that the residual is heteroskedasticity.

Table 4.11: Post Estimation Tests for Agricultural Output Per Capita Growth

Test	Statistics	Probability	Conclusion
Normality	22.17	0.00	Error are not normally distributed
Serial correlation	0.03	0.98	No serial correlation
Heteroskedasticity	3.07	0.01	There is heteroskedasticity distribution
Stability cusum	-	-	Stable model
Cusum of squared	-	-	Stable model

Source: Author's computation from E views 2022

Figure 12 and 13 represent the model stability test results obtained by using the cumulative sum (CUSUM) and cumulative sum squared (CUSUMSQ) tests. The pictures indicate that the dependent variables (AOPCG) and the short-run model parameters satisfied the model's stability

condition. This implies that the null hypothesis that all coefficient in the regression are stable in models cannot be rejected since both plots of CUSUM and CUSUMSQ are within the critical limits of 5% significant levels.

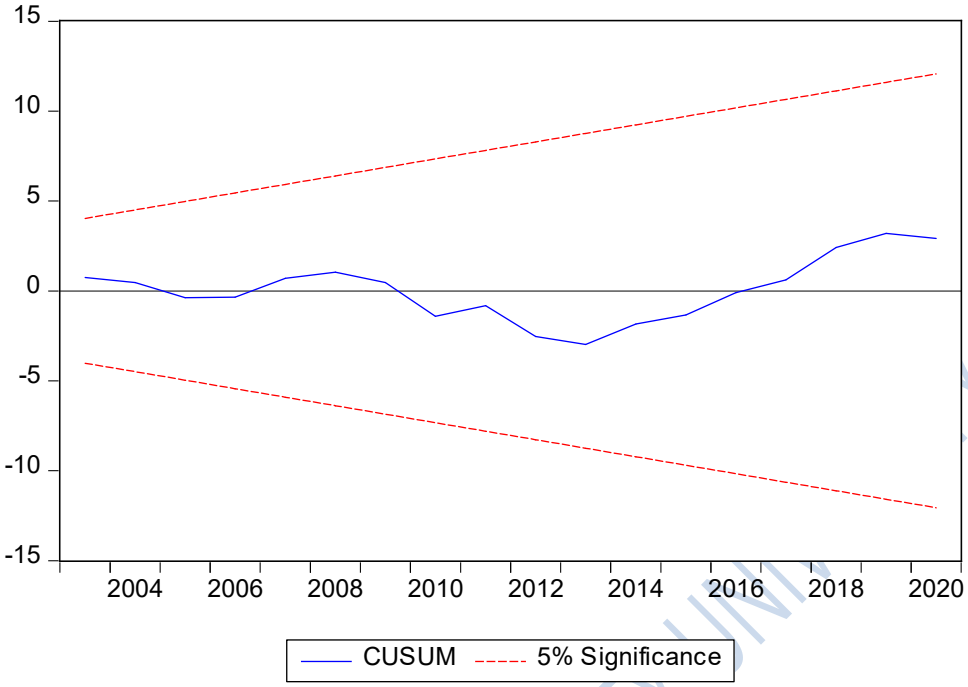


Figure 4.12: Cumulative sum recursive residuals (CUSUM)

Source: Author's computation from E views 2022

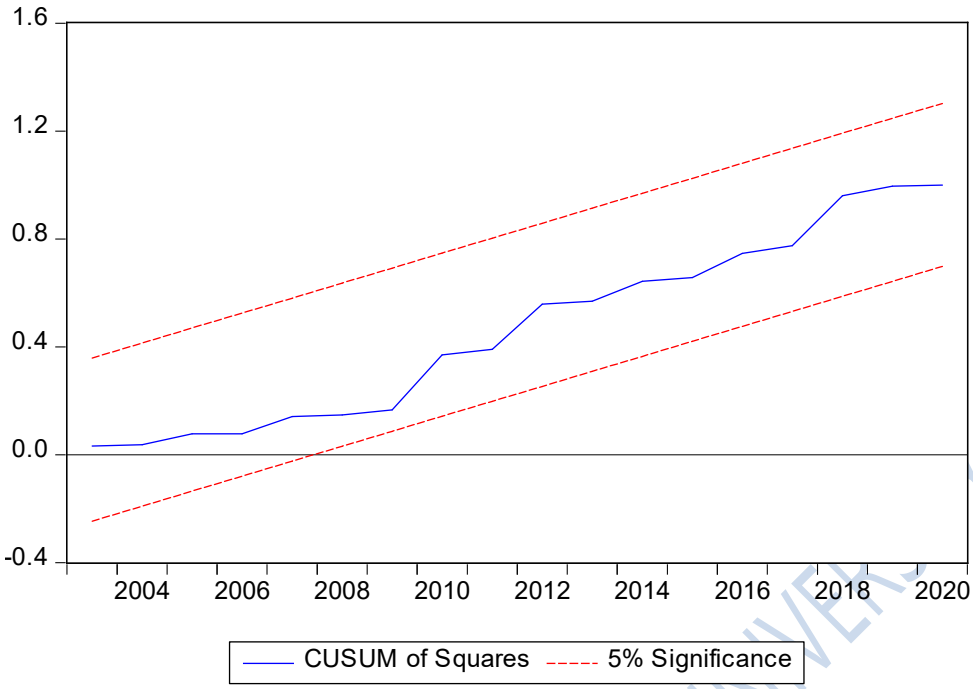


Figure 4.13: Cumulative sum recursive residuals squared (CUSUMSQ)

Source: Author's computation from E views 2022

4.4.2 Effect of Economic Openness on Industrial Output Per Capita Growth

Table 4.8 shows the bounds test result for the ARDL model for industrial output per capita growth (IOPCG). The result reveals that the F statistic is 13.58 approximately. The bounds critical value of 10% are 1.95 for 1(0) and 3.06 for 1(1), at 5%, the critical value are 2.22 for 1(0) and 3.39 for 1(1), at 2.5% the critical value are 2.48 for 1(0) and 3.7 for 1(1). At 1% the critical value are 2.79 and 4.1 for 1(0) and 1(1) respectively.

Table: 4.12 ARDL Bounds Test for Industrial Output per Capita Growth

Test statistics	**Value**	**Lag**	**Significant level**	**Bounds critical value**	
				1(0)	1(1)
			10%	1.95	3.06
F- statistics	13.58	8	5%	2.22	3.39
			2.5%	2.48	3.7
			1%	2.79	4.1

Source: Author's computation from E views 2022

If the estimated F-statistic is higher than the upper bound of the critical value, then, the null hypothesis of no co-integration is rejected and vice versa. However if the calculated F-statistics is between the lower and upper critical value, then no exact opinion can be made. As shown in table 4.9 the calculated F-statistics is 13.58 approximately which is greater than the upper bound critical value of 3.39 at 5% level of significant. This depicts that there exist a long run relationship among IOPCG, CPCG, FDG, TOG, FOG, GEG, INF, EXR and INT. Hence the long run and short run models are shown below.

Table 4.13: Long Run Regression Model

Dependent Variable: Industrial Output per Capita Growth

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CPCG	-0.137703	0.176276	-0.781178	0.4415
FDG	-0.161453	0.130729	-1.235018	0.2275
TOG	0.060364	0.067461	0.894807	0.3788
FOG	-0.009361	0.012184	-0.768276	0.4490
GEG	-0.256673	0.070315	-3.650308	0.0011
INF	0.268905	0.175546	1.531818	0.1372
EXR	0.026022	0.020811	1.250381	0.2219
INT	-0.982229	0.340347	-2.885962	0.0076
C	15.58742	5.444617	2.862905	0.0080

R-squared	0.832519	Mean dependent var	19.37909
Adjusted R-squared	0.782895	S.D. dependent var	21.88356
S.E. of regression	10.19654	Akaike info criterion	7.694291
Sum squared resid	2807.173	Schwarz criterion	8.090171
Log likelihood	-129.4972	Hannan-Quinn criter.	7.832464
F-statistic	16.77656	Durbin-Watson stat	2.032597
Prob(F-statistic)	0.000000		

Source: Author's computation from E views 2022

Table 4.10 shows the result of the long run model for the effect of economic openness on IOPCG. The result reveals that CPCG, FDG, and FOG are not significant and have inverse relation with IOPCG. Similarly, the result shown that TOG, INF and EXR were also not significant but have a positive relation with IOPCG. While it reveals that GEG and INT are significant but has a negative relation with IOPCG.

The result reveals that a 1% increase in GEG bring about 25.6 percent decrease in IOPCG at 1% level of significance. While a 1% increase in INT bring about 98.2 percent decrease in IOPCG at 1% level of significant.

The overall diagnostic tests of the long run model showed that the included variables together explain only 83.3% of the variation by IOPCG and approximately 78.3% is explained when the degree of freedom is taken into account. However, as the F-statistic of approximately16.78% shows, the included variables are collectively significant in explaining the variation in IOPCG at 1% and there is no first order serial correlation in the model.

The ECM result of the short run test for IOPCG presented in table 4.11, the result reveals that all the variables were significance either at level or one lag. While the relation shown that CPCG and FOG have a positive relation with IOPCG. A unit increase in CPCG bring about 52.3 percent increase in IOPCG at 1% and a unit increase in FOG also bring about 63.4 percent increase in IOPCG at 1%.

As shown by the result, a 1% increase in FDG, TOG, GEG, INF and EXR bring about 13.7, 36.0, 0.97, 75.1 and 0.96 percent decrease respectively to IOPCG.

Table 4.14: Short Run Regression Model

Dependent Variable: Industrial Output per Capita Growth

ECM Regression

Case 3: Unrestricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	21.86806	1.881007	11.62572	0.0000
D(IOPCG(-1))	0.754843	0.082992	9.095388	0.0000
D(CPCG)	-0.424277	0.086611	-4.898681	0.0005
D(CPCG(-1))	0.522846	0.101846	5.133695	0.0003
D(FDG)	-0.137108	0.060889	-2.251754	0.0457
D(FDG(-1))	-0.157374	0.063753	-2.468494	0.0312
D(TOG)	0.018678	0.031584	0.591397	0.5662
D(TOG(-1))	-0.359474	0.044112	-8.149134	0.0000
D(FOG)	-0.002924	0.006142	-0.476006	0.6434
D(FOG(-1))	0.063398	0.008759	7.238278	0.0000
D(GEG)	-0.096954	0.026418	-3.670037	0.0037
D(INF)	-0.142953	0.086968	-1.643728	0.1285
D(INF(-1))	-0.751026	0.095322	-7.878823	0.0000
D(EXR)	-0.096090	0.052755	-1.821435	0.0958
CointEq(-1)*	-1.785545	0.122907	-14.52757	0.0000

R-squared	0.981138	Mean dependent var	0.164629
Adjusted R-squared	0.967239	S.D. dependent var	28.19307
S.E. of regression	5.102922	Akaike info criterion	6.397935
Sum squared resid	494.7564	Schwarz criterion	7.071329
Log likelihood	-93.76489	Hannan-Quinn criter.	6.627582
F-statistic	70.59319	Durbin-Watson stat	2.067713
Prob(F-statistic)	0.000000		

* p-value incompatible with t-Bounds distribution.

Source: Author's computation from E views 2022

In assessing the suitability of the model described in table 4.12 three post estimation tests on IOPCG conducted namely normality test; serial correlation test; and heteroskedasticity test. The summary of the tests revealed that the residuals are not normally distributed as shown in the Jarque – Bera statistics and its accompanied probability which rejected the null hypothesis that error are normally distributed.

The serial correlation test which is performed on the null hypothesis of "No serial correlation". From the test, the null hypothesis was not accepted and therefore discarded. The conclusion that there is no serial correlation in the residual is maintained. In the heteroskedasticity test, the tested null hypothesis was "there is heteroskdasticity" therefore, the result shows that this null hypothesis was not accepted and the alternative hypothesis was accepted. Therefore, it is concluded that the residual is heteroskedasticity.

Table: 4.15: Post Estimation Test for Industrial Output Per Capital Growth

Test	Statistics	Probability	Conclusion
Normality	0.59	0.74	Error are not normally distributed
Serial correlation	0.24	0.79	No serial correlation
Heteroskedasticity	0.96	0.55	There is no heteroskedasticity
Stability: cusum	-	-	Stable model
Cusum of squared	-	-	Stable model

Source: Author's computation from E views 2022

Figure 14 and 15 represent the model stability test results obtained using the cumulative sum (CUSUM) and cumulative sum of squared (CUSUMSQ) tests. The images show that the dependent variables (IOPCG) and the short-run model parameters satisfied the stability condition of the model. This implies that the null hypothesis that all coefficient in the regression are stable in models are cannot be rejected since both plots of CUSUM and CUSUMSQ are within the critical limits of 5% significance levels.

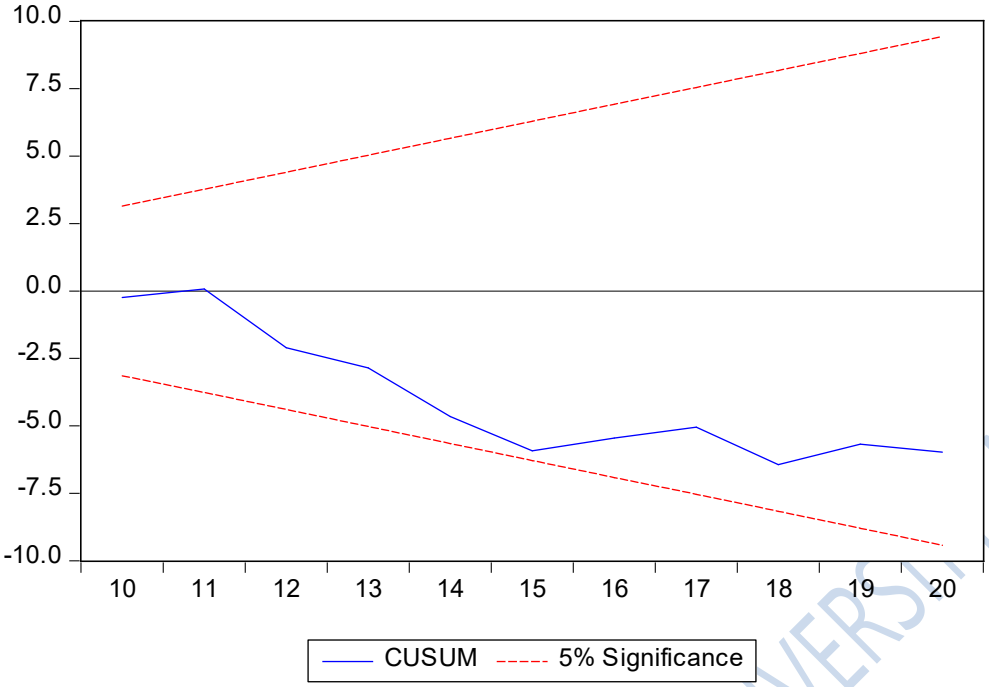


Figure 4.14: Cumulative sum recursive residuals (CUSUM)

Source: Author's computation from E views 2022

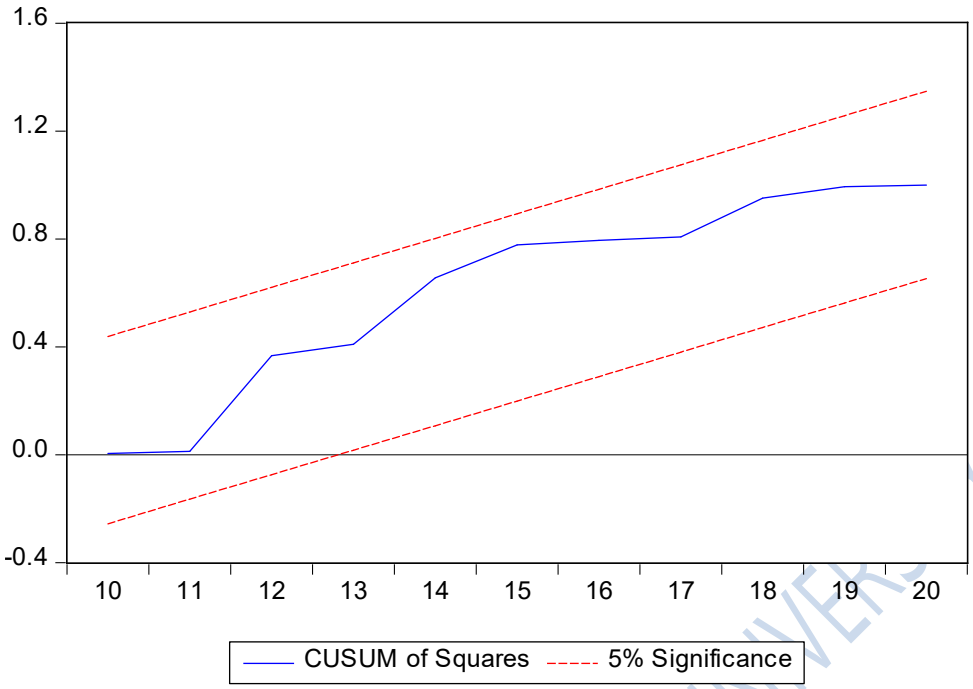


Figure 4.15: Cumulative sum recursive residuals squared (CUSUMSQ)

Source: Author's computation from E views 2022

4.4.3: Effect of Economic Openness on Financial Output per Capita Growth

Table 4.13 reveals the bounds testing by the ARDL model for FOPCG. The value of F-statistics is given to be 5.19 approximately. The bounds critical value at 10% is 2.26 for 1(0) and 3.34 for 1(1) at 5%, the critical value are 2.55 for 1(0) and 3.68 for 1(1). While at 2.5%, the critical values are 2.82 and 4.02 for 1(0) and 1(1) respectively. And at 1%, under 1(0) and 1(1), the critical values are 3.15 and 4.43 respectively.

The guiding rule specifies that at whatever level of significance the F-statistics is greater than the upper bound of the critical value, this reveals the existence of long run relationship among the variables. As shown in table 4.13, the calculated F-statistic is 5.19 approximately is greater than the upper bound critical value of 3.68 at 5% level of significance. This depicts that there exist a long run relationship among FOPCG, CPCG, FDG, TOG, FOG, GEG, INF, EXR and INT. Hence, the long run and short run models are shown below

Table: 4.16: ARDL Bounds Test for Financial Output Per Capita Growth

Test statistics	Value	Lag	Significant level	Bounds critical value	
				1(0)	1(1)
F- statistics	5.19	8	10%	2.26	3.34
			5%	2.55	3.68
			2.5%	2.82	4.02
			1%	3.15	4.43

Source: Author's computation from E views 2022

Table 4.14 depicts the result of the long run model for the effect of economic openness on FOPCG. It reveals that CPCG, TOG and GEG have a positive relation with FOPCG but they are not significance. Also, FDG, FOG, INF and EXR are not significant and have a negative relation

with FOPCG, While INT has a negative relation with FOPCG but its significant at 10%, the result reveals that a unit increase in INT bring about 47.2 percent decrease in FOPCG

The overall diagnostic test of the long run model shows that the included variables together explain only 2.18 of the overall variation in FOPCG. However, as the F-statistics of approximately 0.8 show, the variables included are not jointly significant to explain the variation of FOPCG. Although, there is no first under sub-serial correlation in the model.

Table 4.17: Long Run Regression Model

Dependent Variable: Financial Output per Capita Growth

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CPCG	0.220704	0.427228	0.516597	0.6098
FDG	-0.196786	0.313266	-0.628173	0.5354
TOG	0.144370	0.161945	0.891476	0.3809
FOG	-0.033349	0.029780	-1.119864	0.2730
GEG	0.190774	0.168615	1.131418	0.2682
INF	-0.667759	0.421196	-1.585389	0.1250
EXR	-0.093662	0.130723	-0.716489	0.4801
INT	-1.472363	0.822450	-1.790217	0.0851
@TREND	0.658080	1.217974	0.540307	0.5936
C	33.30601	14.98283	2.222946	0.0351

R-squared	0.217761	Mean dependent var	17.39733
Adjusted R-squared	-0.053015	S.D. dependent var	23.81073
S.E. of regression	24.43374	Akaike info criterion	9.459940
Sum squared resid	15522.20	Schwarz criterion	9.899807
Log likelihood	-160.2789	Hannan-Quinn criter.	9.613466
F-statistic	0.804212	Durbin-Watson stat	1.721652
Prob(F-statistic)	0.616240		

Source: Author's computation from E views 2022

The ECM result of the short run test for FOPCG presented in table 4.15. The result depicts that TOG and FOPCG is positively significance. A 1% increase in TOG bring about 29.62 percent increase in FOPCG while FOG has a negative relation with FOPCG and not significant.

Table 4.18: Short Run Regression Model

Dependent Variable: Financial Output per Capita Growth

ECM Regression

Case 5: Unrestricted Constant and Unrestricted Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	19.92480	7.273509	2.739366	0.0120
@TREND	2.470627	0.460984	5.359463	0.0000
D(TOG)	0.296199	0.071453	4.145384	0.0004
D(FOG)	-0.008363	0.014468	-0.578046	0.5691
CointEq(-1)*	-0.901932	0.113063	-7.977260	0.0000

R-squared	0.694458	Mean dependent var	0.064938
Adjusted R-squared	0.653720	S.D. dependent var	33.86262
S.E. of regression	19.92666	Akaike info criterion	8.953558
Sum squared resid	11912.15	Schwarz criterion	9.175750
Log likelihood	-151.6873	Hannan-Quinn criter.	9.030259
F-statistic	17.04658	Durbin-Watson stat	1.572317
Prob(F-statistic)	0.000000		

Source: Author's computation from E views 2022

In assessing the suitability of the model described in table 4.16, three post estimation tests on FOPCG were performed namely normality test; serial correlation test; and heteroskedasticity test. The summary of the tests found that the residuals are not normally distributed as shown in the Jarque – Bera statistics and its associated probability contradict the null hypothesis that errors are normally distributed.

The serial correlation test which is performed on the null hypothesis of "No serial correlation". From the test, the null hypothesis was not accepted and therefore discarded, and the conclusion that there is no serial correlation in the residual is maintained. For heteroskedasticity test, the tested null hypothesis was "there is heteroskdasticity" therefore, the result shows that this null hypothesis was not accepted and the alternative hypothesis was accepted. Therefore, it is concluded that the residual is heteroskedasticity.

Table 4.19: Post Estimation Test for Financial Output Per Capital Growth

Test	Statistics	Probability	Conclusion
Normality	5.24	0.07	Error are not normally distributed
Serial correlation	1.77	0.20	No serial correlation
Heteroskedasticity	0.82	0.63	There is no heteroskedasticity
Stability: cusum	-	-	Stable model
Cusum of squared	-	-	Stable model

Source: Author's computation from E views 2022

Figure 16 and 17 represent the model stability test results obtained using the cumulative sum (CUSUM) and cumulative sum of squared (CUSUMSQ) tests. The images show that the dependent variables (FOPCG) and the short-run model parameters satisfied the model's stability condition. This implies that the null hypothesis that all coefficient in the regression are stable in models cannot be rejected since both plots of CUSUM and CUSUMSQ are within the critical limits of 5% significant levels.

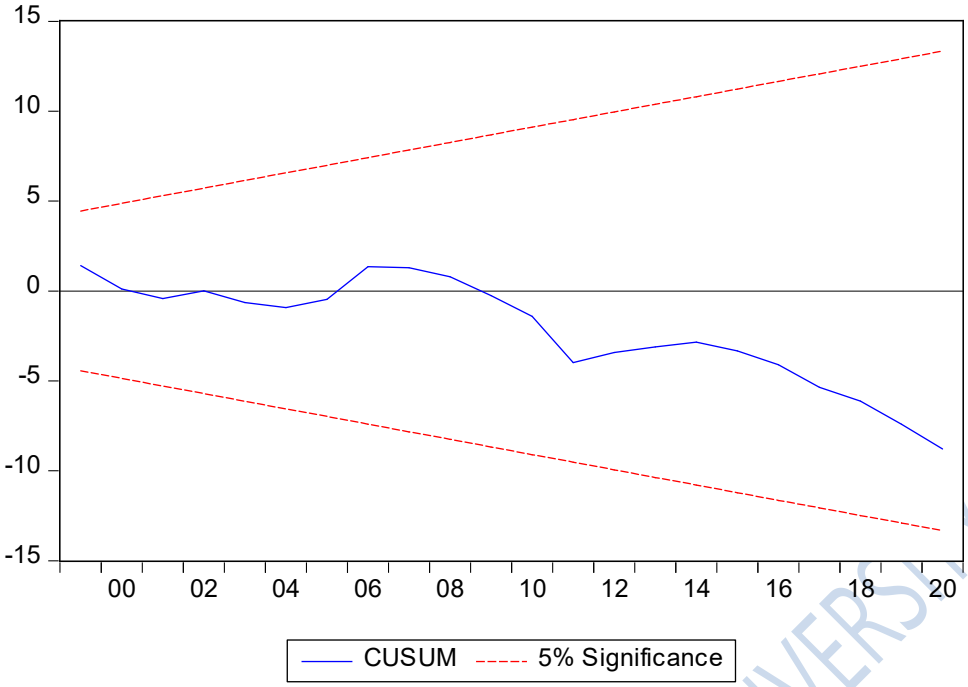


Figure 4.16: Cumulative sum recursive residuals (CUSUM)

Source: Author's computation from E views 2022

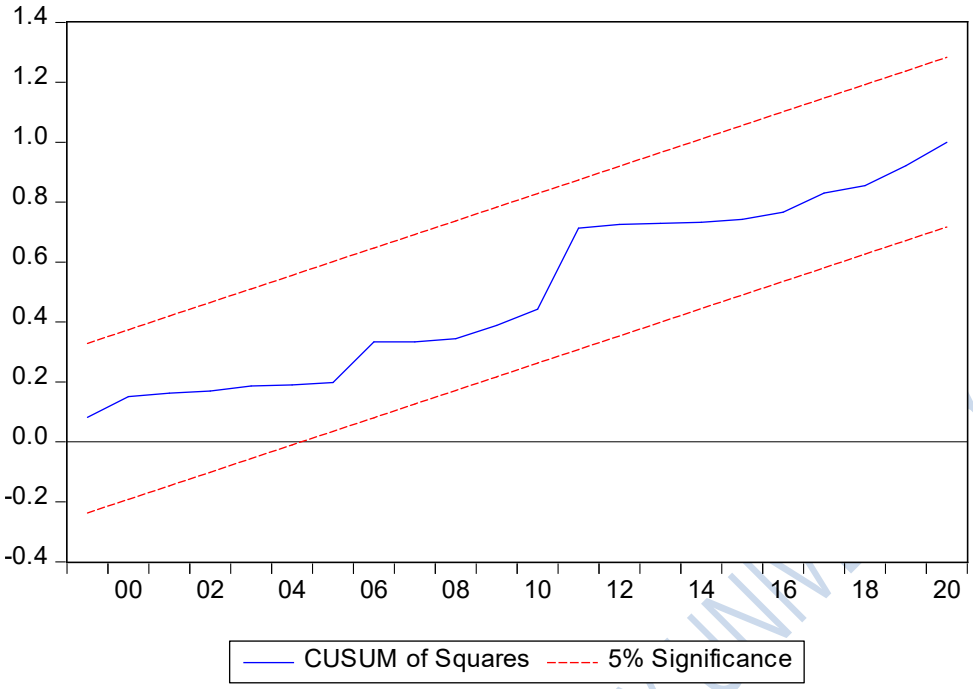


Figure 4.17: Cumulative sum recursive residuals squared (CUSUMSQ)

Source: Author's computation from E views 2022

4.4.4: Effect of Economic Openness on Service Output per Capita Growth

Table 4.18 depict the bound testing for the ARDL model for SOPCG. The value of the F-statistics is given to be 4.68 approximately. The bounds critical value of 10% is 1.95 for 1(0) and 3.06 for 1(1), at 5%, the critical value is 2.22 for 1(0) and 3.39 for 1(1). At 2.5% the critical values are 2.48 and 3.7 for 1(0) and 1(1) respectively, while the critical value at 1% is 2.79 for 1(0) and 4.1 for 1(1).

Table 4.20: ARDL Bounds Test for Service Output per Capital Growth

Test statistics	**Value**	**Lag**	**Significant level**	**Bounds critical value**	
				1(0)	1(1)
			10%	1.95	3.06
F- statistics	4.681552	8	5%	2.22	3.39
			2.5%	2.48	3.7
			1%	2.79	4.1

Source: Author's computation from E views 2022

If the F-statistics is greater than the upper bound critical value, this reveals the existence of a long run relationship among the variables. As shown in table 4.17, the calculated F-statistic is approximately 4.68 greater than the upper bound critical value of 3.39 at 5% level of significant.

This reveals that there exist a long run relationship among SOPCG, CPCG, FDG, TOG, FDG, GEG, INF, EXR and INT. Hence, the long run and short run model are shown below

Table 4.21: Long Run Regression Model

Dependent Variable: Service Output per Capita Growth

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CPCG	0.000966	0.159607	0.006054	0.9952
FDG	0.046142	0.118367	0.389821	0.6997
TOG	-0.093075	0.061082	-1.523783	0.1392
FOG	-0.006686	0.011032	-0.606109	0.5495
GEG	-0.040244	0.063666	-0.632100	0.5326
INF	0.105123	0.158947	0.661374	0.5140
EXR	-0.033562	0.018843	-1.781088	0.0862
INT	-0.820172	0.308164	-2.661479	0.0129
C	23.18032	4.929773	4.702106	0.0001
R-squared	0.637884	Mean dependent var		18.27121
Adjusted R-squared	0.530591	S.D. dependent var		13.47524
S.E. of regression	9.232350	Akaike info criterion		7.495622
Sum squared resid	2301.380	Schwarz criterion		7.891502
Log likelihood	-125.9212	Hannan-Quinn criter.		7.633795
F-statistic	5.945223	Durbin-Watson stat		1.340167
Prob(F-statistic)	0.000200			

Source: Author's computation from E views 2022

Table 4.18 shows the result of the long run model for the effect at economic openness on SOPCG. The result depict that CPCG, FDG and INF have a positive relation with SOPCG but are not significance. Also, TOG, FDG, and GEG are negatively related SOPCG and

insignificance. While EXR and INT have a negative relation with SOPCG but significant at 10% and 1% respectively the result reveals that a unit increase in EXR bring about 0.34 percent decrease in SOPCG. Also, a unit increase in INT bring about 82 percent decrease in SOPCG.

The overall diagnostic tests of the long run model showed that the included variation together explains only 63.79% of the overall variation of SOPCG. However, as the F-statistic of approximately 5.95%shows, the included variables are collectively not significant in explaining the variation in SOPCG.

ECM result at the short run test for SOPCG presented in table 4.19 .the result reveals that all the variables are significant . While EXR and INT have a negative relation with SOPCG other variables have a positive relation. The result shown that a unit increase in CPCG causes 44 percent increase in SOPCG at 1% level of significant. A one-unit increase in FDG also results in a14.6 percent increase in SOPCG at 1% level of significant.

The result showed that a one-unit increase in TOG resulted 19.2 percent increase in SOPCG at 1% level of significant.

Table 4.22: Short Run Regression Model

Dependent Variable: Service Output per Capita Growth

ECM Regression

Case 3: Unrestricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	22.13596	2.555753	8.661227	0.0000
D(SOPCG(-1))	0.078275	0.065736	1.190746	0.2613
D(SOPCG(-2))	-0.262082	0.058592	-4.473022	0.0012
D(CPCG)	0.235216	0.071481	3.290605	0.0081
D(CPCG(-1))	0.439531	0.055260	7.953840	0.0000
D(FDG)	0.088676	0.039912	2.221787	0.0505
D(FDG(-1))	0.145816	0.043911	3.320701	0.0077
D(TOG)	0.009007	0.025939	0.347240	0.7356
D(TOG(-1))	0.192316	0.025866	7.435171	0.0000
D(FOG)	0.007025	0.003920	1.792339	0.1033
D(GEG)	-0.007302	0.019286	-0.378620	0.7129
D(GEG(-1))	0.068396	0.021156	3.232868	0.0090
D(EXR)	-0.138351	0.032802	-4.217730	0.0018
D(INT)	-1.156775	0.090009	-12.85181	0.0000
CointEq(-1)*	-0.660060	0.075793	-8.708682	0.0000

R-squared	0.962676	Mean dependent var	-0.530854
Adjusted R-squared	0.933646	S.D. dependent var	12.88739
S.E. of regression	3.319700	Akaike info criterion	5.540581
Sum squared resid	198.3673	Schwarz criterion	6.220812
Log likelihood	-76.41959	Hannan-Quinn criter.	5.769458
F-statistic	33.16150	Durbin-Watson stat	2.544531
Prob(F-statistic)	0.000000		

* p-value incompatible with t-Bounds distribution.

Source: Author's computation from E views 2022

In evaluating the suitability of the model described in table 4.20, three post estimate tests were performed on SOPCG namely normality test; serial correlation test; and heteroskedasticity test. The summary of the tests found that the residuals are not normally distributed as shown in the Jarque – Bera statistics and its associated probability refuting the null hypothesis that error are normally distributed.

The serial correlation test based on the null hypothesis of "No serial correlation". From the test, the null hypothesis was not accepted and therefore rejected and the conclusion that there is no serial correlation in the residual is maintained. For heteroskedasticity test, the tested null hypothesis was "there is heteroskdasticity" therefore, the result shows that this null hypothesis was not accepted and the alternative hypothesis was accepted. Therefore, it is concluded that the residual is heteroskedasticity.

Table: 4.23: Post Estimation Test For Service Output Per Capital Growth

Test	Statistics	Probability	Conclusion
Normality	0.90	0.64	Error are not normally distributed
Serial correlation	1.69	0.24	No serial correlation
Heteroskedasticity	0.91	0.60	There is no heteroskedasticity
Stability: cusum	-	-	Stable model
Cusum of squared	-	-	Stable model

Source: Author's computation from E views 2022

Figure 18 and 19 represent the model stability test results obtained using the cumulative sum (CUSUM) and cumulative sum of squared (CUSUMSQ) tests. The images show that the dependent variables (SOPCG) and the short-run model parameters satisfied the model's stability condition. This implies that the null hypothesis that all coefficient in the regression are stable in models cannot be rejected since both plots of CUSUM and CUSUMSQ are within the critical limits of 5% significance levels.

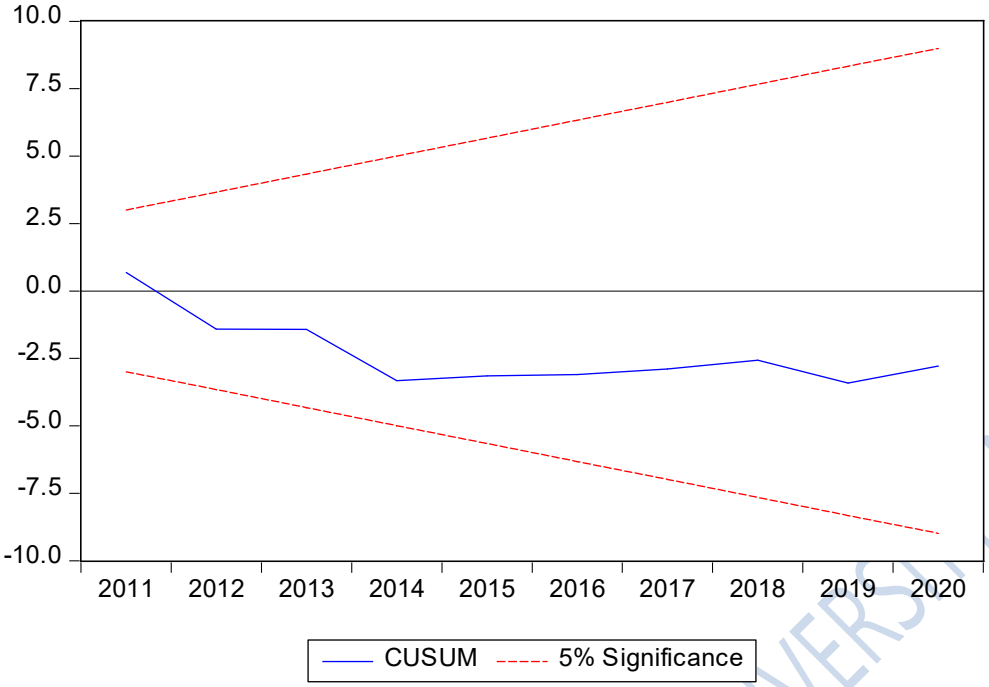


Figure 4.18: Cumulative sum recursive residuals (CUSUM)

Source: Author's computation from E views 2022

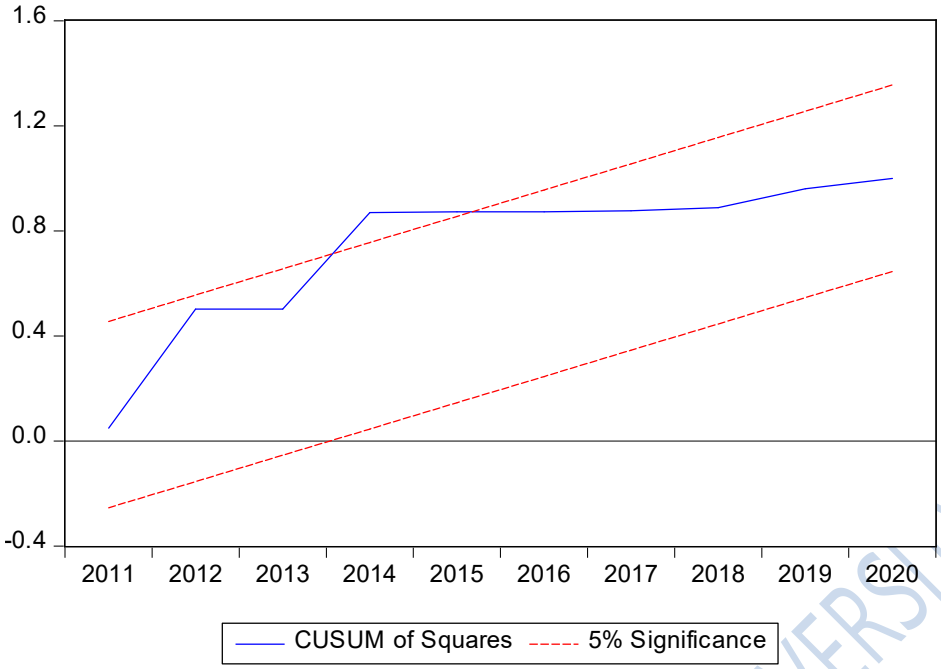


Figure 4.19: Cumulative sum recursive residuals squared (CUSUMSQ)

Source: Author's computation from E views 2022

4.5 Response of Growth in Sectoral Output to Shocks in Economic Openness

The generalized impulse Response Function (GRIF) is conducted to captures interrelationship among variables in the model. On the other part, variance decomposition (VD) shows the amount of impact each shock variable has on other variables. While the selection order criteria (SOC) enable one to identify the number of Lag Length that VAR model should have. Therefore, the impulse Response Function and Variance Decomposition test were conducted to shows the response of sectoral output growth to shocks emanating from other explanatory variables.

4.5.1 Response of Agricultural Output per Capita Growth to Shocks in Economic Openness

Table 4.24: VAR Selection Order Criteria

Dependable Variable: AOPCG

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-1275.69	NA	1.86	81.42	82.66*	81.83
1	-1165.80	137.37*	4.30	79.61	84.56	81.25
2	-1044.46	83.42	2.53*	77.09*	85.75	79.96*

*Indicates lag order selected by the criterion; LR: sequential modified LR test statistic (each test at 5% level), FPE: Final prediction error, AIC: Akaike information criterion, SC: Schwarz information criterion, HQ: Hannan-Quinn -information criterion.

Source: Author's computation from E views 2022

Table 4.25.1 shown the variance decomposition of agricultural output per capita growth (AOPCG), trade openness growth (TOG) and financial openness growth (FOG).The result reveals that (AOPCG) tends to decreased from 100% in the first year to 23.67% in the tenth year.

The result of the (FOG) increased from zero percent in the first year to 1.61% in the third year. It dropped in the fourth year and picked again in the sixth year to 1.71%. The trend continue in the upward direction and recorded 2.05% in the tenth year. The variance decomposition of (TOG) increased slightly from zero percent in the first year to 12.30% in the fifth year. It decreased to 10.11% in the tenth year.

Table 4.25: Variance Decomposition

Table 4.25.1: Variance Decomposition of AOPCG:

Period	S.E.	AOPCG	TOG	FOG
1	15.63	100.00	0.00	0.00
2	21.16	58.79	10.40	0.09
3	25.53	41.97	12.31	1.61
4	30.11	33.34	10.64	1.18
5	32.07	31.37	12.30	1.25
6	32.64	30.46	11.88	1.71
7	33.38	29.56	11.91	1.64
8	34.78	27.44	11.01	1.76
9	36.60	25.40	10.52	1.95
10	38.02	23.67	10.11	2.05

Source: Author's computation from E views 2022

The result of variance decomposition of trade openness growth (TOG), agricultural output per capita growth (AOPCG) and financial openness growth (FOG) in table 4.25.2 depicts that (TOG) declined from 88.30% in the first year to 28.36% in the tenth year. (FOG) has a variance decomposition of zero percent in the first year increased to 10.19% in the fourth year and dropped to 9.68% in the fifth year. It increased to 13.71% in the seventh year and felt to 12.89% in the tenth year. The result further reveals that (AOPCG) dropped from 1.29% in the first year to 0.86% in the second year. It picked in the third year from 3.61% to 5.10% in the tenth year.

Table 4.25.2: Variance Decomposition of TOG:

Period	S.E.	AOPCG	TOG	FOG
1	13.70	1.29	88.30	0.00
2	15.40	0.86	58.46	1.60
3	17.57	3.61	46.71	6.94
4	19.19	4.35	35.44	10.19
5	19.71	4.57	35.13	9.68
6	20.51	4.35	32.95	12.39
7	20.79	4.71	30.59	13.71
8	21.56	4.47	29.62	12.95
9	21.86	5.18	28.60	12.91
10	22.10	5.10	28.36	12.89

Source: Author's computation from E views 2022

The result of the variance decomposition of financial openness growth (FOG), trade openness growth (TOG) and agricultural output per capita growth (AOPCG) in table 4.25.3 indicated that (FOG) declined from 67.73% in the first year to 41.08% in the fifth year. The result dropped to 39.20% in the tenth year. The (AOPCG) result decreased from 7.15% in the first year to 2.67% in the tenth year. The variance decomposition result reveals that (TOG) dropped from 10.76% in the first year to 4.79% in the tenth year.

Table 4.25.3: Variance Decomposition of FOG:

Period	S.E.	AOPCG	TOG	FOG
1	14.26	7.15	10.76	67.73
2	19.45	2.50	3.75	40.74
3	24.98	2.33	5.52	38.26
4	27.89	2.18	5.05	39.14
5	29.52	2.04	4.59	41.08
6	30.75	2.47	4.69	39.25
7	31.61	2.59	4.81	39.30
8	31.86	2.52	4.82	39.59
9	32.14	2.58	4.74	39.51
10	32.60	2.67	4.79	39.20

Source: Author's computation from E views 2022

The result of GRIF test on figure 20, reveals that all the variables were fluctuated except FOG to AOPCG and FOG to TOG where the response were not significant.

Dependent variable: AOPCG

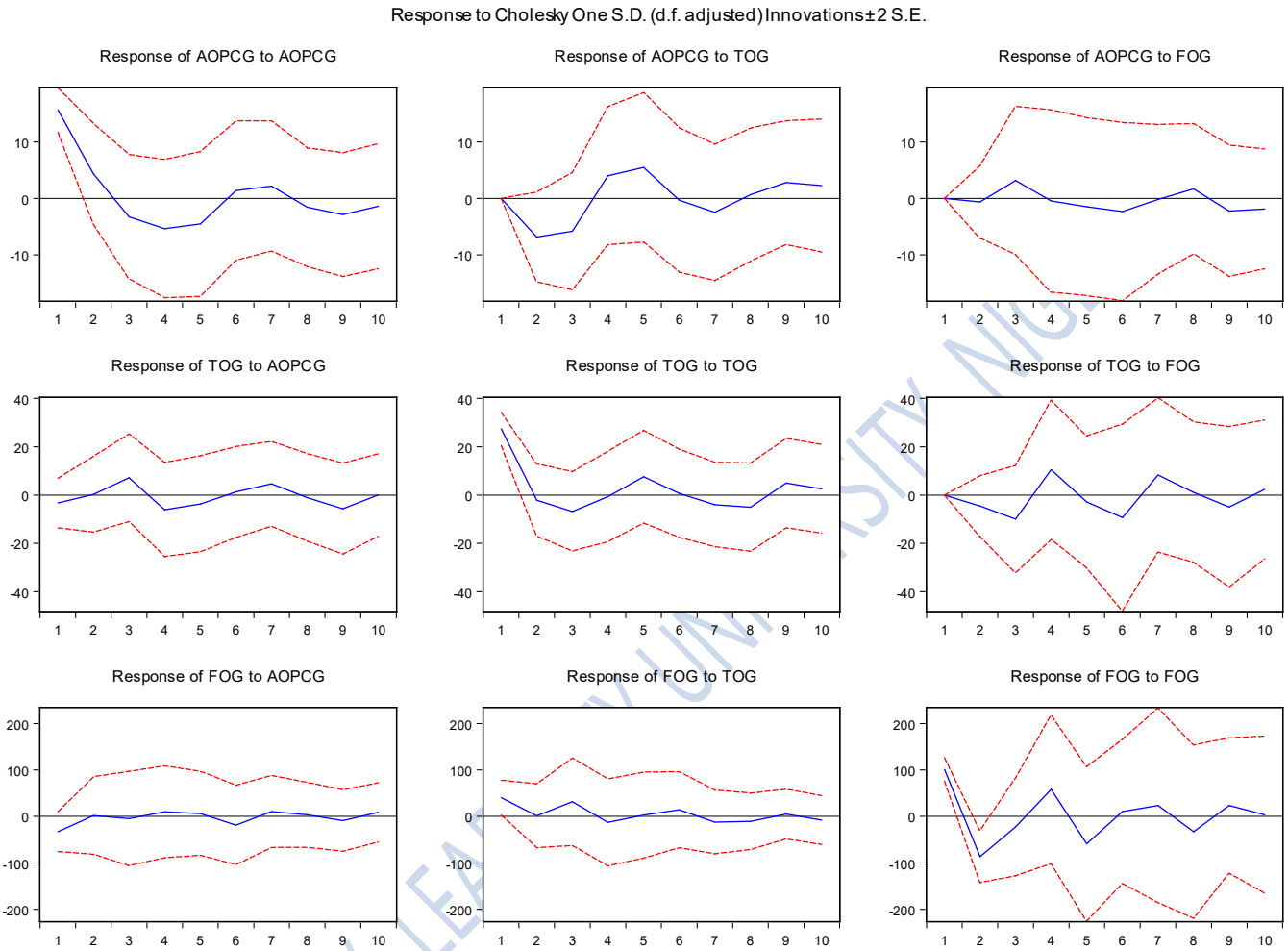


Figure 4.20: Graph of impulse response function

Source: Author's computation from E views 2022

4.5.2 Response of Industrial Output per Capita Growth to Shocks in Economic Openness

Table 4.26: VAR Selection Order Criteria

Dependable Variable: IOPCG

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-1275.30	NA	1.81	81.39	82.63*	81.80
1	-1162.30	141.25	3.45	79.39	84.34	81.03
2	-1010.53	104.34*	3.04*	74.97*	83.63	77.84*

* indicates lag order selected by the criterion; LR: sequential modified LR test statistic (each test at 5% level, LR: sequential modified LR test statistic (each test at 5% level), FPE: Final prediction error, AIC: Akaike information criterion, SC: Schwarz information criterion, HQ: Hannan-Quinn information criterion.

Source: Author's computation from E views 2022

Table 4.27.1 depicts the variance decomposition of industrial output per capita growth (IOPCG), trade openness growth (TOG) and financial openness growth (FOG). The result indicated that IOPCG decreased from 100% in the first year to 36.26% in the tenth year. The variance decomposition of (TOG) increased from zero percent in the first year to 22.94% in the fourth year. It decreased from 19.70% in the fifth year to 13.43% in the tenth year. While the result of (FOG) increased from zero percent in the first year to 2.81% in the fourt year. It dropped in the fifth year to 2.44% before it picked again in the sixth year and recorded 4.25% in the tenth year.

Table 4.27: Variance Decomposition

Table 4.27.1: Variance Decomposition of IOPCG:

Period	S.E.	IOPCG	TOG	FOG
1	19.05	100.00	0.00	0.00
2	27.30	48.88	22.91	0.23
3	33.21	40.42	22.65	1.55
4	36.87	33.04	22.94	2.81
5	40.28	37.88	19.70	2.44
6	43.27	37.02	18.32	4.63
7	45.60	36.05	16.52	4.26
8	47.19	33.84	15.46	4.96
9	51.34	35.29	13.50	4.22
10	52.98	36.26	13.43	4.25

Source: Author's computation from E views 2022

Table 4.27.2 shows the variance decomposition of trade openness growth (TOG), industrial output per capita growth (IOPCG) and financial openness growth (FOG). The result indicated that (TOG) declined steadily from 58.01% in the first year to 21.55% in the tenth year. The IOPCG fluctuated under the period reviewed. It dropped from 21.00% in the first year to 13.86% in the fourth year and increased from 15.25% in the fifth year to 19.59% in the tenth year. The result of the variance decomposition shown that (FOG) increased from zero percent in the first year to 4.98% in the fourth year. It dropped in the fifth year to 4.78%. The result increased in the sixth year to 6.50% and later dropped to 5.45% in the tenth year.

Table 4.27.2: Variance Decomposition of TOG:

Period	S.E.	IOPCG	TOG	FOG
1	14.20	21.00	58.01	0.00
2	14.77	14.42	41.38	0.40
3	15.93	13.78	35.15	3.34
4	17.74	13.86	30.50	4.98
5	18.34	15.25	27.73	4.78
6	19.86	16.55	26.76	6.50
7	20.52	16.78	23.84	5.77
8	21.57	17.65	23.24	5.97
9	22.79	18.43	21.87	5.61
10	23.28	19.59	21.55	5.45

Source: Author's computation from E views 2022

Table 4.27.3 depicts the variance decomposition of financial openness growth (FOG), industrial output per capita growth (IOPCG) and trade openness growth (TOG). The result indicated that FOG decreased from 38.86% in the first year to 21.24% in the fourth year. The result increased in the fifth year to 22.14% and declined to 21.26% in the tenth year. The variance decomposition result indicated that IOPCG decreased from 10.28% in the first year to 5.03% in the third year. It picked in the fourth year to 6.79% and declined marginally to 6.31% in the tenth year. The result of TOG declined in an unstable way from 38.86% in the first year to 21.26% in the tenth year.

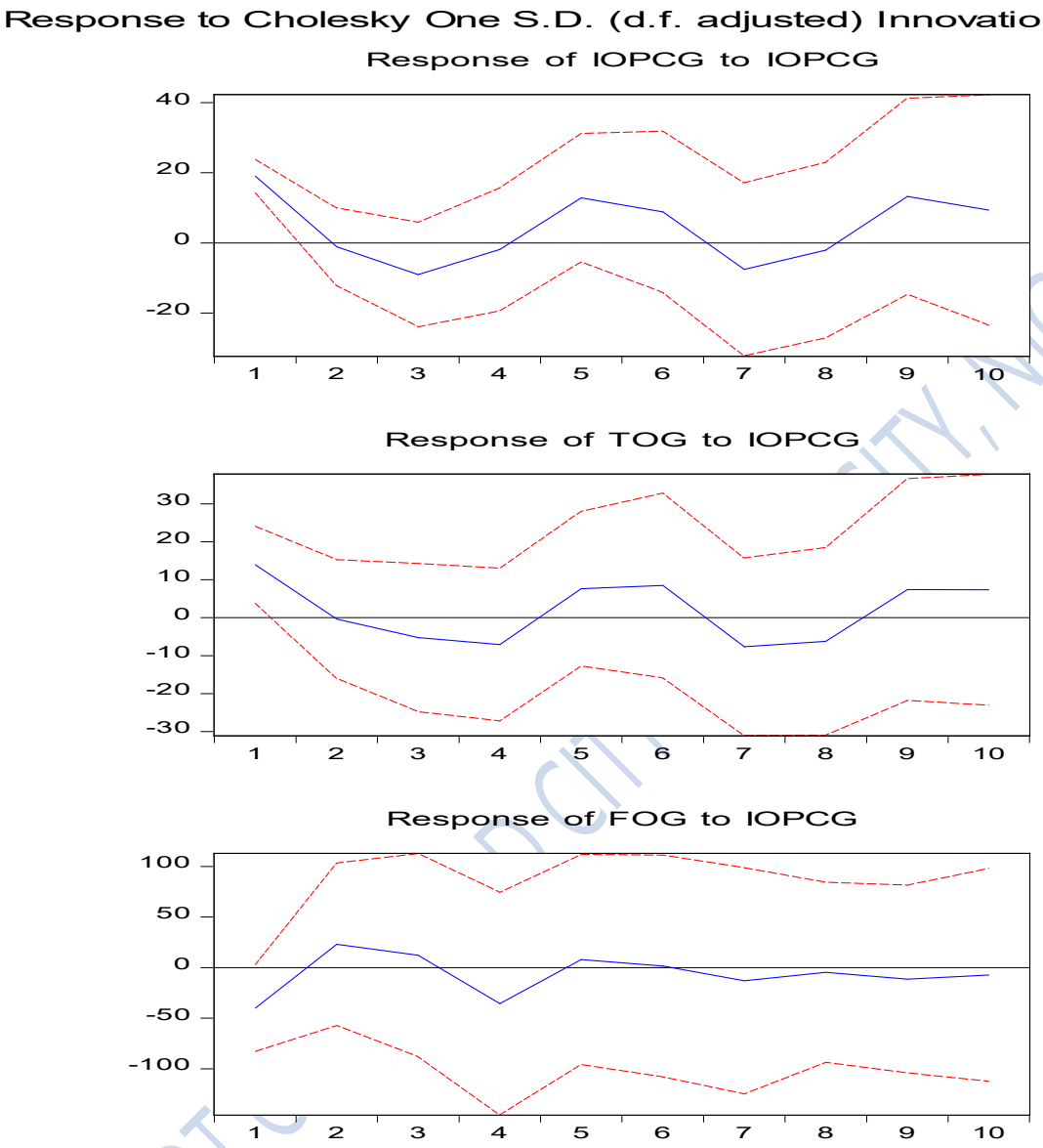
Table 4.27.3: Variance Decomposition of FOG:

Period	S.E.	IOPCG	TOG	FOG
1	13.13	10.28	35.96	38.86
2	19.19	5.10	24.47	22.58
3	24.40	5.032	24.73	21.57
4	26.64	6.79	22.60	21.24
5	27.64	6.46	21.13	22.14
6	28.82	6.23	21.37	21.46
7	29.02	6.41	21.02	21.82
8	29.31	6.09	21.52	21.37
9	29.62	6.24	21.39	21.28
10	29.99	6.31	21.37	21.26

Source: Author's computation from E views 2022

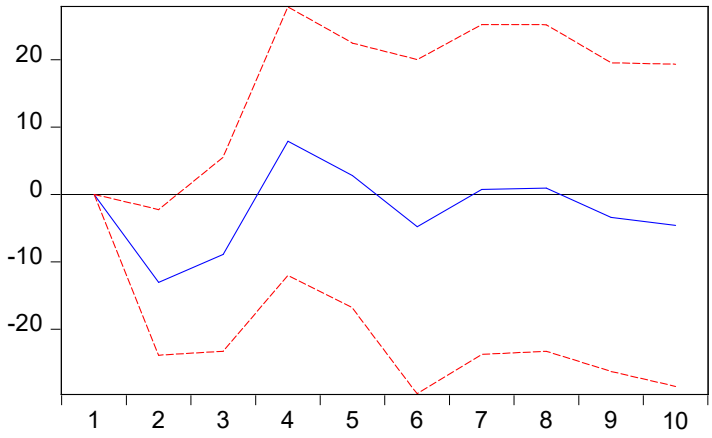
The result of GIRF test on figure 21 reveals that all the variables fluctuated throughout the period. The results shows that IOPCG to IOPCG, TOG, to IOPCG, TOG to TOG FOG to FOG responds positively to shocks in the early periods and responds negatively later and vice versa. Also, the result reveals that FOG responds negatively to shock in IOPCG and fluctuated along the periods. While responds to shock within other variables were not significance at the first year but continue fluctuating in the subsequent periods.

Dependent variable: IOPCG

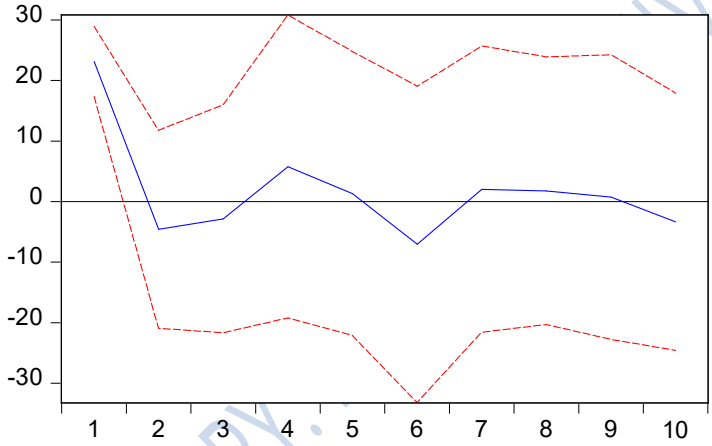


Response to Cholesky One S.D. (d.f. adjusted) Innovations ± 2 S.E.

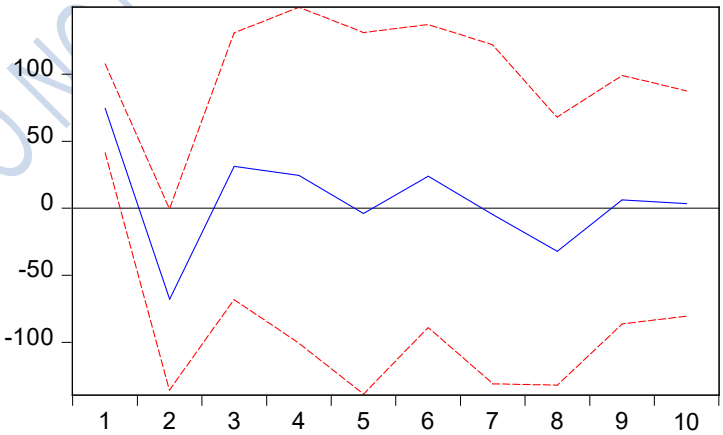
Response of lOPCG to TOG



Response of TOG to TOG



Response of FOG to TOG



Response to Cholesky One S.D. (d.f. adjusted) Innovations ± 2 S.E.

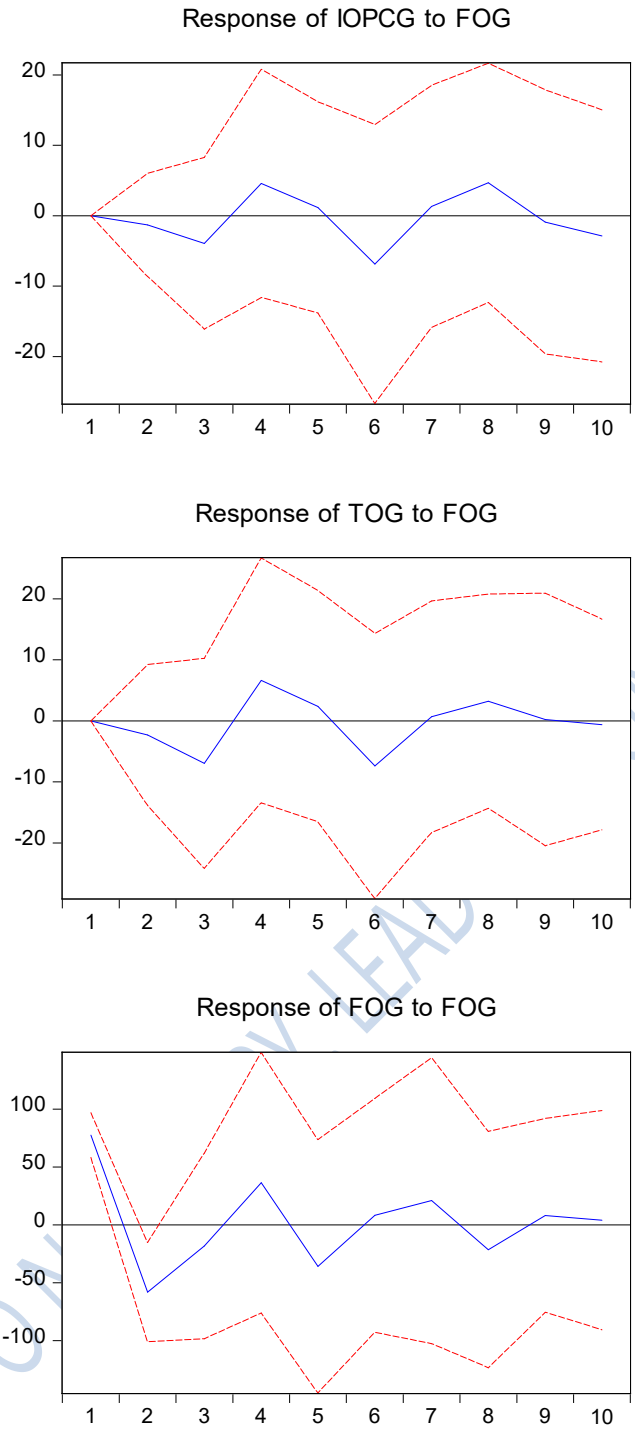


Figure 4.21: Graph of impulse response function

Source: Author's computation from E views 2022

4.5.3 Response of Financial Output per Capita Growth to Shocks in Economic Openness

Table 4.28: VAR Selection Order Criteria

Dependable Variable: FOPCG

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-1301.21	NA	9.16	83.01	84.25*	83.42
1	-1183.38	147.29*	1.29	80.71	85.66	82.35
2	-1050.39	91.43	3.67*	77.46*	86.12	80.33*

* indicates lag order selected by the criterion LR: sequential modified LR test statistic (each test at 5% level) FPE: Final prediction error AIC: Akaike information criterion SC: Schwarz information criterion HQ: Hannan-Quinn information criterion

Source: Author's computation from E views 2022

Table 4.29.1 depicts the variance decomposition result of financial output per capita growth (FOPCG), trade openness growth (TOG) and financial openness growth (FOG). The result indicated that FOPCG decreased from 100% in the first year to 42.94% in the tenth year. The variance decomposition of TOG increased from zero percent in the first year to 5.33% in the sixth year. The result indicated that it dropped from 5.02% in the seventh year to 4.98% in the tenth year. The result of FOG increased marginally from zero percent in the first year to 0.82% in the ninth year and dropped to 0.76% in the tenth year.

Table 4.29: Variance Decomposition

Table 4.29.1: Variance Decomposition of FOPCG:

Period	S.E.	FOPCG	TOG	FOG
1	27.92	100.00	0.00	0.00
2	32.49	75.51	1.75	0.10
3	36.56	65.31	3.37	0.22
4	37.82	62.25	3.58	0.22
5	39.90	55.92	4.81	0.24
6	41.13	52.71	5.33	0.63
7	42.39	50.04	5.02	0.61
8	43.02	48.59	4.98	0.82
9	44.20	46.17	4.76	0.82
10	45.83	42.94	4.98	0.76

Table 4.29.2 shows the variance decomposition of trade openness growth (TOG), financial output per capita growth (FOPCG) and financial openness growth (FOG). The result indicated that TOG declined from 35.41% in the first year to 24.16% in the fourth year. It picked in the fifth year to 25.17% and dropped again from 24.67% in the sixth year to 21.50% in the tenth year. The variance decomposition of FOPCG decreased steadily from 60.78% in the first year to 22.56% in the tenth year. The result of FOG increased from zero percent in the first year to 1.18% in the fourth year. It dropped to 1.13% in the fifth year before it picked back in the sixth year from 2.80% to 3.75% in the ninth year and dropped slightly to 3.70% in the tenth year.

Table 4.29.2: Variance Decomposition of TOG:

Period	S.E.	FOPCG	TOG	FOG
1	13.81	60.78	35.41	0.00
2	14.61	39.20	32.75	0.19
3	16.20	31.90	27.79	0.39
4	17.76	27.40	24.16	1.18
5	18.97	27.05	25.17	1.13
6	19.98	25.66	24.67	2.80
7	20.59	24.56	23.63	3.80
8	21.88	24.07	22.88	3.67
9	22.99	22.92	22.04	3.75
10	23.74	22.56	21.50	3.70

Table 4.29.3 reveals the variance decomposition of financial openness growth (FOG), financial output per capita growth (FOPCG) and trade openness growth (TOG). The result indicated that FOG decreased from 46.24% in the first year to 26.82% in the seventh year. It picked in the eighth year to 27.10% and dropped back in the tenth year to 26.05%. The variance decomposition of FOPCG declined and fluctuated from 0.48% in the first year to 0.42% in the third year. It increased from 2.95% in the fourth year to 4.36% in the tenth year. The result reveals that TOG declined from 31.64% in the first year to 13.56% in the seventh year and picked in the eighth year to 14.00%. The result dropped again to 13.11% in the tenth year.

Table 4.29.3: Variance Decomposition of FOG:

Period	S.E.	FOPCG	TOG	FOG
1	13.19	0.48	31.64	46.24
2	20.17	0.34	26.14	35.03
3	24.20	0.42	22.25	29.81
4	25.55	2.93	18.90	29.75
5	26.98	2.32	15.64	29.05
6	27.44	2.14	14.57	27.60
7	28.06	3.61	13.56	26.82
8	28.62	3.74	14.00	27.10
9	29.05	3.65	13.64	27.06
10	29.50	4.36	13.11	26.05

Source: Author's computation from E views 2022

The GRIF test results in figure 22 also reveals that the response of FOPCG to FOG is not significant while other variables responses to socks fluctuated along the horizons.

Dependent variable: FOPCG

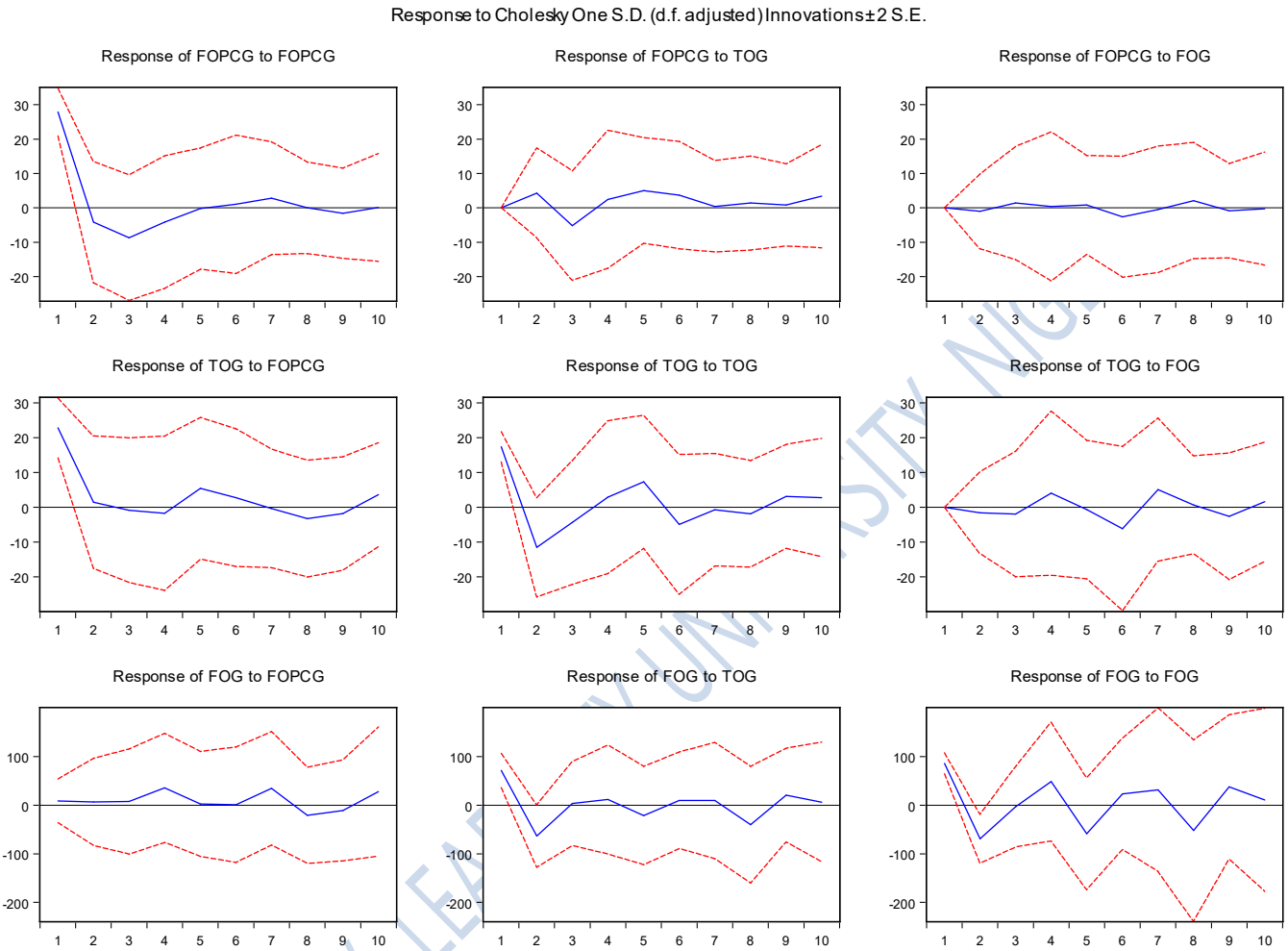


Figure 4.22: Graph of impulse response function

Source: Author's computation from E views 2022

4.5.4 Response of Service Output per Capita Growth to Shocks in Economic Openness

Table 4.30: VAR Selection Order Criteria

Dependable Variable: SOPCG

Lag	LogL	LR	FPE	AIC
0	-1263.96	NA	8.94	80.69
1	-1139.11	156.08*	8.11	77.94
2	-1023.03	79.80	6.64*	75.75*

* indicates lag order selected by the criterion; LR: sequential modified LR test statistic (each test at 5% level), FPE: Final prediction error, AIC: Akaike information criterion, SC: Schwarz information criterion, HQ: Hannan-Quinn information criterion.

Source: Author's computation from E views 2022

Table 4.31.1 depicts the variance decomposition of service output per capita growth (SOPCG), trade openness growth (TOG) and financial openness growth (FOG). The result indicated that SOPCG declined from 100% in the first year to 30.81% in the seventh year. It picked to 32.17% in the eighth year before it dropped again to 19.81% in the tenth year. The variance decomposition of TOG increased and fluctuated from zero percent in the first year to 7.80% in the tenth year. The result shown that FOG also picked and fluctuated from zero percent in the first year to 8.36% in the tenth year.

Table 4.31: Variance Decomposition

Table 4.31.1 Variance Decomposition of SOPCG:

Period	S.E.	SOPCG	TOG	FOG
1	10.92	100.00	0.00	0.00
2	14.71	81.10	5.67	0.72
3	16.92	61.65	8.10	1.30
4	19.78	45.15	6.83	6.45
5	22.71	41.35	7.50	7.77
6	25.15	33.77	7.65	9.88
7	26.40	30.81	7.02	11.31
8	28.64	32.17	6.59	10.54
9	33.00	24.27	6.99	9.96
10	36.64	19.81	7.80	8.36

Source: Author's computation from E views 2022

Table 4.31.2 shows the variance decomposition of trade openness growth (TOG), service output per capita growth (SOPCG) and financial openness growth (FOG). The result indicated that TOG decreased steadily from 77.83% in the first year to 20.00% in the tenth year. The variance decomposition of SOPCG increased and fluctuated from 0.68% in the first year to 7.39% in the tenth year. The result of FOG also increased and fluctuated from zero percent in the first year to 12.26% in the tenth year.

Table 4.31.2 Variance Decomposition of TOG:

Period	S.E.	SOPCG	TOG	FOG
1	11.16	0.68	77.83	0.00
2	12.59	0.71	52.58	3.69
3	14.93	1.60	36.28	2.56
4	19.41	1.95	29.37	8.26
5	20.77	3.31	25.20	10.04
6	22.81	4.12	24.64	9.82
7	25.33	3.85	22.83	10.97
8	26.90	6.44	21.00	11.12
9	31.42	7.88	20.58	11.02
10	36.80	7.39	20.00	12.26

Source: Author's computation from E views 2022

Table 4.31.3 reveals the trend of the variance decomposition of financial openness growth (FOG), service output per capita growth (SOPCG) and trade openness growth (TOG). The result indicated that Fog decreases from 69.47% in the first year to 38.70% in the third year. It rose in the fourth year to 42.83% and felt again to 32.98% in the sixth year. The variance decomposition rise again in the seventh year to 34.51% before declined to 27.55% in the tenth year. The result reveals that SOPCG picked and fluctuated from 2.41% in the first year to 19.51% in the tenth year. While the variance decomposition of TOG dropped from 1.63% in the first year to 0.68% in the second year. It picked and dropped from 3.18% in the third year to 2.99% in the fifth year. The variance decomposition of TOG then picked from 3.25% in the sixth year to 4.99% in the tenth year.

Table 4.31.3 Variance Decomposition of FOG:

Period	S.E.	SOPCG	TOG	FOG
1	13.61	2.41	1.63	69.47
2	18.31	18.82	0.68	45.94
3	25.89	25.20	3.18	38.70
4	27.34	19.77	4.39	42.83
5	28.94	20.50	2.99	34.55
6	30.34	22.98	3.25	32.98
7	30.98	20.53	3.76	34.51
8	31.57	21.06	3.20	30.12
9	32.78	22.61	3.51	28.54
10	34.46	19.51	4.99	27.55

Source: Author's computation from E views 2022

The GRIF test on figure 23 also shown that the response of FOG to TOG is not significant, while it reveals that the results of response of other variables among other variables were fluctuated throughout the horizons.

Dependent variable: SOPCG

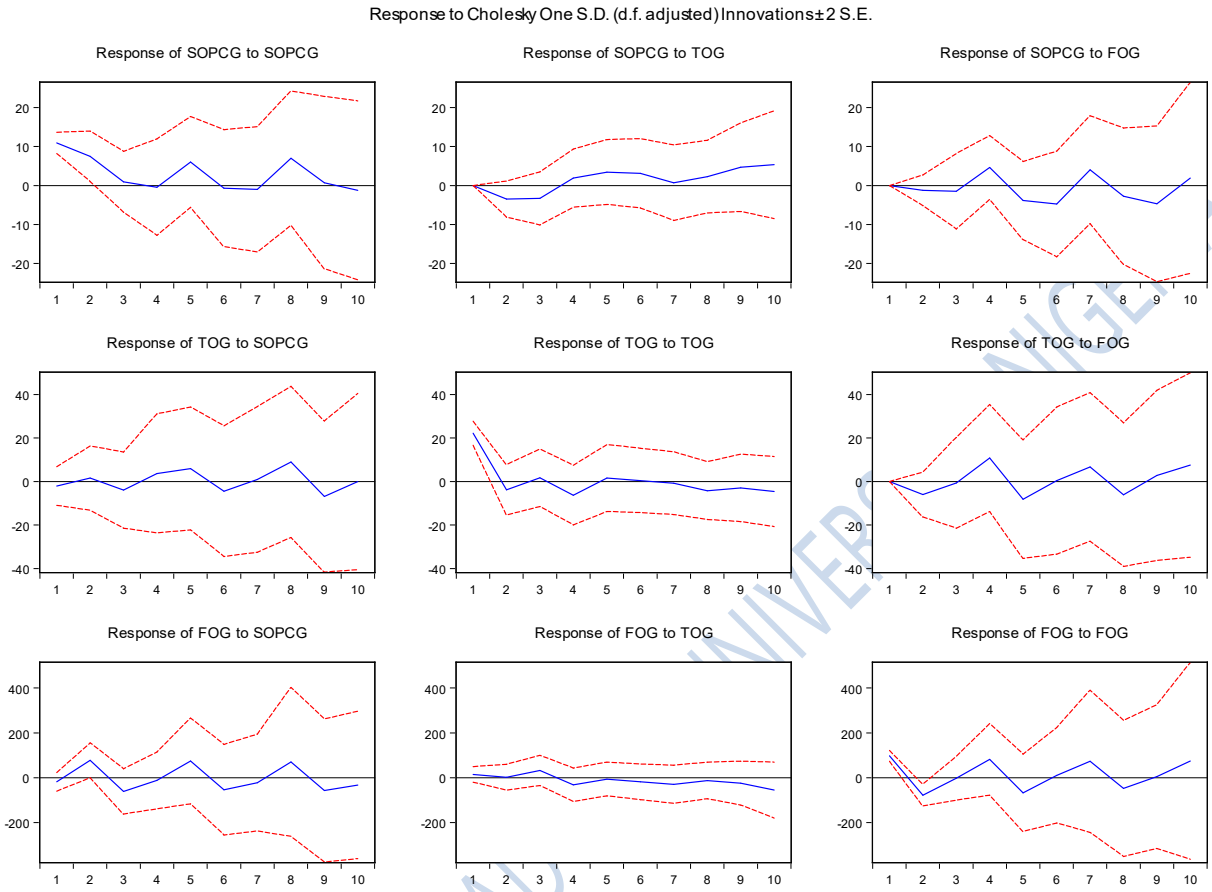


Figure 4.23: Graph of impulse response function

Source: Author's computation from E views 2022

4.6 Discussion of Findings

This research was carried out to investigate the impact of economic openness on growth of sectoral output in Nigeria between 1985-2019. Several econometric techniques were employed in order to achieve the research objectives. The Toda and Yamamoto causality test was used to investigate the causal relationship between economic openness and growth of sectoral output. This was followed by the Autoregressive Distributed Lag (ARDL) bounds test employed to investigate the long-run co-integrating relationship between economic openness and growth of sectoral output. The Impulse Response Functions (IRFs) and Forecast Error Variance Decomposition (FEVDs) were employed in examining the response of the dependent variable to impulse in economic openness.

The discussion of findings of the study is as follows; The result of the granger causality test indicated non causality between economic openness and agricultural, industrial and financial output as a result of total neglect of agriculture and other non-oil sector in the country in the early 1970s and this neglect continues to the extent that Nigerian agricultural sector cannot afford to produce what her citizenry will consume not to talk about exporting of the produce. The present-day problem of Nigerian economy is as a result of total neglect of the agricultural sector and increased dependence on a mono-cultural economy based on oil. The contribution of agriculture to Nigeria's GDP now lies within 5%[3]. While it indicated that there is unidirectional causality between trade openness and service output and between service output and trade openness which has been traced to the positive performance of the sector. For instance, the Nigerian service sector has been able to display impressive results despite tough economic circumstances. In 2014,Nigeria's rebased Gross Domestic Product sectoral composition shifted toward the service sector and moved away from the oil sector. The service sector accounted for

54.8% of the rebased GDP, with the largest contributors being wholesale and retail trade contributing 16.27%, real estate contributing 8.3% and information and communication contributing 11.04%[4]. The result of the ARDL bounds test confirms the existence of long-run relationship between economic openness and sectoral output (agricultural, industrial, financial and service sector). This necessitated the long-run and the ecm short-run analysis. Also, the result of the variance decomposition indicated that agricultural output to own shock and financial output to own shock decreases from 100% in the first year to 23.67% and 42.94% respectively in the tenth year. While the shocks of industrial and service sector output to their various own shock fluctuated within the said periods. For the Impulse Response Function, the result indicated that the response of most of the variables were weak and fluctuating, while that of financial openness to agricultural output, financial openness to trade openness, financial output to financial openness and financial openness to trade openness were not significance.

The study recommended that Nigeria government should diversified the economy away from oil, attention should be more given on the provision of infrastructural facilities, sensitizing farmers on the uses of sophisticated farm tools among others.

Endnotes

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Chapter Five

Conclusion

5.1 Summary of Findings

The main objective of this study was to assess the of impact of Economic Openness on growth of sectoral output in Nigeria. Specifically to establish the causal relationship between Economic Openness and sectoral output, determining the effect of economic openness on sectoral output and to analyzed the response of growth of sectoral output on economic openness in Nigeria. The study was concluded using time series data collated from Central Bank of Nigeria and World Bank Development indicator ranging from 1985 – 2019.

The stationarity test on variable depicts a mixed results of integration of order zero and one. While AOPCG, IOPCG, SOPCG, FOPCG, GDPPCG, INT, FOG, TOG, CPCG, FDO and GEG are integrated of order one (1(0)). Other variable, INF and EXR are integrated of order one (1(1)). These respective orders of integration are at 1% level of significant. Hence to achieve the stated objectives of this study based on the combination of the statistical properties at included variables as mentioned above.

Toda and Yamamoto causality test, bounds testing and impulse tests were carried out to establish the causal relationship between economic openness and growth of sectoral output, determining the effect of economic openness on sectoral output and to analyzed the response of growth of sectoral output on economic openness.

5.2 Conclusion

From the study, it can be concluded that; SOPCG causes TOG and TOG cause SOPCG's while there was no causal relationship among other variables. In the long run, TOG has positive effect

on AOPCG, IOPCG and FOPCG but negative effect on SOPCG. Though, they are not significance, while FOG has negative and insignificance effect on AOPCG, IOPCG, FOPCG and SOPCG. Furthermore, INT is significance to IOPCG, FOPCG and SOPCG but not significant to the variables.

In the short run, there are mixed results on the effect of economic openness on growth in sectoral output. TOG and FOG have positive effect and significance to SOPCG they both have negative effect on AOPCG though TOG is significance to AOPCG while FOG is insignificance. For other two sectors, TOG has both positive and significance effect on FOPCG while it also significance to IOPCG but the result reveal a negative effect. FOG equally has both positive and significant effect on IOPCG and its effect on FOPCG are negative and not significance.

On responses to shocks in variables, TOG and FOG had positive impact on AOPCG also AOPCG had impact on FOG while AOPCG and TOG impact on FOG felt during the period under consideration. The result reveals that the impact of TOG and FOG on IOPCG also IOPCG and FOG on TOG rose positively.

The response to shocks of TOG and FOG on FOPCG rose positively while FOPCG and FOG had negative response on TOG. Similarly, all the explanatory variables had positive impact with SOPCG.

5.3 Recommendations

From the analysis in this study, the following recommendations are made:

1. Government should diversely Nigeria economy away from oil as fluctuations in oil price constitute a huge channel through which external shocks affect the domestic economy.

2. Nigeria government should focus on the improvement of infrastructure facilities such as electricity, water supply, transportation etc this would reduce the problem confronting various sector in the country and foster the benefit of economic openness.
3. Government should make provisions and enforce the uses of sophisticated farm tools both in the urban and rural area. These would increase agricultural products, reducing poverty rate and increase the standard of living in Nigeria.
4. Government should encourage the development and transfer of technology from developed countries so as to bring about advanced production techniques in the various sectors.
5. Government should formulate and implement efficient fiscal and monetary policies in order to improve macroeconomic stability, reduce vulnerability to external shocks, while stable exchange and interest rate should be carried out.
6. Every sector of the economy should be given equal priority in order to improve the per capita income and Gross Domestic Product (GDP) of the country and creation of employment opportunities

5.4 Contribution to Knowledge

The study is more up-to-date, more robust and more comprehensive. It also contributed to the dearth of literature and provided clear explanation of the relationship between economic openness and sectors such as agricultural production, industrial production, financial performance and service performance. The study would also give scope for full implementation of economic or export product diversification policy in Nigeria. This implies that the study could

have insights to Nigeria government and other policy makers to create enabling environment for global economic integration (trade and financial interventions).

5.5 Areas of Further Research

In view of limitations of this study, it is anticipated that future studies should find statistical determinants of economic openness in Nigeria. Also, subsequent scholars should widen the scope and variables of this study. More so, further studies should consider the determinants of the neglected non-oil export in the country. Furthermore, future research work should make a further consideration of sub sectors of the nation's economy by splitting each of the sectors such as agricultural sector into farming, fishery, livestock; industrial sector into mining, quarrying, manufacturing; financial sector into financial banking, investment banking, insurance; and service sector into transportation, communication and logistic.

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Appendices

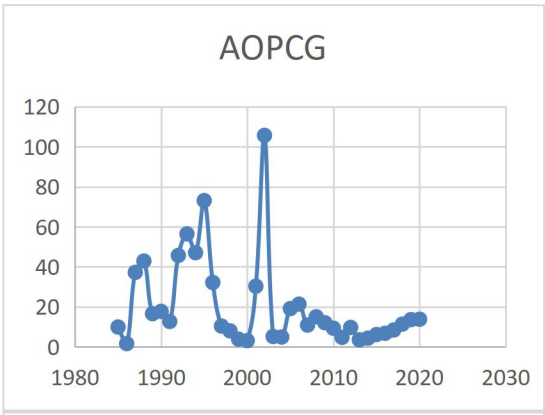
Trade Openness Performance in Nigeria (1981-2019)

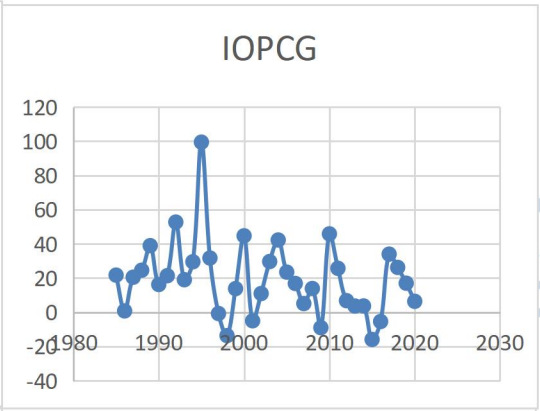
Period	Average Trade in Billions US $	Average Growth in billions US $	Averages in Billions US $
1981-1990	12.93	80.68	17.25
1991-2000	19.55	49.15	38.60
2001-2010	83.67	208.90	40.61
2011-2019	146.19	447.60	32.80

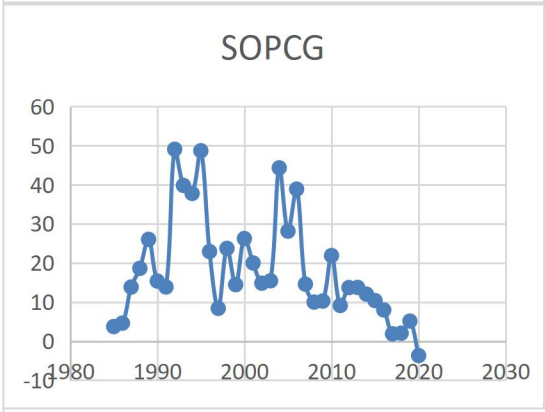
Financial Openness Performance in Nigeria (1981-2019)

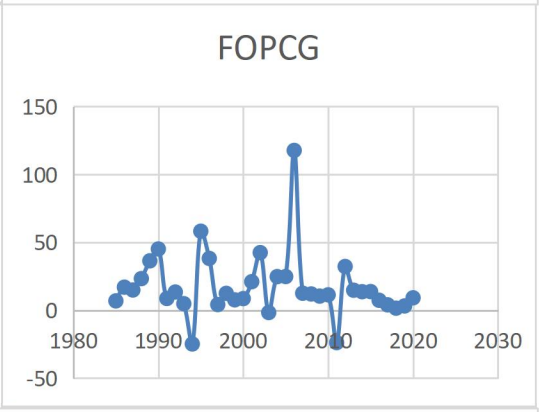
Period	Average Current Account in Billions US $	Average Growth in Billions US $	Average Financial Openness in Billions US $
1981-1990	2.75	80.68	3.00
1991-2000	1.76	49.15	3.44
2001-2010	18.06	208.90	8.33
2011-2019	10.99	447.60	2.46

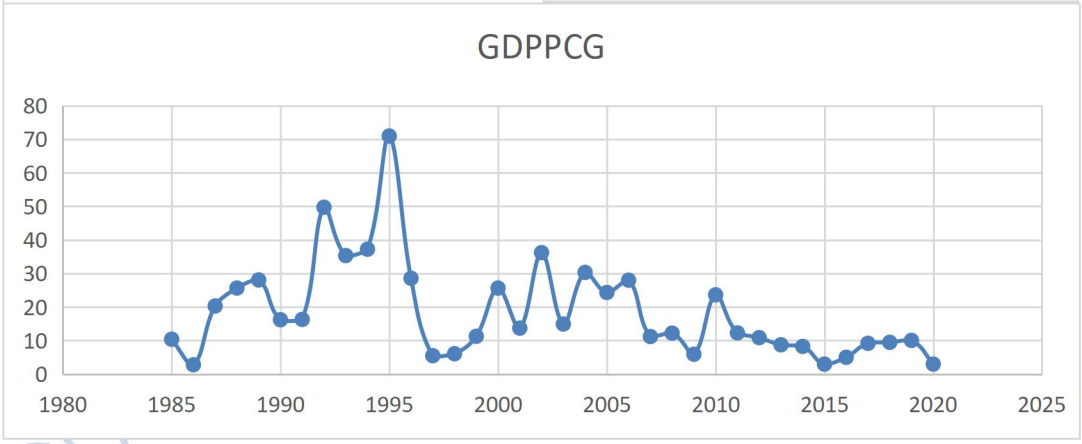
Preliminary Analysis

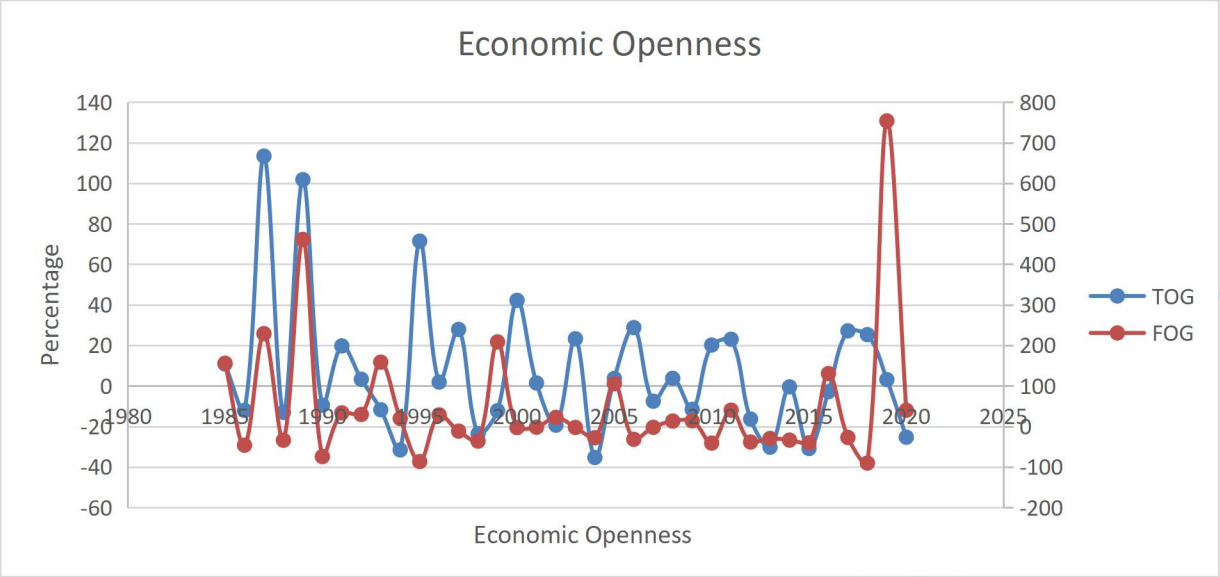


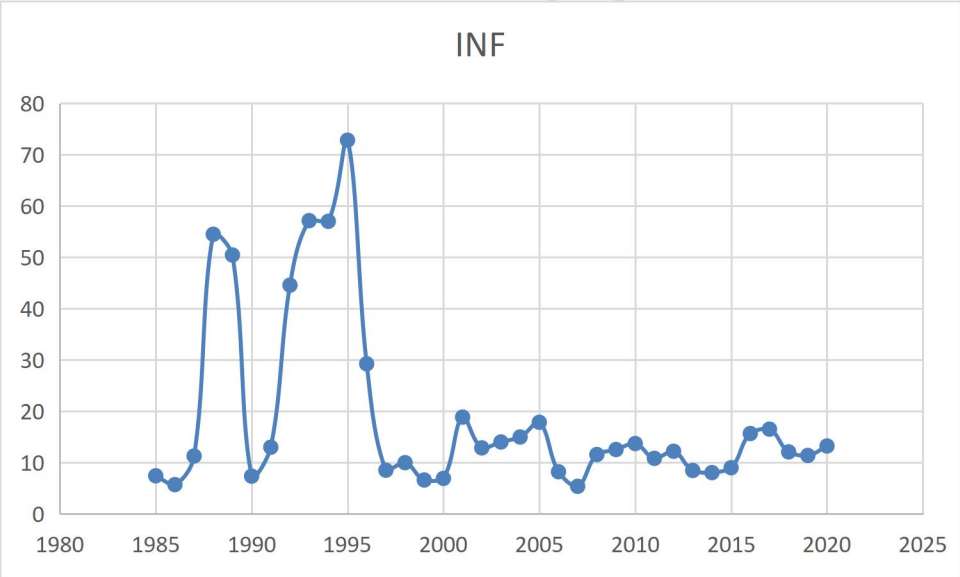


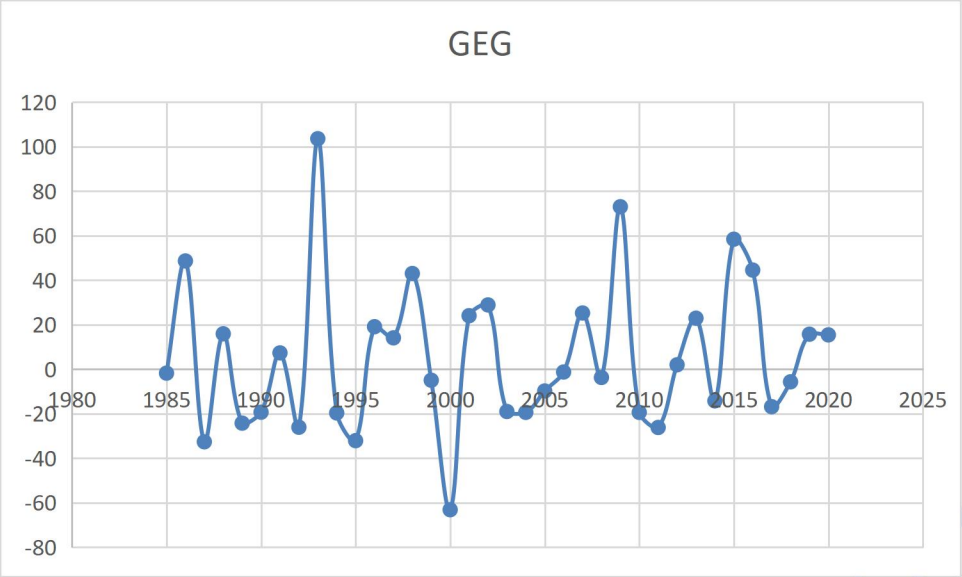


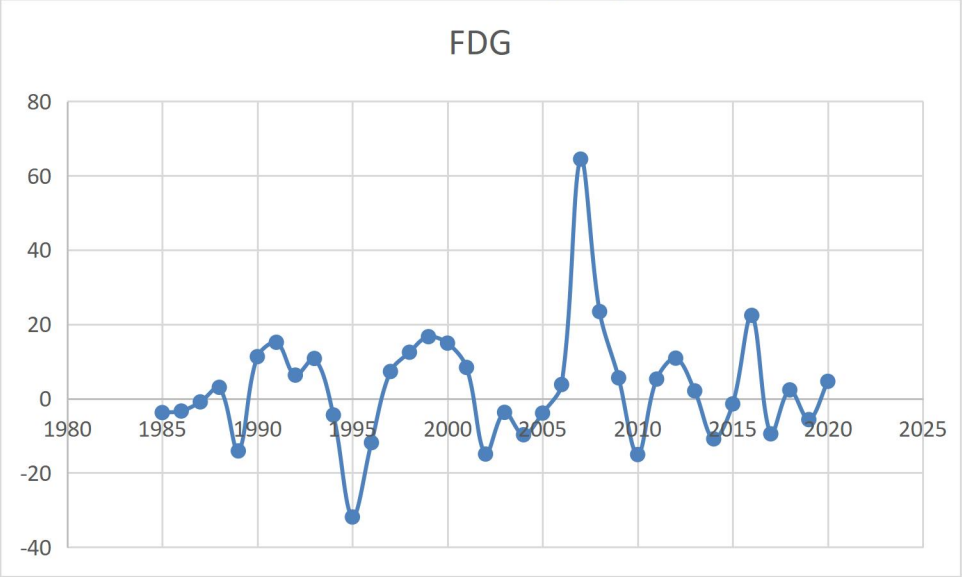


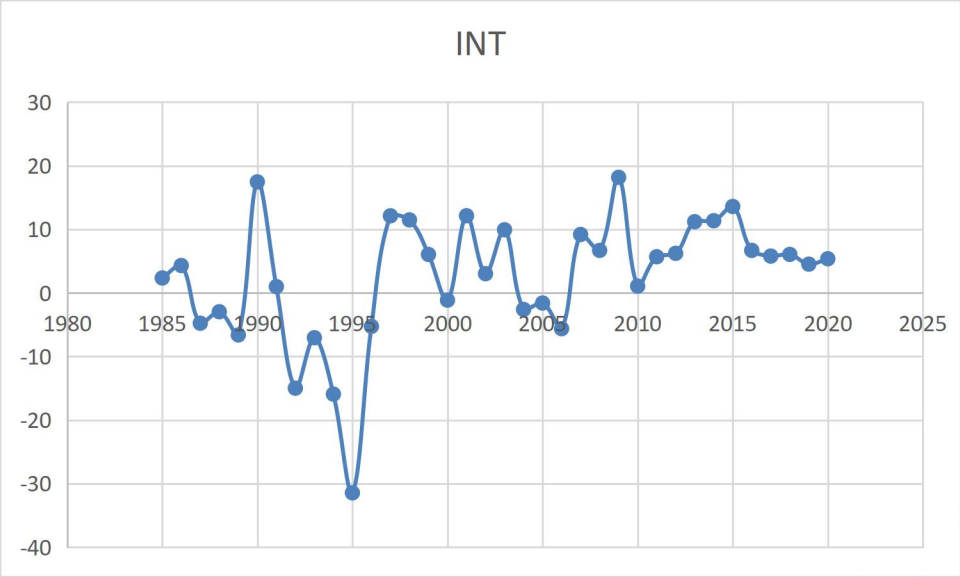


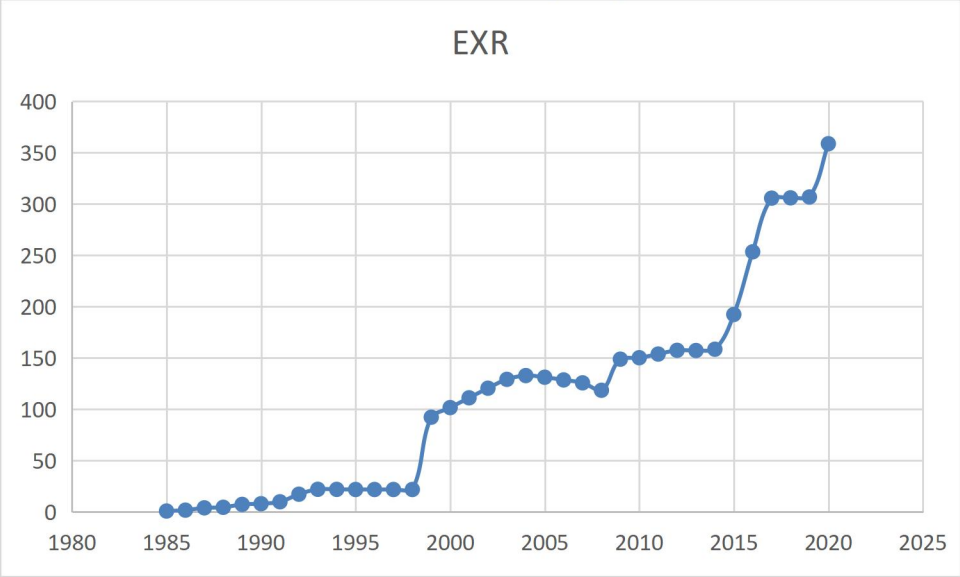

Economic Openness
140
120
100
80
60
40
20
0
-20
-40
-60
800
700
600
500
400
300
200
100
0
-100
-200
1980
1985
1990
1995
2000
2005
2010
2015
2020
2025
Percentage
Economic Openness
TOG
FOG


INF
80
70
60
50
40
30
20
10
0
1980
1985
1990
1995
2000
2005
2010
2015
2020
2025









Descriptive Statistics

	CPCG	EXR	FDG	FOG	GEG	INF	INT	TOG
Mean	-1.227072	111.8784	2.956653	49.40526	5.613641	19.17829	2.541450	7.144043
Maximum	29.48122	358.8108	64.47381	753.7976	103.5954	72.83550	18.18000	113.3939
Minimum	-22.87835	0.893774	-31.87148	-90.56402	-63.16369	-5.388008	-31.45257	-35.34835
Std. Dev.	12.66990	100.1713	15.70859	161.1776	33.40248	17.68447	9.951241	33.86525
Skewness	-0.712346	0.784745	-1.395309	-2.889518	0.771039	-1.742210	-1.207375	-1.504840
Kurtosis	3.231892	2.875050	8.038520	12.13190	3.796135	4.695101	5.215168	5.369585
Jarque-Bera	3.125281	3.718367	49.76135	175.1834	4.517757	22.52183	16.10699	22.00966
Probability	0.209582	0.155800	0.000000	0.000000	0.104468	0.000013	0.000318	0.000017

	IOPCG	SOPCG	GDPPCG	FOPCG	AOPCG
Mean	19.37909	18.27121	18.61001	17.39733	20.39739
Maximum	99.47081	49.07453	70.95777	117.6895	105.6968
Minimum	-15.87252	-3.688673	2.770630	-24.80774	1.601277
Std. Dev.	21.88356	13.47524	14.58992	23.81073	22.35733
Skewness	1.246419	0.842523	1.568594	2.065159	2.110044
Kurtosis	6.204235	2.946034	5.933252	10.21586	7.577394
Jarque-Bera	24.72204	4.263440	27.66887	103.6922	58.14252
Probability	0.000004	0.118633	0.000001	0.000000	0.000000

Correlation Analysis

	CPCG	EXR	FDG	FOG	GEG	INF	INT	TOG
CPCG	1.00							
EXR	0.38	1.00						
FDG	-0.20	0.04	1.00					
FOG	0.35	0.10	-0.07	1.00				
GEG	0.22	0.06	0.24	0.02	1.00			
INF	-0.08	-0.38	-0.35	0.07	-0.03	1.00		
INT	0.22	0.36	0.41	-0.10	0.35	-0.78	1.00	
TOG	0.04	-0.21	-0.25	0.28	-0.51	0.19	-0.38	1.00

Unit Root

Null Hypothesis: AOPCG has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.073539	0.0032
Test critical values:	1% level	-3.632900	
	5% level	-2.948404	
	10% level	-2.612874	

Null Hypothesis: IOPCG has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.659162	0.0006
Test critical values:	1% level	-3.632900	
	5% level	-2.948404	
	10% level	-2.612874	

Null Hypothesis: SOPCG has a unit root
Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.940348	0.0509
Test critical values:	1% level	-3.632900	
	5% level	-2.948404	
	10% level	-2.612874	

Null Hypothesis: FOPCG has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.676309	0.0000
Test critical values:	1% level	-3.632900	
	5% level	-2.948404	
	10% level	-2.612874	

Null Hypothesis: GDPPCG has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.399942	0.0177
Test critical values:	1% level	-3.632900	
	5% level	-2.948404	
	10% level	-2.612874	

Null Hypothesis: INT has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.587875	0.0112
Test critical	1% level	-3.632900	

values:		
	5% level	-2.948404
	10% level	-2.612874

Null Hypothesis: INF has a unit root
Exogenous: Constant
Lag Length: 7 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.320388	0.1729
Test critical values:	1% level	-3.689194	
	5% level	-2.971853	
	10% level	-2.625121	

Null Hypothesis: D(INF) has a unit root
Exogenous: Constant
Lag Length: 7 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.633335	0.0010
Test critical values:	1% level	-3.699871	
	5% level	-2.976263	
	10% level	-2.627420	

Null Hypothesis: EXR has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		1.813206	0.9996
Test critical values:	1% level	-3.632900	
	5% level	-2.948404	
	10% level	-2.612874	

Null Hypothesis: D(EXR) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.988345	0.0041
Test critical values:	1% level	-3.639407	
	5% level	-2.951125	
	10% level	-2.614300	

Null Hypothesis: FOG has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.347637	0.0000
Test critical values:	1% level	-3.632900	
	5% level	-2.948404	
	10% level	-2.612874	

Null Hypothesis: TOG has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.459340	0.0000
Test critical values:	1% level	-3.632900	
	5% level	-2.948404	
	10% level	-2.612874	

Null Hypothesis: CPCG has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*

Augmented Dickey-Fuller test statistic		-4.903842	0.0003
Test critical values:	1% level	-3.632900	
	5% level	-2.948404	
	10% level	-2.612874	

Null Hypothesis: FDG has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.350136	0.0015
Test critical values:	1% level	-3.632900	
	5% level	-2.948404	
	10% level	-2.612874	

Null Hypothesis: GEG has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.891309	0.0000
Test critical values:	1% level	-3.639407	
	5% level	-2.951125	
	10% level	-2.614300	

Causality Test

VAR Granger Causality/Block Exogeneity Wald Tests
Date: 12/16/21 Time: 14:58
Sample: 1985 2020
Included observations: 31

Dependent variable: AOPCG

Excluded	Chi-sq	df	Prob.
CPCG	0.023293	2	0.9884
FDG	0.020757	2	0.9897
TOG	1.213632	2	0.5451
FOG	0.483992	2	0.7851
GEG	0.201715	2	0.9041
INF	1.636909	2	0.4411
EXR	0.533574	2	0.7658
INT	1.628069	2	0.4431
All	4.661630	16	0.9972

Dependent variable: CPCG

Excluded	Chi-sq	df	Prob.
AOPCG	0.417246	2	0.8117
FDG	1.829968	2	0.4005
TOG	2.063593	2	0.3564
FOG	2.341615	2	0.3101
GEG	0.602910	2	0.7397
INF	1.190789	2	0.5513
EXR	4.220848	2	0.1212
INT	0.301415	2	0.8601
All	12.43600	16	0.7135

Dependent variable: FDG

Excluded	Chi-sq	df	Prob.
AOPCG	0.190318	2	0.9092
CPCG	1.221074	2	0.5431
TOG	1.283374	2	0.5264
FOG	0.056470	2	0.9722
GEG	0.628698	2	0.7303
INF	4.083692	2	0.1298
EXR	0.155354	2	0.9253
INT	4.328640	2	0.1148
All	10.51120	16	0.8386

Dependent variable: TOG

Excluded	Chi-sq	df	Prob.
AOPCG	2.883785	2	0.2365
CPCG	3.322144	2	0.1899
FDG	5.842977	2	0.0539
FOG	2.755533	2	0.2521
GEG	8.800542	2	0.0123
INF	1.922454	2	0.3824
EXR	2.250354	2	0.3246
INT	2.914747	2	0.2328
All	17.68730	16	0.3425

Dependent variable: FOG

Excluded	Chi-sq	df	Prob.
AOPCG	2.111663	2	0.3479
CPCG	0.179083	2	0.9144
FDG	2.046594	2	0.3594
TOG	12.96819	2	0.0015
GEG	2.635677	2	0.2677
INF	7.903353	2	0.0192
EXR	4.565261	2	0.1020
INT	4.130860	2	0.1268
All	56.54745	16	0.0000

Dependent variable: GEG

Excluded	Chi-sq	df	Prob.
AOPCG	2.132986	2	0.3442
CPCG	2.214874	2	0.3304
FDG	2.230458	2	0.3278
TOG	0.451112	2	0.7981
FOG	1.816461	2	0.4032
INF	0.783387	2	0.6759
EXR	0.070121	2	0.9655
INT	0.824491	2	0.6622
All	9.178539	16	0.9059

Dependent variable: INF

Excluded	Chi-sq	df	Prob.
AOPCG	0.183728	2	0.9122
CPCG	1.023145	2	0.5996
FDG	0.026835	2	0.9867
TOG	0.696968	2	0.7058
FOG	0.055448	2	0.9727
GEG	1.694660	2	0.4286
EXR	0.031699	2	0.9843
INT	0.898193	2	0.6382
All	7.260022	16	0.9679

Dependent variable: EXR

Excluded	Chi-sq	df	Prob.
AOPCG	0.163842	2	0.9213
CPCG	0.805672	2	0.6684
FDG	1.366683	2	0.5049
TOG	1.409832	2	0.4942
FOG	0.074534	2	0.9634
GEG	0.245570	2	0.8845
INF	0.860784	2	0.6503
INT	3.002862	2	0.2228
All	8.251498	16	0.9410

Dependent variable: INT

Excluded	Chi-sq	df	Prob.
AOPCG	0.696357	2	0.7060
CPCG	1.241467	2	0.5375
FDG	3.276737	2	0.1943
TOG	11.31515	2	0.0035
FOG	2.036799	2	0.3612
GEG	1.149249	2	0.5629
INF	7.004304	2	0.0301
EXR	2.121236	2	0.3462
All	34.94881	16	0.0040

VAR Granger Causality/Block Exogeneity Wald Tests
Date: 12/16/21 Time: 14:59
Sample: 1985 2020
Included observations: 31

Dependent variable: IOPCG

Excluded	Chi-sq	df	Prob.
CPCG	0.045454	2	0.9775
FDG	0.850260	2	0.6537
TOG	1.548206	2	0.4611
FOG	2.681513	2	0.2616
GEG	2.308746	2	0.3153
INF	2.829443	2	0.2430
EXR	8.226998	2	0.0164
INT	0.005244	2	0.9974
All	27.54242	16	0.0358

Dependent variable: CPCG

Excluded	Chi-sq	df	Prob.
IOPCG	2.986473	2	0.2246
FDG	3.721019	2	0.1556
TOG	4.577678	2	0.1014
FOG	4.833328	2	0.0892
GEG	1.196755	2	0.5497
INF	1.589589	2	0.4517
EXR	6.019043	2	0.0493
INT	2.645493	2	0.2664
All	17.96944	16	0.3257

Dependent variable: FDG

Excluded	Chi-sq	df	Prob.
IOPCG	0.612492	2	0.7362
CPCG	1.407142	2	0.4948

TOG	1.198696	2	0.5492
FOG	0.253767	2	0.8808
GEG	1.276763	2	0.5281
INF	5.107173	2	0.0778
EXR	0.471670	2	0.7899
INT	4.564620	2	0.1020
All	11.36096	16	0.7867

Dependent variable: TOG

Excluded	Chi-sq	df	Prob.
IOPCG	0.331220	2	0.8474
CPCG	1.306671	2	0.5203
FDG	3.405098	2	0.1822
FOG	0.902799	2	0.6367
GEG	1.895430	2	0.3876
INF	2.717622	2	0.2570
EXR	1.073982	2	0.5845
INT	3.071315	2	0.2153
All	12.20183	16	0.7300

Dependent variable: FOG

Excluded	Chi-sq	df	Prob.
IOPCG	3.738971	2	0.1542
CPCG	1.890765	2	0.3885
FDG	2.483776	2	0.2888
TOG	18.84089	2	0.0001
GEG	2.869494	2	0.2382
INF	8.178692	2	0.0168
EXR	3.723991	2	0.1554
INT	0.943790	2	0.6238
All	65.48869	16	0.0000

Dependent variable: GEG

Excluded	Chi-sq	df	Prob.
IOPCG	1.068492	2	0.5861
CPCG	0.747969	2	0.6880
FDG	3.090233	2	0.2133

TOG	0.909426	2	0.6346
FOG	0.825259	2	0.6619
INF	0.657993	2	0.7196
EXR	0.172065	2	0.9176
INT	0.348065	2	0.8403
All	7.495900	16	0.9625

Dependent variable: INF

Excluded	Chi-sq	df	Prob.
IOPCG	4.539433	2	0.1033
CPCG	3.786244	2	0.1506
FDG	0.028641	2	0.9858
TOG	0.935140	2	0.6265
FOG	1.927991	2	0.3814
GEG	4.094451	2	0.1291
EXR	0.311633	2	0.8557
INT	0.653726	2	0.7212
All	14.64235	16	0.5510

Dependent variable: EXR

Excluded	Chi-sq	df	Prob.
IOPCG	1.086413	2	0.5809
CPCG	0.653614	2	0.7212
FDG	1.653354	2	0.4375
TOG	1.581930	2	0.4534
FOG	0.415645	2	0.8124
GEG	0.291914	2	0.8642
INF	2.295099	2	0.3174
INT	3.929116	2	0.1402
All	9.908184	16	0.8714

Dependent variable: INT

Excluded	Chi-sq	df	Prob.
IOPCG	6.246471	2	0.0440
CPCG	4.898680	2	0.0864
FDG	3.035566	2	0.2192
TOG	15.11222	2	0.0005

FOG	6.527598	2	0.0382
GEG	2.840047	2	0.2417
INF	14.03264	2	0.0009
EXR	4.036068	2	0.1329
All	58.27180	16	0.0000

VAR Granger Causality/Block Exogeneity Wald Tests
Date: 12/16/21 Time: 14:59
Sample: 1985 2020
Included observations: 31

Dependent variable: IOPCG

Excluded	Chi-sq	df	Prob.
CPCG	0.045454	2	0.9775
FDG	0.850260	2	0.6537
TOG	1.548206	2	0.4611
FOG	2.681513	2	0.2616
GEG	2.308746	2	0.3153
INF	2.829443	2	0.2430
EXR	8.226998	2	0.0164
INT	0.005244	2	0.9974
All	27.54242	16	0.0358

Dependent variable: CPCG

Excluded	Chi-sq	df	Prob.
IOPCG	2.986473	2	0.2246
FDG	3.721019	2	0.1556
TOG	4.577678	2	0.1014
FOG	4.833328	2	0.0892
GEG	1.196755	2	0.5497
INF	1.589589	2	0.4517
EXR	6.019043	2	0.0493
INT	2.645493	2	0.2664
All	17.96944	16	0.3257

Dependent variable: FDG

Excluded	Chi-sq	df	Prob.
IOPCG	0.612492	2	0.7362
CPCG	1.407142	2	0.4948
TOG	1.198696	2	0.5492
FOG	0.253767	2	0.8808
GEG	1.276763	2	0.5281
INF	5.107173	2	0.0778
EXR	0.471670	2	0.7899
INT	4.564620	2	0.1020
All	11.36096	16	0.7867

Dependent variable: TOG

Excluded	Chi-sq	df	Prob.
IOPCG	0.331220	2	0.8474
CPCG	1.306671	2	0.5203
FDG	3.405098	2	0.1822
FOG	0.902799	2	0.6367
GEG	1.895430	2	0.3876
INF	2.717622	2	0.2570
EXR	1.073982	2	0.5845
INT	3.071315	2	0.2153
All	12.20183	16	0.7300

Dependent variable: FOG

Excluded	Chi-sq	df	Prob.
IOPCG	3.738971	2	0.1542
CPCG	1.890765	2	0.3885
FDG	2.483776	2	0.2888
TOG	18.84089	2	0.0001
GEG	2.869494	2	0.2382
INF	8.178692	2	0.0168
EXR	3.723991	2	0.1554
INT	0.943790	2	0.6238
All	65.48869	16	0.0000

Dependent variable: GEG

Excluded	Chi-sq	df	Prob.
IOPCG	1.068492	2	0.5861
CPCG	0.747969	2	0.6880
FDG	3.090233	2	0.2133
TOG	0.909426	2	0.6346
FOG	0.825259	2	0.6619
INF	0.657993	2	0.7196
EXR	0.172065	2	0.9176
INT	0.348065	2	0.8403
All	7.495900	16	0.9625

Dependent variable: INF

Excluded	Chi-sq	df	Prob.
IOPCG	4.539433	2	0.1033
CPCG	3.786244	2	0.1506
FDG	0.028641	2	0.9858
TOG	0.935140	2	0.6265
FOG	1.927991	2	0.3814
GEG	4.094451	2	0.1291
EXR	0.311633	2	0.8557
INT	0.653726	2	0.7212
All	14.64235	16	0.5510

Dependent variable: EXR

Excluded	Chi-sq	df	Prob.
IOPCG	1.086413	2	0.5809
CPCG	0.653614	2	0.7212
FDG	1.653354	2	0.4375
TOG	1.581930	2	0.4534
FOG	0.415645	2	0.8124
GEG	0.291914	2	0.8642
INF	2.295099	2	0.3174
INT	3.929116	2	0.1402
All	9.908184	16	0.8714

Dependent variable: INT

Excluded	Chi-sq	df	Prob.
IOPCG	6.246471	2	0.0440
CPCG	4.898680	2	0.0864
FDG	3.035566	2	0.2192
TOG	15.11222	2	0.0005
FOG	6.527598	2	0.0382
GEG	2.840047	2	0.2417
INF	14.03264	2	0.0009
EXR	4.036068	2	0.1329
All	58.27180	16	0.0000

VAR Granger Causality/Block Exogeneity Wald Tests
Date: 12/16/21 Time: 15:00
Sample: 1985 2020
Included observations: 31

Dependent variable: SOPCG

Excluded	Chi-sq	df	Prob.
CPCG	0.151648	2	0.9270
FDG	2.075821	2	0.3542
TOG	10.67198	2	0.0048
FOG	1.517500	2	0.4683
GEG	3.431434	2	0.1798
INF	6.010883	2	0.0495
EXR	1.473137	2	0.4788
INT	3.772877	2	0.1516
All	36.19543	16	0.0027

Dependent variable: CPCG

Excluded	Chi-sq	df	Prob.
SOPCG	0.145356	2	0.9299
FDG	1.829499	2	0.4006

TOG	1.399233	2	0.4968
FOG	2.102305	2	0.3495
GEG	0.621942	2	0.7327
INF	0.627112	2	0.7308
EXR	3.331812	2	0.1890
INT	0.526611	2	0.7685
All	11.85042	16	0.7542

Dependent variable: FDG

Excluded	Chi-sq	df	Prob.
SOPCG	6.803264	2	0.0333
CPCG	3.894181	2	0.1427
TOG	7.419247	2	0.0245
FOG	0.467837	2	0.7914
GEG	1.110033	2	0.5741
INF	6.963210	2	0.0308
EXR	0.970796	2	0.6155
INT	2.888443	2	0.2359
All	23.82183	16	0.0935

Dependent variable: TOG

Excluded	Chi-sq	df	Prob.
SOPCG	6.249115	2	0.0440
CPCG	0.999063	2	0.6068
FDG	1.325341	2	0.5155
FOG	1.076511	2	0.5838
GEG	0.697559	2	0.7055
INF	2.277103	2	0.3203
EXR	1.749290	2	0.4170
INT	9.512740	2	0.0086
All	24.91941	16	0.0713

Dependent variable: FOG

Excluded	Chi-sq	df	Prob.
SOPCG	0.463650	2	0.7931
CPCG	1.415510	2	0.4927
FDG	1.037355	2	0.5953

TOG	9.415608	2	0.0090
GEG	0.369822	2	0.8312
INF	8.170415	2	0.0168
EXR	2.617688	2	0.2701
INT	2.294783	2	0.3175
All	47.49246	16	0.0001

Dependent variable: GEG

Excluded	Chi-sq	df	Prob.
SOPCG	1.537550	2	0.4636
CPCG	0.088223	2	0.9568
FDG	1.272368	2	0.5293
TOG	0.535570	2	0.7651
FOG	0.313796	2	0.8548
INF	0.844064	2	0.6557
EXR	0.488365	2	0.7833
INT	1.205345	2	0.5473
All	8.237337	16	0.9415

Dependent variable: INF

Excluded	Chi-sq	df	Prob.
SOPCG	1.202979	2	0.5480
CPCG	3.211322	2	0.2008
FDG	0.016951	2	0.9916
TOG	1.914792	2	0.3839
FOG	0.053171	2	0.9738
GEG	0.609643	2	0.7373
EXR	0.356507	2	0.8367
INT	2.057744	2	0.3574
All	8.987514	16	0.9139

Dependent variable: EXR

Excluded	Chi-sq	df	Prob.
SOPCG	2.221073	2	0.3294
CPCG	2.671778	2	0.2629
FDG	1.003962	2	0.6053
TOG	3.838679	2	0.1467

FOG	0.443798	2	0.8010
GEG	9.69E-05	2	1.0000
INF	1.163264	2	0.5590
INT	5.427984	2	0.0663
All	11.94572	16	0.7477

Dependent variable: INT

Excluded	Chi-sq	df	Prob.
SOPCG	2.414192	2	0.2991
CPCG	4.911509	2	0.0858
FDG	1.008614	2	0.6039
TOG	8.221636	2	0.0164
FOG	1.329558	2	0.5144
GEG	0.326490	2	0.8494
INF	8.611984	2	0.0135
EXR	3.244634	2	0.1974
All	42.16759	16	0.0004

VAR Granger Causality/Block Exogeneity Wald Tests
Date: 01/19/22 Time: 13:17
Sample: 1985 2020
Included observations: 33

Dependent variable: FOPCG

Excluded	Chi-sq	df	Prob.
CPCG	0.723741	2	0.6964
FDG	1.160852	2	0.5597
TOG	2.412179	2	0.2994
FOG	1.366723	2	0.5049
GEG	3.220657	2	0.1998
INF	0.776351	2	0.6783
EXR	1.539928	2	0.4630
All	11.57974	14	0.6400

Dependent variable: CPCG

Excluded	Chi-sq	df	Prob.
FOPCG	1.109031	2	0.5744
FDG	1.974188	2	0.3727
TOG	5.711381	2	0.0575
FOG	1.151142	2	0.5624
GEG	0.471413	2	0.7900
INF	3.184429	2	0.2035
EXR	4.272257	2	0.1181
All	14.74334	14	0.3959

Dependent variable: FDG

Excluded	Chi-sq	df	Prob.
FOPCG	8.790114	2	0.0123
CPCG	0.171398	2	0.9179
TOG	0.038071	2	0.9811
FOG	0.311767	2	0.8557
GEG	0.411410	2	0.8141
INF	1.993761	2	0.3690
EXR	0.005048	2	0.9975
All	18.43974	14	0.1875

Dependent variable: TOG

Excluded	Chi-sq	df	Prob.
FOPCG	1.951765	2	0.3769
CPCG	0.180831	2	0.9136
FDG	0.867348	2	0.6481
FOG	0.062264	2	0.9693
GEG	2.910147	2	0.2334
INF	2.793013	2	0.2475
EXR	3.966806	2	0.1376
All	13.99302	14	0.4502

Dependent variable: FOG

Excluded	Chi-sq	df	Prob.
FOPCG	0.647196	2	0.7235
CPCG	16.41606	2	0.0003
FDG	1.468575	2	0.4798
TOG	12.47306	2	0.0020
GEG	1.676417	2	0.4325
INF	10.89759	2	0.0043
EXR	4.361879	2	0.1129
All	51.02051	14	0.0000

Dependent variable: GEG

Excluded	Chi-sq	df	Prob.
FOPCG	0.374339	2	0.8293
CPCG	0.167977	2	0.9194
FDG	1.009841	2	0.6036
TOG	0.275972	2	0.8711
FOG	0.485730	2	0.7844
INF	0.027798	2	0.9862
EXR	0.902741	2	0.6368
All	3.778394	14	0.9967

Dependent variable: INF

Excluded	Chi-sq	df	Prob.
FOPCG	1.840019	2	0.3985
CPCG	1.691658	2	0.4292
FDG	0.075677	2	0.9629
TOG	0.025513	2	0.9873
FOG	0.306629	2	0.8579
GEG	0.470603	2	0.7903
EXR	1.283747	2	0.5263
All	8.512056	14	0.8610

Dependent variable: EXR

Excluded	Chi-sq	df	Prob.
FOPCG	1.326874	2	0.5151
CPCG	0.407117	2	0.8158
FDG	0.064702	2	0.9682
TOG	0.797552	2	0.6711
FOG	1.121384	2	0.5708
GEG	1.055575	2	0.5899
INF	1.572923	2	0.4555
All	8.219161	14	0.8776

Effect of Economic Openness on Sectoral performance

Bounds Test

F-Bounds Test			Null Hypothesis: No levels relationship	
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic : n=1000	
F-statistic	5.527796	10%	1.95	3.06
k	8	5%	2.22	3.39
		2.5%	2.48	3.7
		1%	2.79	4.1
			Finite Sample: n=35	
Actual Sample Size	34			
		10%	-1	-1
		5%	-1	-1
		1%	-1	-1
			Finite Sample: n=30	
		10%	-1	-1
		5%	-1	-1
		1%	-1	-1

Dependent Variable: AOPCG
Method: Least Squares
Date: 12/16/21 Time: 15:24
Sample: 1985 2020
Included observations: 36

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CPCG	-0.481079	0.309026	-1.556756	0.1312
FDG	-0.317084	0.229179	-1.383565	0.1778
TOG	0.025666	0.118264	0.217025	0.8298
FOG	-0.000166	0.021359	-0.007757	0.9939
GEG	0.221696	0.123269	1.798478	0.0833
INF	0.337155	0.307747	1.095559	0.2829
EXR	0.000812	0.036484	0.022251	0.9824
INT	-0.703598	0.596657	-1.179235	0.2486
C	14.55615	9.544868	1.525024	0.1389

R-squared	0.506864	Mean dependent var	20.39739
Adjusted R-squared	0.360750	S.D. dependent var	22.35733
S.E. of regression	17.87538	Akaike info criterion	8.817044
Sum squared resid	8627.288	Schwarz criterion	9.212923
Log likelihood	-149.7068	Hannan-Quinn criter.	8.955216
F-statistic	3.468961	Durbin-Watson stat	1.775718
Prob(F-statistic)	0.007079		

ARDL Error Correction Regression
Dependent Variable: D(AOPCG)
Selected Model: ARDL(2, 2, 0, 2, 1, 0, 0, 0, 0)
Case 3: Unrestricted Constant and No Trend
Date: 12/16/21 Time: 15:21
Sample: 1985 2020
Included observations: 34

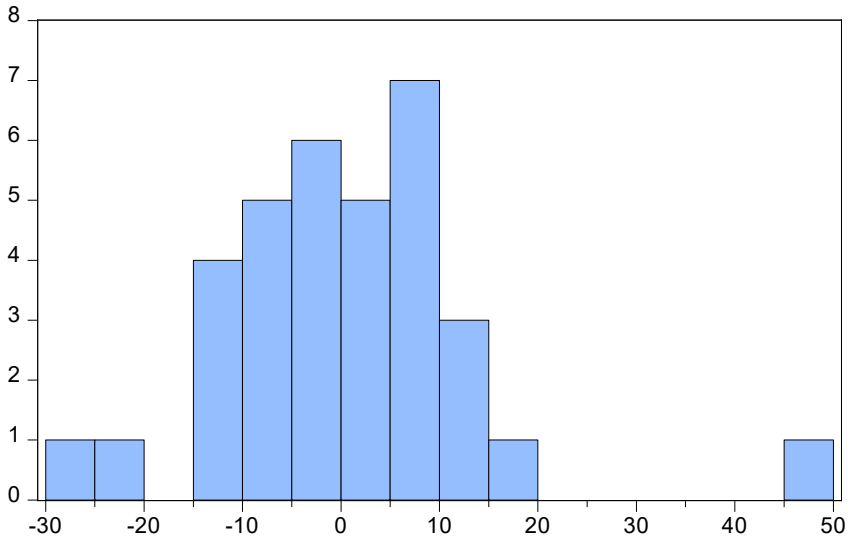
ECM Regression
Case 3: Unrestricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	29.23442	4.168819	7.012639	0.0000
D(AOPCG(-1))	0.284374	0.117296	2.424405	0.0261
D(CPCG)	-0.513801	0.198173	-2.592685	0.0184
D(CPCG(-1))	0.588582	0.205168	2.868781	0.0102
D(TOG)	-0.035920	0.064565	-0.556331	0.5848
D(TOG(-1))	-0.187702	0.070467	-2.663706	0.0158
D(FOG)	-0.002710	0.011167	-0.242731	0.8110
CointEq(-1)*	-1.200202	0.141582	-8.477107	0.0000

		Mean dependent var	0.358748
R-squared	0.770227		
		S.D. dependent var	26.48293
Adjusted R-squared	0.708365		
		Akaike info criterion	8.360952
S.E. of regression	14.30165		
		Schwarz criterion	8.720095
Sum squared resid	5317.969		
		Hannan-Quinn criter.	8.483430
Log likelihood	-134.1362		
		Durbin-Watson stat	1.935606
F-statistic	12.45071		
Prob(F-statistic)	0.000001		

* p-value incompatible with t-Bounds distribution.

Post Estimation Tests



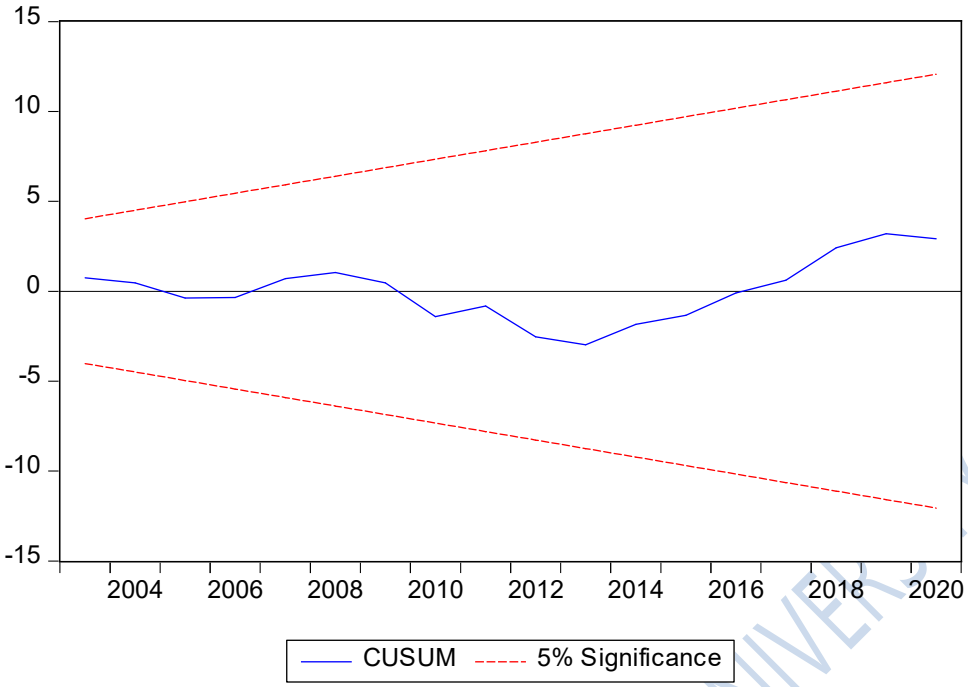
Series: Residuals	
Sample 1987 2020	
Observations 34	
Mean	-6.17e-15
Median	-0.201625
Maximum	45.68008
Minimum	-26.27341
Std. Dev.	12.69451
Skewness	0.941163
Kurtosis	6.478845
Jarque-Bera	22.16448
Probability	0.000015

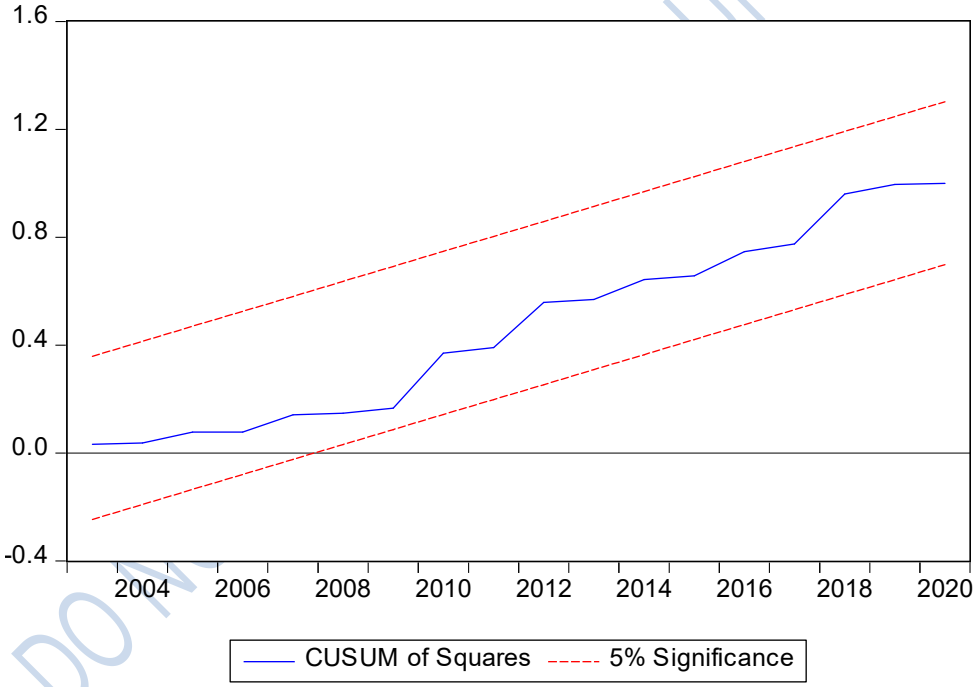
Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.025610	Prob. F(2,16)	0.9748
Obs*R-squared	0.108495	Prob. Chi-Square(2)	0.9472

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	3.068971	Prob. F(15,18)	0.0129
Obs*R-squared	24.44266	Prob. Chi-Square(15)	0.0579
Scaled explained SS	18.76699	Prob. Chi-Square(15)	0.2245





F-Bounds Test			Null Hypothesis: No levels relationship	
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic : n=1000	
F-statistic	5.527796	10%	1.95	3.06
k	8	5%	2.22	3.39
		2.5%	2.48	3.7
		1%	2.79	4.1
			Finite Sample: n=35	
Actual Sample Size	34			
		10%	-1	-1
		5%	-1	-1
		1%	-1	-1
			Finite Sample: n=30	
		10%	-1	-1
		5%	-1	-1
		1%	-1	-1

Dependent Variable: AOPCG
Method: Least Squares
Date: 12/16/21 Time: 15:30
Sample: 1985 2020
Included observations: 36

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CPCG	-0.481079	0.309026	-1.556756	0.1312
FDG	-0.317084	0.229179	-1.383565	0.1778
TOG	0.025666	0.118264	0.217025	0.8298
FOG	-0.000166	0.021359	-0.007757	0.9939
GEG	0.221696	0.123269	1.798478	0.0833
INF	0.337155	0.307747	1.095559	0.2829
EXR	0.000812	0.036484	0.022251	0.9824
INT	-0.703598	0.596657	-1.179235	0.2486
C	14.55615	9.544868	1.525024	0.1389

R-squared	0.506864	Mean dependent var	20.39739
Adjusted R-squared	0.360750	S.D. dependent var	22.35733
S.E. of regression	17.87538	Akaike info criterion	8.817044
Sum squared resid	8627.288	Schwarz criterion	9.212923
Log likelihood	-149.7068	Hannan-Quinn criter.	8.955216
F-statistic	3.468961	Durbin-Watson stat	1.775718
Prob(F-statistic)	0.007079		

ARDL Error Correction Regression
Dependent Variable: D(AOPCG)
Selected Model: ARDL(2, 2, 0, 2, 1, 0, 0, 0, 0)
Case 3: Unrestricted Constant and No Trend
Date: 12/16/21 Time: 15:27
Sample: 1985 2020
Included observations: 34

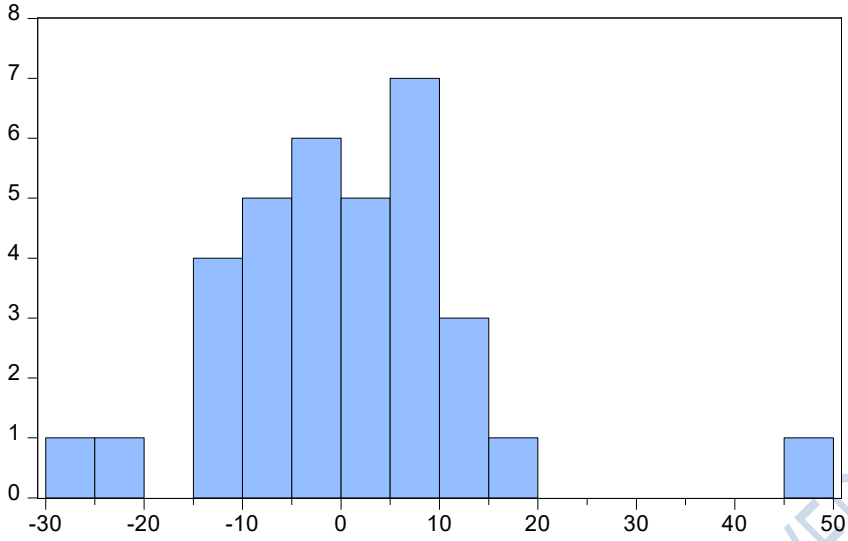
ECM Regression
Case 3: Unrestricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	29.23442	4.168819	7.012639	0.0000
D(AOPCG(-1))	0.284374	0.117296	2.424405	0.0261
D(CPCG)	-0.513801	0.198173	-2.592685	0.0184
D(CPCG(-1))	0.588582	0.205168	2.868781	0.0102
D(TOG)	-0.035920	0.064565	-0.556331	0.5848
D(TOG(-1))	-0.187702	0.070467	-2.663706	0.0158
D(FOG)	-0.002710	0.011167	-0.242731	0.8110
CointEq(-1)*	-1.200202	0.141582	-8.477107	0.0000

R-squared	0.770227	Mean dependent var	0.358748
Adjusted R-squared	0.708365	S.D. dependent var	26.48293
S.E. of regression	14.30165	Akaike info criterion	8.360952
Sum squared resid	5317.969	Schwarz criterion	8.720095
Log likelihood	-134.1362	Hannan-Quinn criter.	8.483430
F-statistic	12.45071	Durbin-Watson stat	1.935606
Prob(F-statistic)	0.000001		

* p-value incompatible with t-Bounds distribution.

Post Estimation Tests



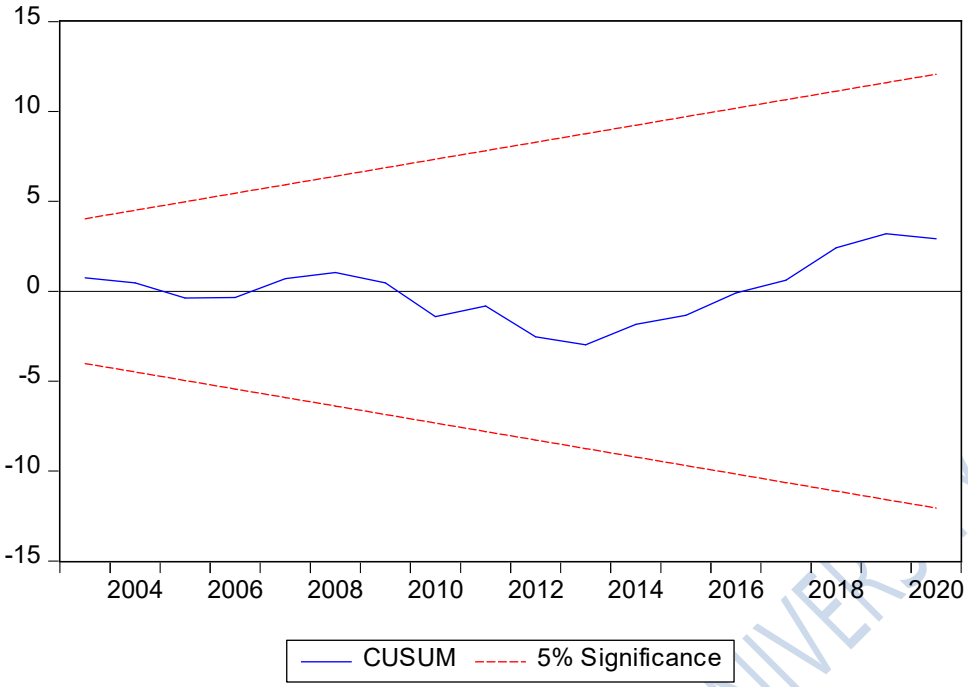
Series: Residuals	
Sample 1987 2020	
Observations 34	
Mean	-6.17e-15
Median	-0.201625
Maximum	45.68008
Minimum	-26.27341
Std. Dev.	12.69451
Skewness	0.941163
Kurtosis	6.478845
Jarque-Bera	22.16448
Probability	0.000015

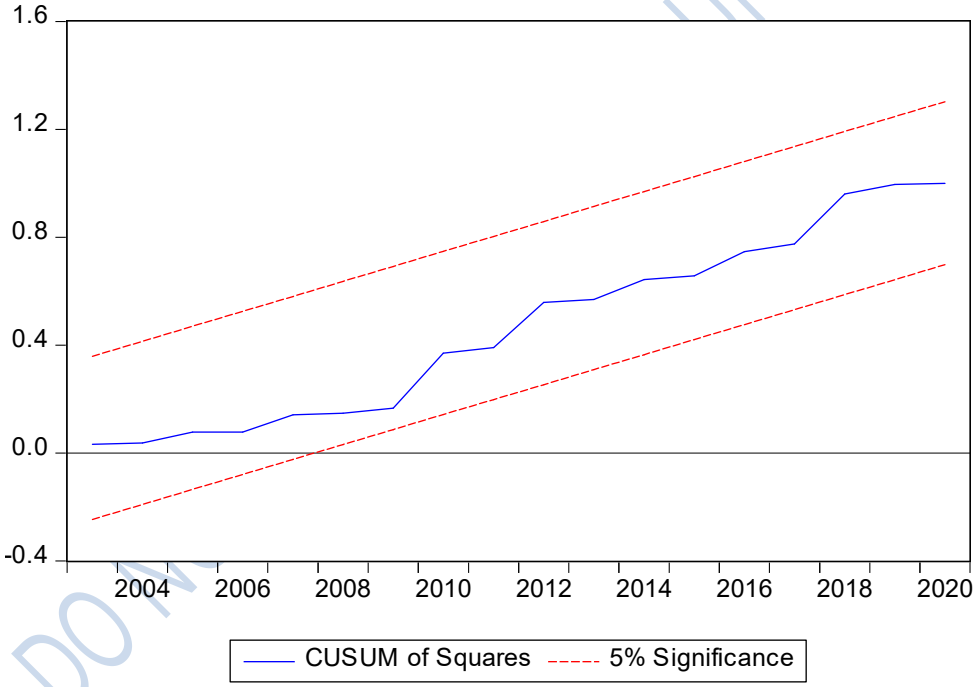
Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.025610	Prob. F(2,16)	0.9748
Obs*R-squared	0.108495	Prob. Chi-Square(2)	0.9472

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	3.068971	Prob. F(15,18)	0.0129
Obs*R-squared	24.44266	Prob. Chi-Square(15)	0.0579
Scaled explained SS	18.76699	Prob. Chi-Square(15)	0.2245





F-Bounds Test			Null Hypothesis: No levels relationship	
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic : n=1000	
F-statistic	5.527796	10%	1.95	3.06
k	8	5%	2.22	3.39
		2.5%	2.48	3.7
		1%	2.79	4.1
			Finite Sample: n=35	
Actual Sample Size	34			
		10%	-1	-1
		5%	-1	-1
		1%	-1	-1
			Finite Sample: n=30	
		10%	-1	-1
		5%	-1	-1
		1%	-1	-1

Dependent Variable: AOPCG
Method: Least Squares
Date: 12/16/21 Time: 15:37
Sample: 1985 2020
Included observations: 36

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CPCG	-0.481079	0.309026	-1.556756	0.1312
FDG	-0.317084	0.229179	-1.383565	0.1778
TOG	0.025666	0.118264	0.217025	0.8298
FOG	-0.000166	0.021359	-0.007757	0.9939

GEG	0.221696	0.123269	1.798478	0.0833
INF	0.337155	0.307747	1.095559	0.2829
EXR	0.000812	0.036484	0.022251	0.9824
INT	-0.703598	0.596657	-1.179235	0.2486
C	14.55615	9.544868	1.525024	0.1389

R-squared	0.506864	Mean dependent var	20.39739
Adjusted R-squared	0.360750	S.D. dependent var	22.35733
S.E. of regression	17.87538	Akaike info criterion	8.817044
Sum squared resid	8627.288	Schwarz criterion	9.212923
Log likelihood	-149.7068	Hannan-Quinn criter.	8.955216
F-statistic	3.468961	Durbin-Watson stat	1.775718
Prob(F-statistic)	0.007079		

ARDL Error Correction Regression
Dependent Variable: D(AOPCG)
Selected Model: ARDL(2, 2, 0, 2, 1, 0, 0, 0, 0)
Case 3: Unrestricted Constant and No Trend
Date: 12/16/21 Time: 15:33
Sample: 1985 2020
Included observations: 34

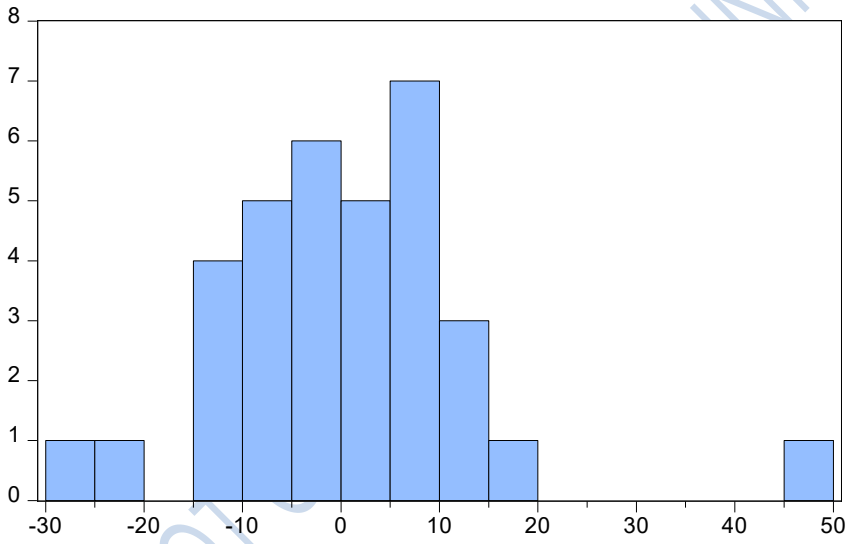
ECM Regression
Case 3: Unrestricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	29.23442	4.168819	7.012639	0.0000
D(AOPCG(-1))	0.284374	0.117296	2.424405	0.0261
D(CPCG)	-0.513801	0.198173	-2.592685	0.0184
D(CPCG(-1))	0.588582	0.205168	2.868781	0.0102
D(TOG)	-0.035920	0.064565	-0.556331	0.5848
D(TOG(-1))	-0.187702	0.070467	-2.663706	0.0158
D(FOG)	-0.002710	0.011167	-0.242731	0.8110
CointEq(-1)*	-1.200202	0.141582	-8.477107	0.0000

		Mean dependent	0.358748
R-squared	0.770227	var	
			26.48293
Adjusted R-squared	0.708365	S.D. dependent var	
			8.360952
S.E. of regression	14.30165	Akaike info criterion	
			8.720095
Sum squared resid	5317.969	Schwarz criterion	
		Hannan-Quinn	8.483430
Log likelihood	-134.1362	criter.	
			1.935606
F-statistic	12.45071	Durbin-Watson stat	
Prob(F-statistic)	0.000001		

* p-value incompatible with t-Bounds distribution.

Post Estimation Test



Series: Residuals
Sample 1987 2020
Observations 34

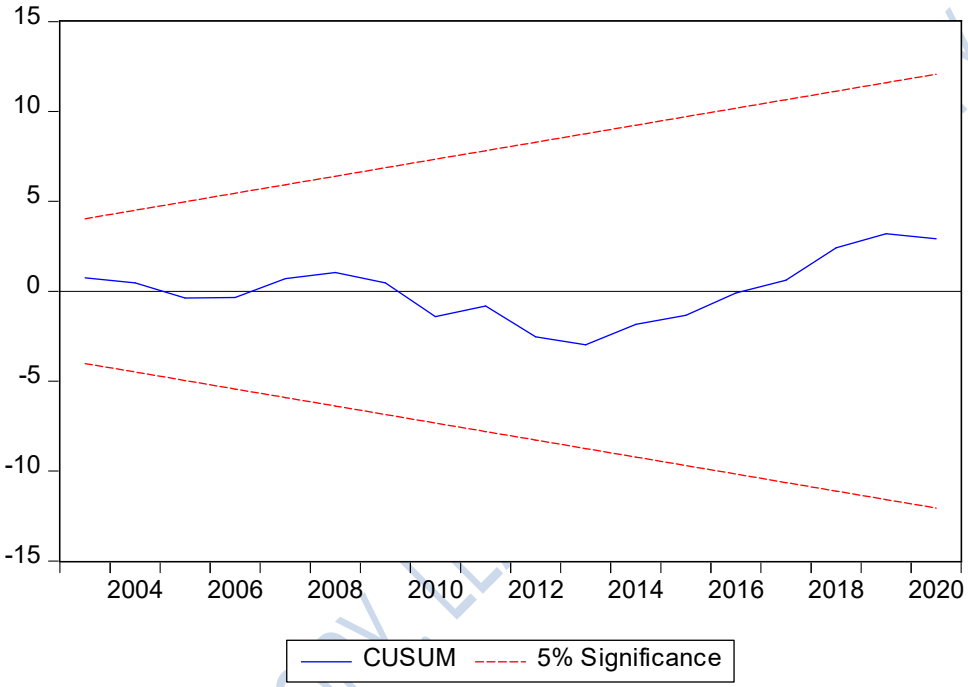
Mean	-6.17e-15
Median	-0.201625
Maximum	45.68008
Minimum	-26.27341
Std. Dev.	12.69451
Skewness	0.941163
Kurtosis	6.478845
Jarque-Bera	22.16448
Probability	0.000015

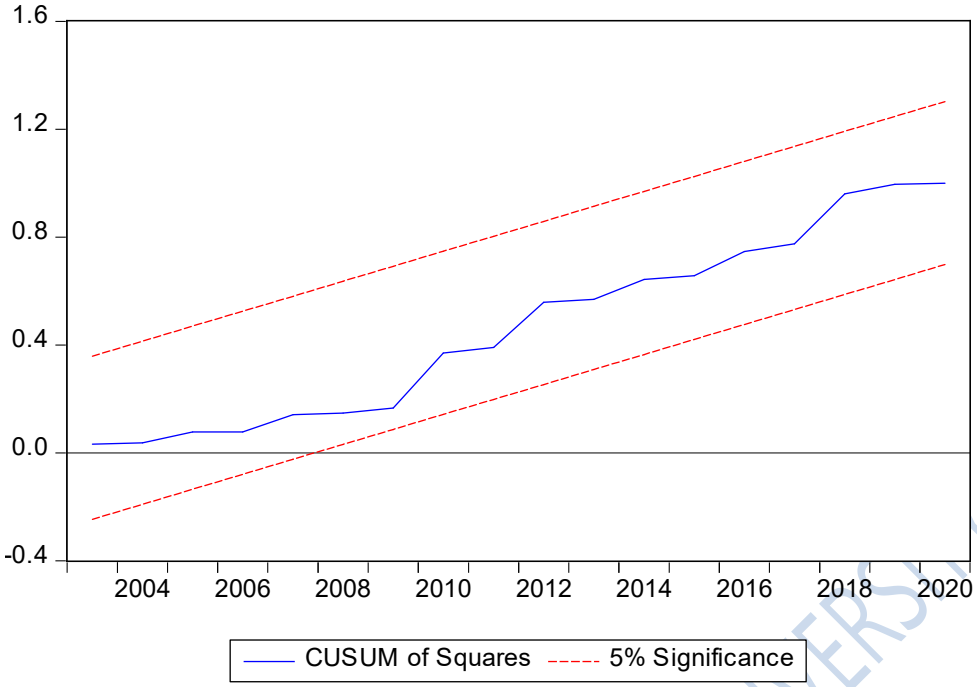
Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.025610	Prob. F(2,16)	0.9748
Obs*R-squared	0.108495	Prob. Chi-Square(2)	0.9472

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	3.068971	Prob. F(15,18)	0.0129
Obs*R-squared	24.44266	Prob. Chi-Square(15)	0.0579
Scaled explained SS	18.76699	Prob. Chi-Square(15)	0.2245





F-Bounds Test			Null Hypothesis: No levels relationship	
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic : n=1000	
F-statistic	5.527796	10%	1.95	3.06
k	8	5%	2.22	3.39
		2.5%	2.48	3.7
		1%	2.79	4.1
			Finite Sample: n=35	
Actual Sample Size	34			
		10%	-1	-1
		5%	-1	-1
		1%	-1	-1
			Finite Sample: n=30	
		10%	-1	-1
		5%	-1	-1
		1%	-1	-1

Dependent Variable: AOPCG
Method: Least Squares
Date: 12/16/21 Time: 15:58
Sample: 1985 2020
Included observations: 36

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CPCG	-0.481079	0.309026	-1.556756	0.1312
FDG	-0.317084	0.229179	-1.383565	0.1778
TOG	0.025666	0.118264	0.217025	0.8298
FOG	-0.000166	0.021359	-0.007757	0.9939
GEG	0.221696	0.123269	1.798478	0.0833
INF	0.337155	0.307747	1.095559	0.2829
EXR	0.000812	0.036484	0.022251	0.9824
INT	-0.703598	0.596657	-1.179235	0.2486
C	14.55615	9.544868	1.525024	0.1389

R-squared	0.506864	Mean dependent var	20.39739
Adjusted R-squared	0.360750	S.D. dependent var	22.35733
S.E. of regression	17.87538	Akaike info criterion	8.817044
Sum squared resid	8627.288	Schwarz criterion	9.212923
Log likelihood	-149.7068	Hannan-Quinn criter.	8.955216
F-statistic	3.468961	Durbin-Watson stat	1.775718
Prob(F-statistic)	0.007079		

ARDL Error Correction Regression
Dependent Variable: D(AOPCG)
Selected Model: ARDL(2, 2, 0, 2, 1, 0, 0, 0, 0)
Case 3: Unrestricted Constant and No Trend
Date: 12/16/21 Time: 15:42
Sample: 1985 2020
Included observations: 34

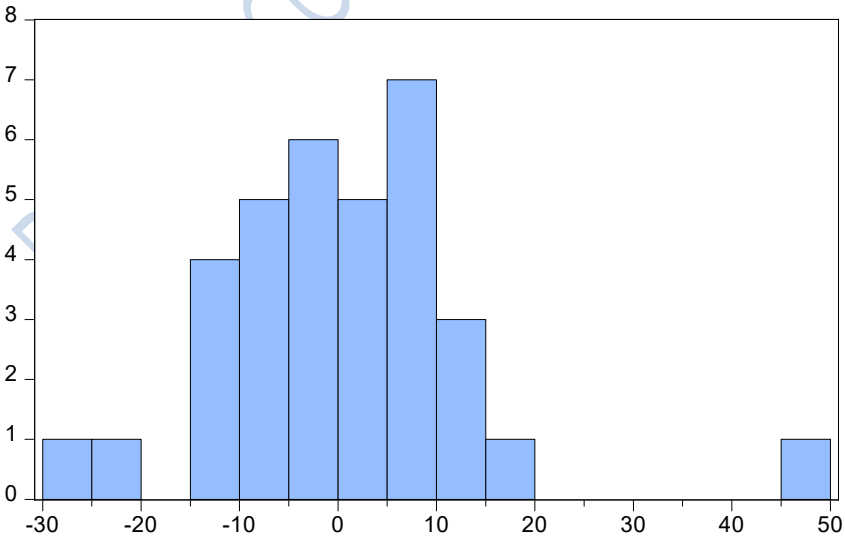
ECM Regression

Case 3: Unrestricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	29.23442	4.168819	7.012639	0.0000
D(AOPCG(-1))	0.284374	0.117296	2.424405	0.0261
D(CPCG)	-0.513801	0.198173	-2.592685	0.0184
D(CPCG(-1))	0.588582	0.205168	2.868781	0.0102
D(TOG)	-0.035920	0.064565	-0.556331	0.5848
D(TOG(-1))	-0.187702	0.070467	-2.663706	0.0158
D(FOG)	-0.002710	0.011167	-0.242731	0.8110
CointEq(-1)*	-1.200202	0.141582	-8.477107	0.0000

R-squared	0.770227	Mean dependent var	0.358748
Adjusted R-squared	0.708365	S.D. dependent var	26.48293
S.E. of regression	14.30165	Akaike info criterion	8.360952
Sum squared resid	5317.969	Schwarz criterion	8.720095
Log likelihood	-134.1362	Hannan-Quinn criter.	8.483430
F-statistic	12.45071	Durbin-Watson stat	1.935606
Prob(F-statistic)	0.000001		

Post Estimation Test



Series: Residuals
Sample 1987 2020
Observations 34

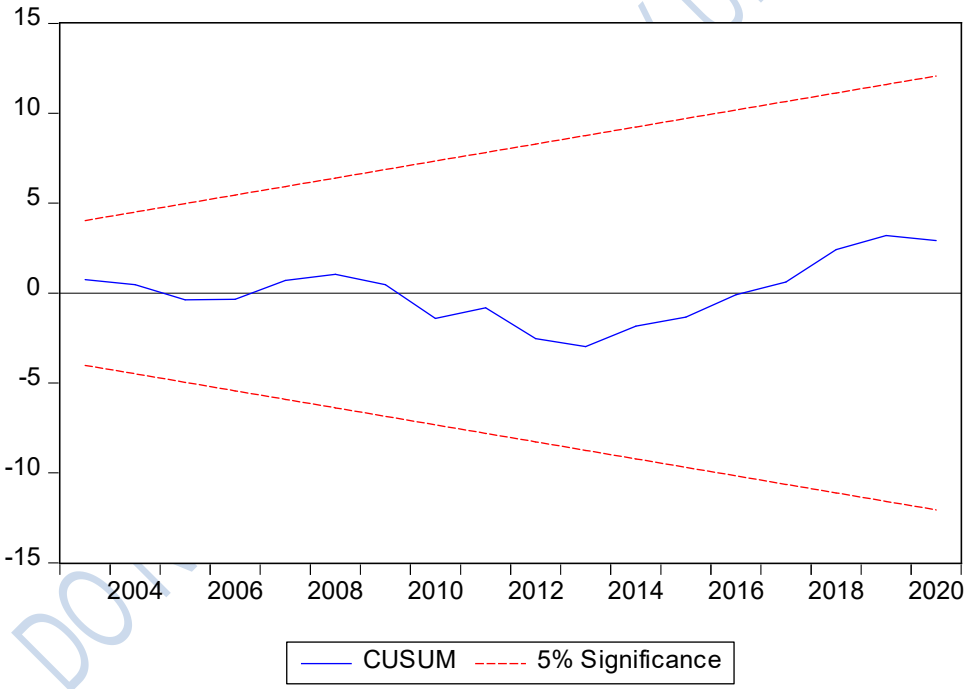
Mean	-6.17e-15
Median	-0.201625
Maximum	45.68008
Minimum	-26.27341
Std. Dev.	12.69451
Skewness	0.941163
Kurtosis	6.478845
Jarque-Bera	22.16448
Probability	0.000015

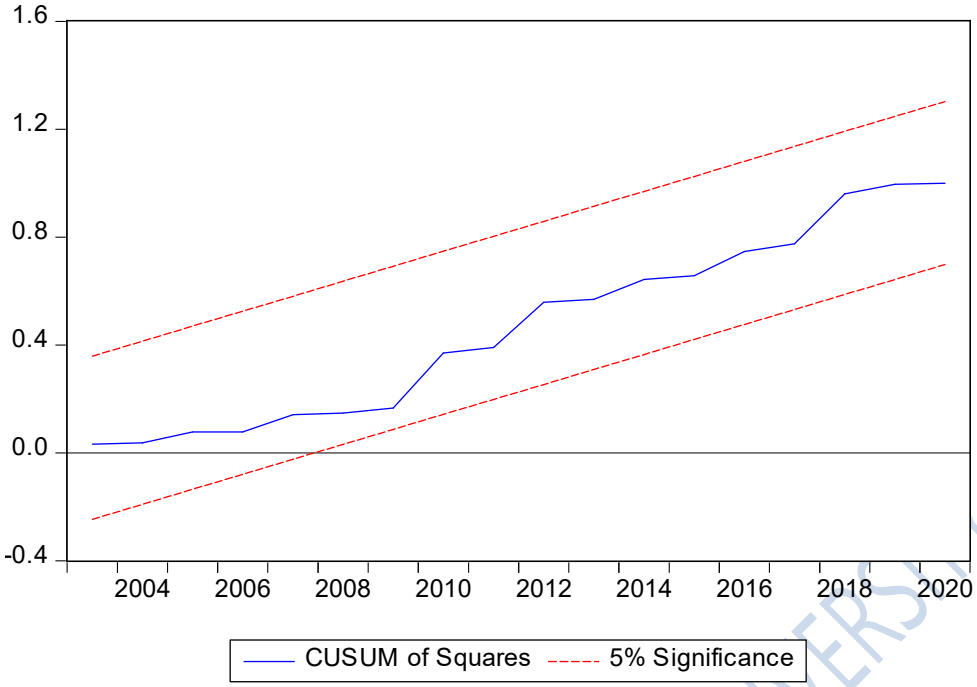
Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.025610	Prob. F(2,16)	0.9748
Obs*R-squared	0.108495	Prob. Chi-Square(2)	0.9472

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	3.068971	Prob. F(15,18)	0.0129
Obs*R-squared	24.44266	Prob. Chi-Square(15)	0.0579
Scaled explained SS	18.76699	Prob. Chi-Square(15)	0.2245





Dependent Variable: IOPCG
Method: Least Squares
Date: 01/21/22 Time: 15:02
Sample: 1985 2020
Included observations: 36

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CPCG	-0.137703	0.176276	-0.781178	0.4415
FDG	-0.161453	0.130729	-1.235018	0.2275
TOG	0.060364	0.067461	0.894807	0.3788
FOG	-0.009361	0.012184	-0.768276	0.4490
GEG	-0.256673	0.070315	-3.650308	0.0011
INF	0.268905	0.175546	1.531818	0.1372
EXR	0.026022	0.020811	1.250381	0.2219
INT	-0.982229	0.340347	-2.885962	0.0076
C	15.58742	5.444617	2.862905	0.0080

R-squared	0.832519	Mean dependent var	19.37909
Adjusted R-squared	0.782895	S.D. dependent var	21.88356
S.E. of regression	10.19654	Akaike info criterion	7.694291
Sum squared resid	2807.173	Schwarz criterion	8.090171
Log likelihood	-129.4972	Hannan-Quinn criter.	7.832464
F-statistic	16.77656	Durbin-Watson stat	2.032597
Prob(F-statistic)	0.000000		

F-Bounds Test — Null Hypothesis: No levels relationship

Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	13.57634	10%	1.95	3.06
k	8	5%	2.22	3.39

		2.5%	2.48	3.7
		1%	2.79	4.1
			Finite Sample: n=35	
Actual Sample Size	34			
		10%	-1	-1
		5%	-1	-1
		1%	-1	-1
			Finite Sample: n=30	
		10%	-1	-1
		5%	-1	-1
		1%	-1	-1

ARDL Error Correction Regression
Dependent Variable: D(IOPCG)
Selected Model: ARDL(2, 2, 2, 2, 2, 1, 2, 1, 0)
Case 3: Unrestricted Constant and No Trend
Date: 01/21/22 Time: 15:00
Sample: 1985 2020
Included observations: 34

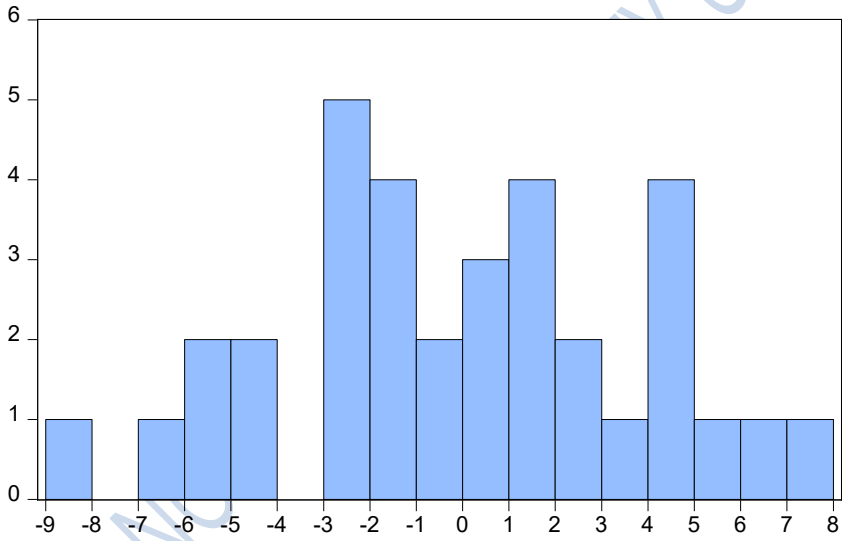
ECM Regression
Case 3: Unrestricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	21.86806	1.881007	11.62572	0.0000
D(IOPCG(-1))	0.754843	0.082992	9.095388	0.0000
D(CPCG)	-0.424277	0.086611	-4.898681	0.0005
D(CPCG(-1))	0.522846	0.101846	5.133695	0.0003
D(FDG)	-0.137108	0.060889	-2.251754	0.0457
D(FDG(-1))	-0.157374	0.063753	-2.468494	0.0312
D(TOG)	0.018678	0.031584	0.591397	0.5662
D(TOG(-1))	-0.359474	0.044112	-8.149134	0.0000
D(FOG)	-0.002924	0.006142	-0.476006	0.6434
D(FOG(-1))	0.063398	0.008759	7.238278	0.0000
D(GEG)	-0.096954	0.026418	-3.670037	0.0037
D(INF)	-0.142953	0.086968	-1.643728	0.1285

D(INF(-1))	-0.751026	0.095322	-7.878823	0.0000
D(EXR)	-0.096090	0.052755	-1.821435	0.0958
CointEq(-1)*	-1.785545	0.122907	-14.52757	0.0000

R-squared	0.981138	Mean dependent var	0.164629
Adjusted R-squared	0.967239	S.D. dependent var	28.19307
S.E. of regression	5.102922	Akaike info criterion	6.397935
Sum squared resid	494.7564	Schwarz criterion	7.071329
Log likelihood	-93.76489	Hannan-Quinn criter.	6.627582
F-statistic	70.59319	Durbin-Watson stat	2.067713
Prob(F-statistic)	0.000000		

* p-value incompatible with t-Bounds distribution.



Series: Residuals
Sample 1987 2020
Observations 34

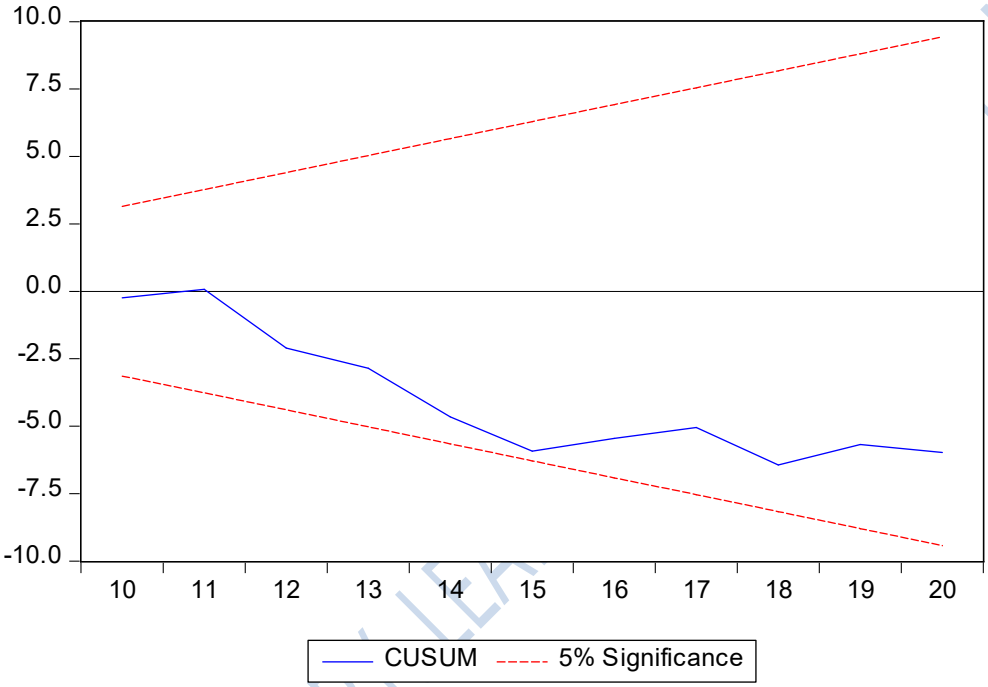
Mean	-8.48e-15
Median	-0.073560
Maximum	7.050439
Minimum	-8.842871
Std. Dev.	3.872030
Skewness	-0.149191
Kurtosis	2.427173
Jarque-Bera	0.590980
Probability	0.744167

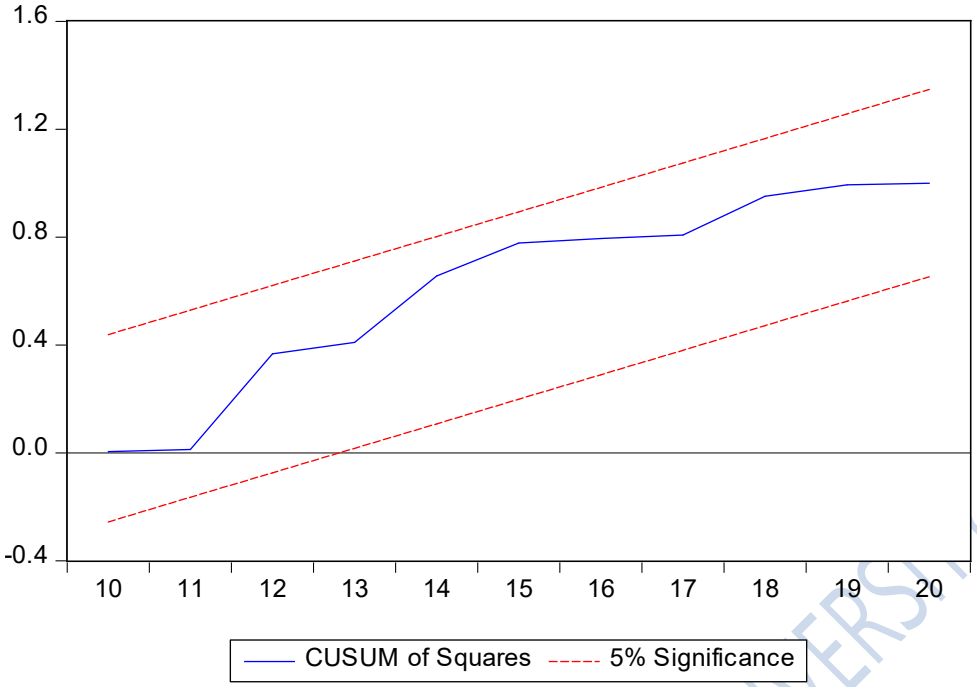
Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.239209	Prob. F(2,9)	0.7921
Obs*R-squared	1.716129	Prob. Chi-Square(2)	0.4240

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.963843	Prob. F(22,11)	0.5510
Obs*R-squared	22.38674	Prob. Chi-Square(22)	0.4370
Scaled explained SS	1.672110	Prob. Chi-Square(22)	1.0000





Dependent Variable: FOPCG
Method: Least Squares
Date: 01/21/22 Time: 15:19
Sample: 1985 2020
Included observations: 36

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CPCG	0.220704	0.427228	0.516597	0.6098
FDG	-0.196786	0.313266	-0.628173	0.5354
TOG	0.144370	0.161945	0.891476	0.3809
FOG	-0.033349	0.029780	-1.119864	0.2730
GEG	0.190774	0.168615	1.131418	0.2682
INF	-0.667759	0.421196	-1.585389	0.1250
EXR	-0.093662	0.130723	-0.716489	0.4801
INT	-1.472363	0.822450	-1.790217	0.0851
@TREND	0.658080	1.217974	0.540307	0.5936
C	33.30601	14.98283	2.222946	0.0351

		Mean dependent var	17.39733
R-squared	0.217761		
Adjusted R-squared	-0.053015	S.D. dependent var	23.81073
S.E. of regression	24.43374	Akaike info criterion	9.45994

			0
			9.89980
Sum squared resid	15522.20	Schwarz criterion	7
		Hannan-Quinn	9.61346
Log likelihood	-160.2789	criter.	6
			1.72165
F-statistic	0.804212	Durbin-Watson stat	2
Prob(F-statistic)	0.616240		

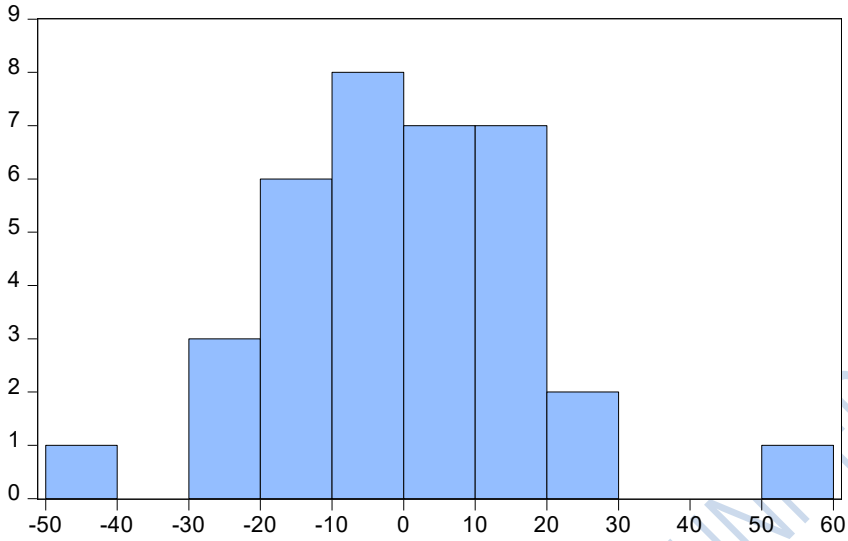
F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	5.185211	10%	2.26	3.34
k	8	5%	2.55	3.68
		2.5%	2.82	4.02
		1%	3.15	4.43

ECM Regression
Case 5: Unrestricted Constant and Unrestricted Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	19.92480	7.273509	2.739366	0.0120
@TREND	2.470627	0.460984	5.359463	0.0000
D(TOG)	0.296199	0.071453	4.145384	0.0004
D(FOG)	-0.008363	0.014468	-0.578046	0.5691
CointEq(-1)*	-0.901932	0.113063	-7.977260	0.0000

		Mean dependent	0.06493
R-squared	0.694458	var	8
			33.8626
Adjusted R-squared	0.653720	S.D. dependent var	2
			8.95355
S.E. of regression	19.92666	Akaike info criterion	8
			9.17575
Sum squared resid	11912.15	Schwarz criterion	0
		Hannan-Quinn	9.03025
Log likelihood	-151.6873	criter.	9
F-statistic	17.04658	Durbin-Watson stat	1.57231

Prob(F-statistic)	0.000000



Series: Residuals
Sample 1986 2020
Observations 35

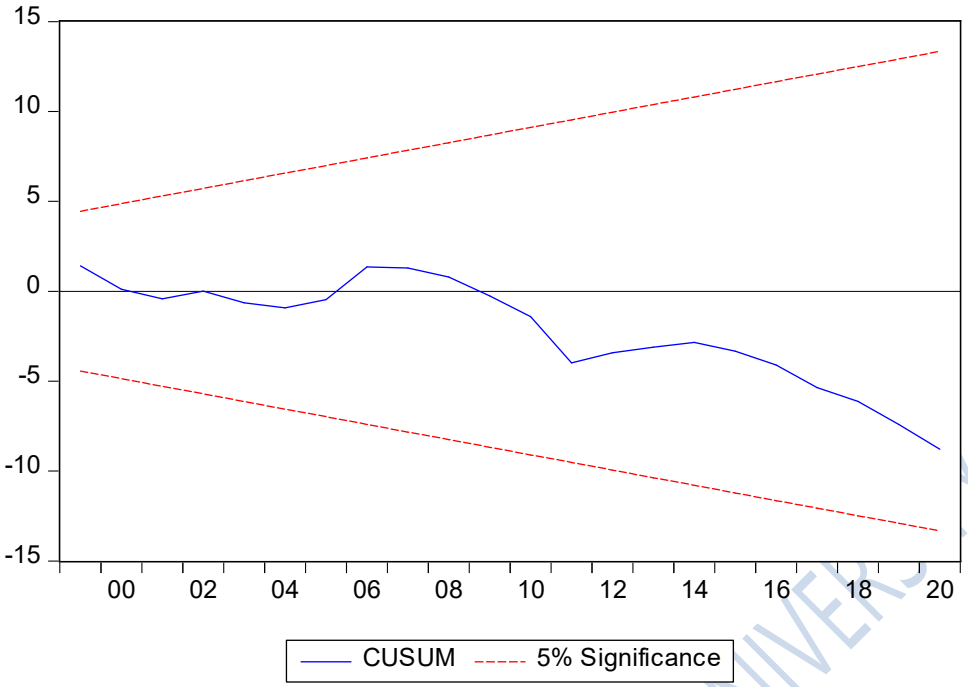
Mean	-4.47e-15
Median	-0.187653
Maximum	58.84469
Minimum	-45.36112
Std. Dev.	18.71784
Skewness	0.473558
Kurtosis	4.642364
Jarque-Bera	5.241816
Probability	0.072737

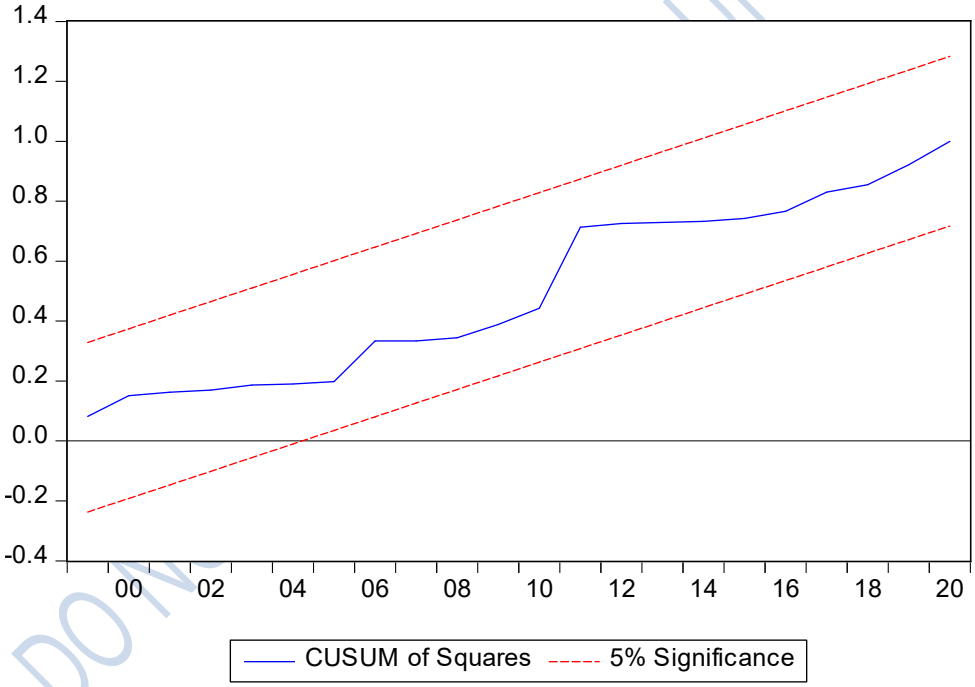
Breusch-Godfrey Serial Correlation LM Test:

F-statistic	1.774377	Prob. F(2,20)	0.1953
Obs*R-squared	5.274436	Prob. Chi-Square(2)	0.0716

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.821440	Prob. F(12,22)	0.6284
Obs*R-squared	10.82970	Prob. Chi-Square(12)	0.5436
Scaled explained SS	7.792539	Prob. Chi-Square(12)	0.8011





Dependent Variable: SOPCG
Method: Least Squares
Date: 01/21/22 Time: 15:28
Sample: 1985 2020
Included observations: 36

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CPCG	0.000966	0.159607	0.006054	0.9952
FDG	0.046142	0.118367	0.389821	0.6997
TOG	-0.093075	0.061082	-1.523783	0.1392
FOG	-0.006686	0.011032	-0.606109	0.5495
GEG	-0.040244	0.063666	-0.632100	0.5326
INF	0.105123	0.158947	0.661374	0.5140
EXR	-0.033562	0.018843	-1.781088	0.0862
INT	-0.820172	0.308164	-2.661479	0.0129
C	23.18032	4.929773	4.702106	0.0001

R-squared	0.637884	Mean dependent var	18.27121
Adjusted R-squared	0.530591	S.D. dependent var	13.47524
S.E. of regression	9.232350	Akaike info criterion	7.495622
Sum squared resid	2301.380	Schwarz criterion	7.891502
Log likelihood	-125.9212	Hannan-Quinn criter.	7.633795
F-statistic	5.945223	Durbin-Watson stat	1.340167
Prob(F-statistic)	0.000200		

F-Bounds Test — Null Hypothesis: No levels relationship

Test Statistic	Value	Signif.	I(0)	I(1)
		Asymptotic		

			: n=1000	
F-statistic	4.681552	10%	1.95	3.06
k	8	5%	2.22	3.39
		2.5%	2.48	3.7
		1%	2.79	4.1
			Finite Sample: n=35	
Actual Sample Size	33			
		10%	-1	-1
		5%	-1	-1
		1%	-1	-1
			Finite Sample: n=30	
		10%	-1	-1
		5%	-1	-1
		1%	-1	-1

ARDL Error Correction Regression
Dependent Variable: D(SOPCG)
Selected Model: ARDL(3, 2, 2, 2, 1, 2, 0, 1, 1)
Case 3: Unrestricted Constant and No Trend
Date: 01/21/22 Time: 15:24
Sample: 1985 2020
Included observations: 33

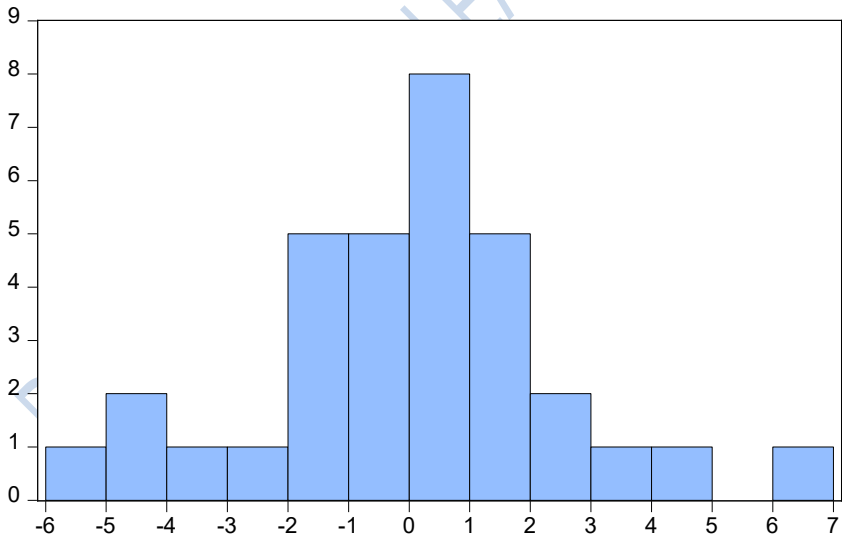
ECM Regression
Case 3: Unrestricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	22.13596	2.555753	8.661227	0.0000
D(SOPCG(-1))	0.078275	0.065736	1.190746	0.2613
D(SOPCG(-2))	-0.262082	0.058592	-4.473022	0.0012
D(CPCG)	0.235216	0.071481	3.290605	0.0081
D(CPCG(-1))	0.439531	0.055260	7.953840	0.0000
D(FDG)	0.088676	0.039912	2.221787	0.0505
D(FDG(-1))	0.145816	0.043911	3.320701	0.0077
D(TOG)	0.009007	0.025939	0.347240	0.7356
D(TOG(-1))	0.192316	0.025866	7.435171	0.0000

D(FOG)	0.007025	0.003920	1.792339	0.1033
D(GEG)	-0.007302	0.019286	-0.378620	0.7129
D(GEG(-1))	0.068396	0.021156	3.232868	0.0090
D(EXR)	-0.138351	0.032802	-4.217730	0.0018
D(INT)	-1.156775	0.090009	-12.85181	0.0000
CointEq(-1)*	-0.660060	0.075793	-8.708682	0.0000

		Mean dependent var	-0.530854
R-squared	0.962676		
Adjusted R-squared	0.933646	S.D. dependent var	12.88739
S.E. of regression	3.319700	Akaike info criterion	5.540581
Sum squared resid	198.3673	Schwarz criterion	6.220812
Log likelihood	-76.41959	Hannan-Quinn criter.	5.769458
F-statistic	33.16150	Durbin-Watson stat	2.544531
Prob(F-statistic)	0.000000		

* p-value incompatible with t-Bounds distribution.



Series: Residuals
Sample 1988 2020
Observations 33

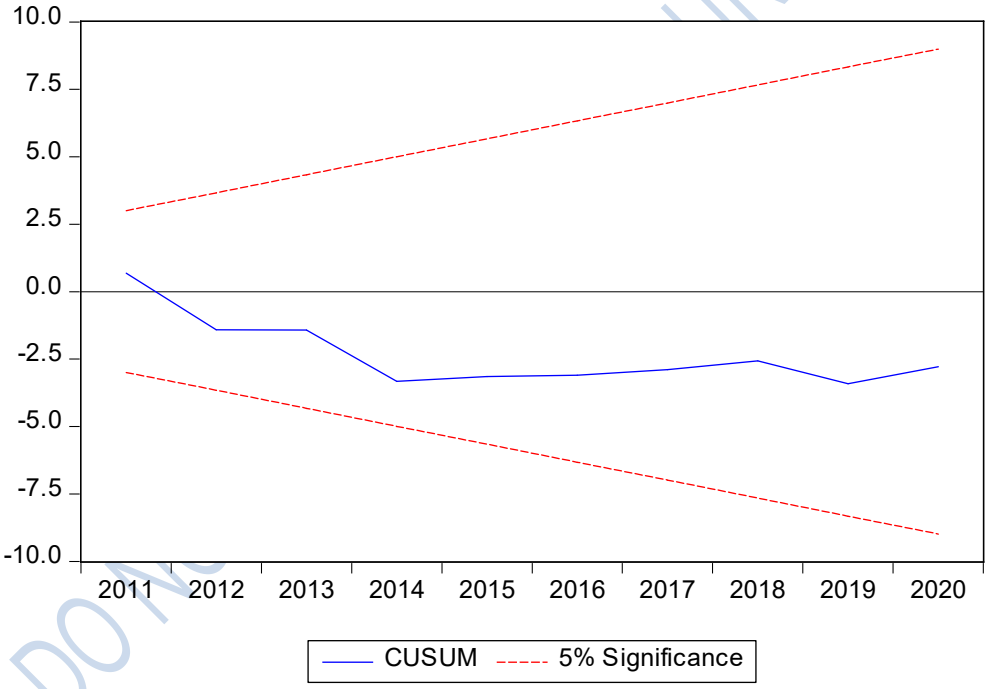
Mean	-3.18e-15
Median	0.242157
Maximum	6.730983
Minimum	-5.390786
Std. Dev.	2.489775
Skewness	0.070541
Kurtosis	3.794368
Jarque-Bera	0.895021
Probability	0.639218

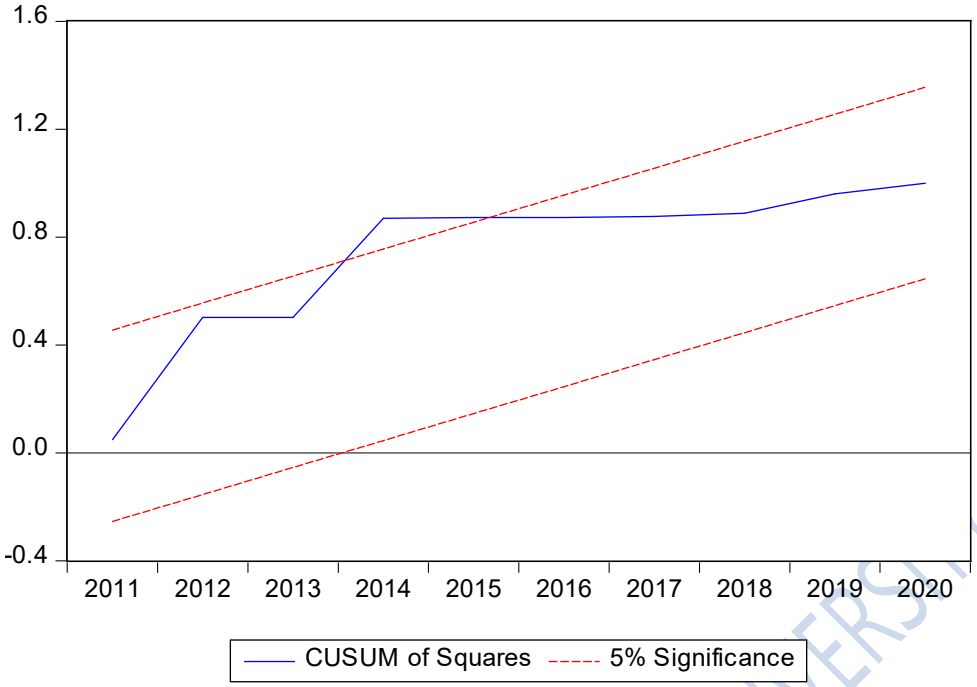
Breusch-Godfrey Serial Correlation LM Test:

F-statistic	1.689400	Prob. F(2,8)	0.2443
Obs*R-squared	9.798959	Prob. Chi-Square(2)	0.0075

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.906228	Prob. F(22,10)	0.5982
Obs*R-squared	21.97686	Prob. Chi-Square(22)	0.4613
Scaled explained SS	2.819625	Prob. Chi-Square(22)	1.0000





Vector Autoregressive Model (VAR Model)

VAR Lag Order Selection Criteria
Endogenous variables: IOPCG CPCG FDG TOG FOG GEG INF EXR INT
Exogenous variables: C D(EXR(-3)) D(INF(-3))
Date: 01/21/22 Time: 15:35
Sample: 1985 2020
Included observations: 32

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-1275.299	NA	1.81e+24	81.39366	82.6303 8*	81.80360
1	-1162.301	141.2475	3.45e+23	79.39379	84.34065	81.03353
2	-1010.531	104.341 5*	3.04e+2 2*	74.9707 0*	83.62770	77.8402 5*

* indicates lag order selected by the criterion;
LR: sequential modified LR test statistic (each test at 5% level,
LR: sequential modified LR test statistic (each test at 5%

level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

* indicates lag order selected by the criterion; LR: sequential modified LR test statistic (each test at 5% level, LR: sequential modified LR test statistic (each test at 5% level), FPE: Final prediction error

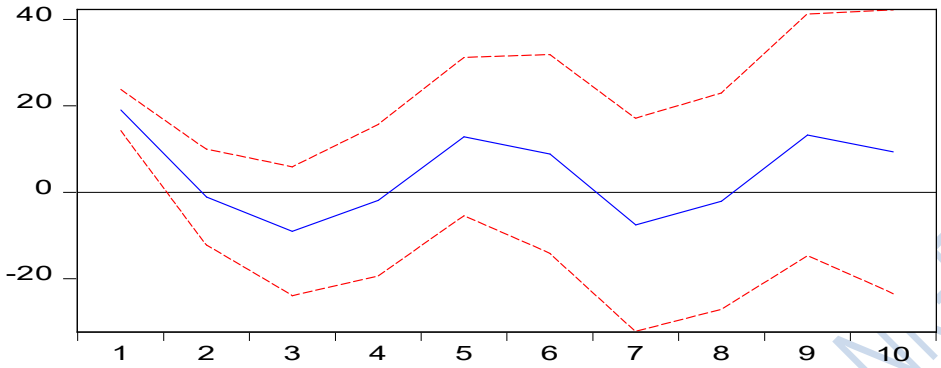
AIC: Akaike information criterion

SC: Schwarz information criterion

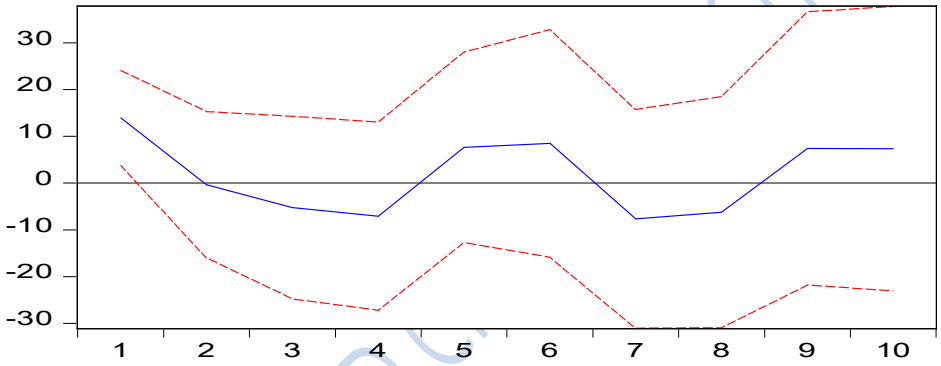
HQ: Hannan-Quinn information criterion

Response to Cholesky One S.D. (d.f. adjusted) Innovations ± 2 S.E.

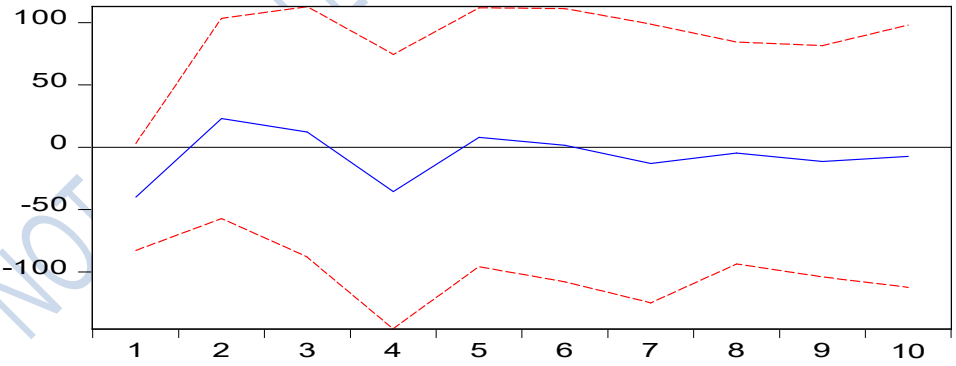
Response of IOPCG to IOPCG



Response of TOG to IOPCG

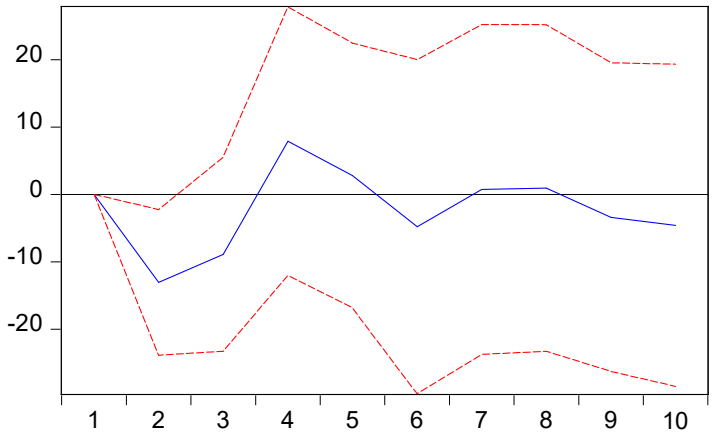


Response of FOG to IOPCG

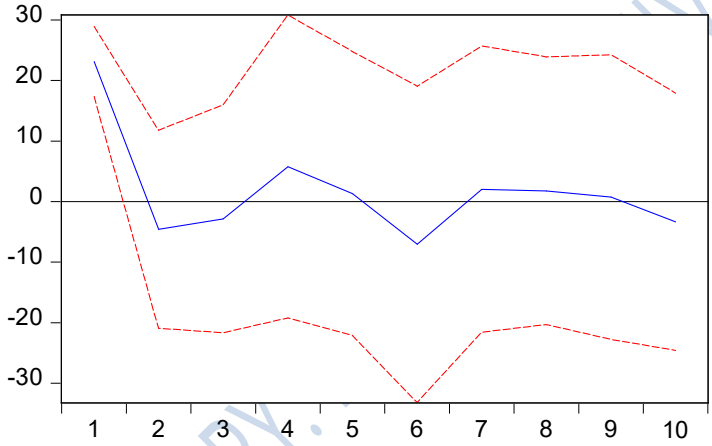


Response to Cholesky One S.D. (d.f. adjusted) Innovations ± 2 S.E.

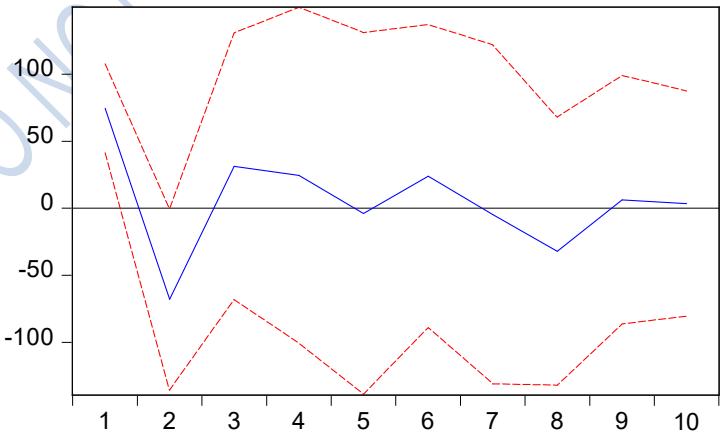
Response of lOPCG to TOG



Response of TOG to TOG

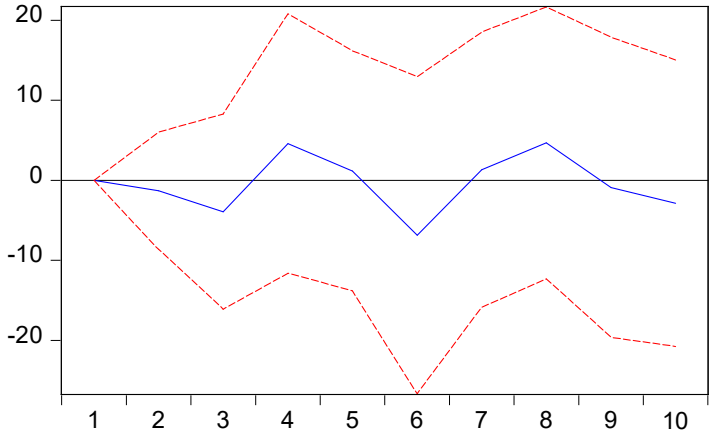


Response of FOG to TOG

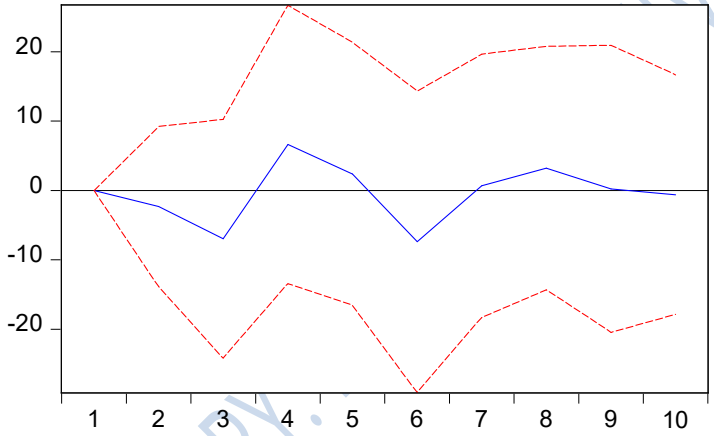


Response to Cholesky One S.D. (d.f. adjusted) Innovations ± 2 S.E.

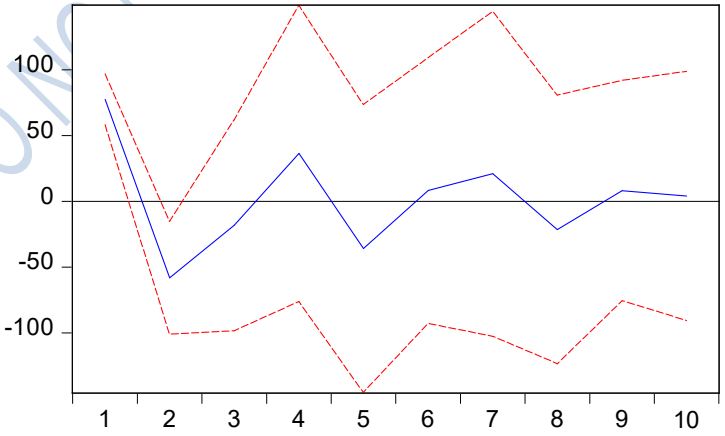
Response of lOPCG to FOG



Response of TOG to FOG



Response of FOG to FOG



Variance Decomposition of IOPCG: Period	S.E.	IOPCG	TOG	FOG
1	19.05239	100.0000	0.000000	0.000000
2	27.29724	48.87858	22.91378	0.229706
3	33.21006	40.42313	22.65313	1.552985
4	36.87382	33.04009	22.93889	2.814046
5	40.28354	37.88211	19.70287	2.441961
6	43.26508	37.02303	18.31873	4.633062
7	45.59673	36.04869	16.51904	4.255059
8	47.19074	33.83948	15.46056	4.954783
9	51.33935	35.28841	13.49979	4.216307
10	52.98382	36.26160	13.42964	4.250295

Variance Decomposition of TOG: Period	S.E.	IOPCG	TOG	FOG
1	14.19920	20.99816	58.00838	0.000000
2	14.77339	14.42477	41.38443	0.396459
3	15.92559	13.78205	35.14683	3.343313
4	17.73446	13.85658	30.50054	4.980270
5	18.34352	15.25229	27.73305	4.776762
6	19.86214	16.54601	26.75579	6.5019

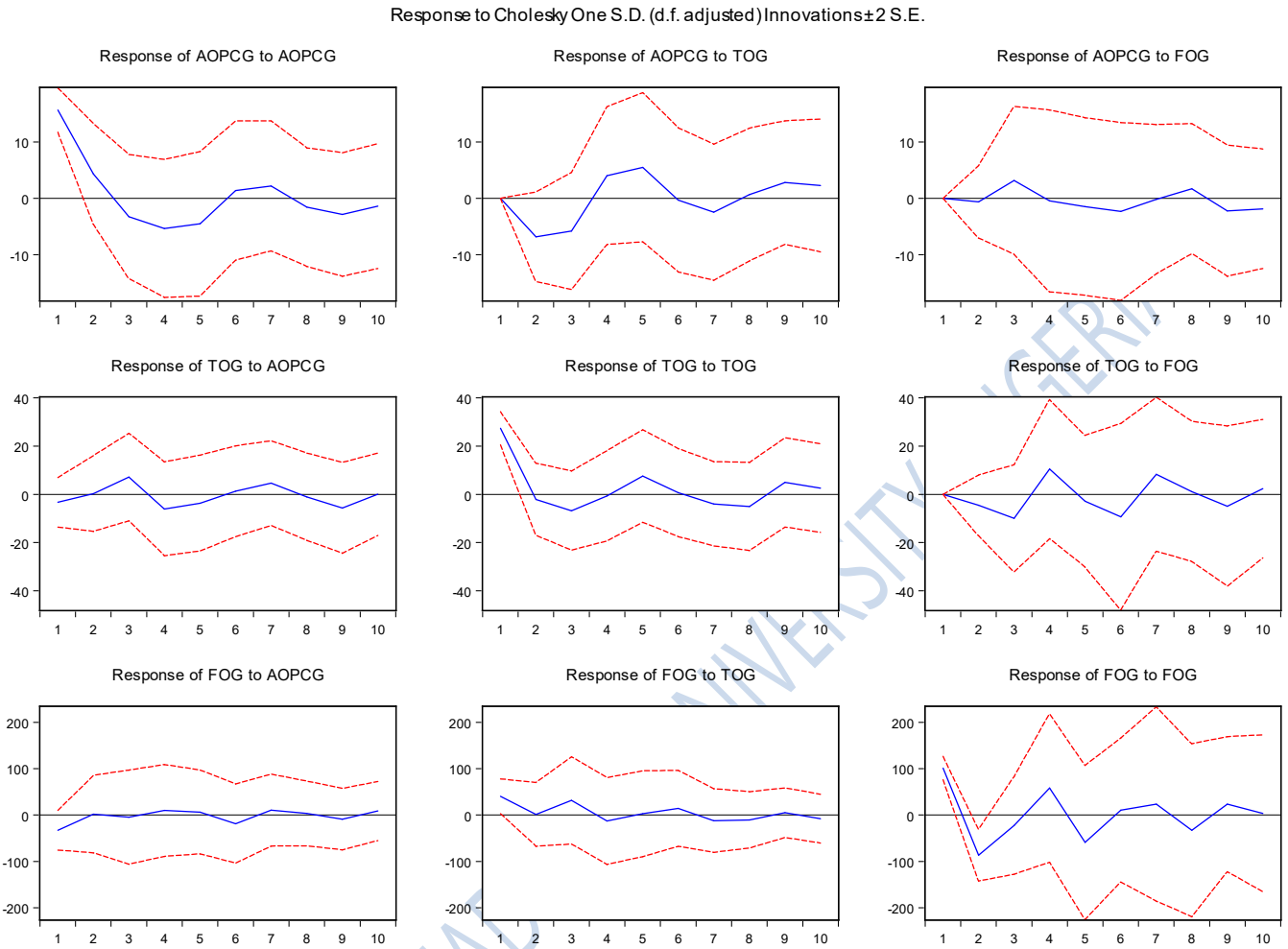
				58
7	20.52205	16.78040	23.84248	5.7737 29
8	21.57014	17.65083	23.23959	5.9650 44
9	22.79032	18.42599	21.86524	5.6093 78
10	23.27789	19.59173	21.54847	5.4474 42

Variance Decomposition of FOG: Period	S.E.	IOPCG	TOG	FOG
1	13.12508	10.27914	35.96113	38.860 74
2	19.19324	5.097961	24.47008	22.579 41
3	24.39602	5.032625	24.73141	21.569 78
4	26.63761	6.791663	22.59692	21.240 64
5	27.64173	6.456671	21.13431	22.141 75
6	28.82095	6.228757	21.36567	21.463 46
7	29.01767	6.406360	21.01696	21.819 90
8	29.30856	6.091643	21.52130	21.367 66
9	29.61735	6.241710	21.39415	21.283 95
10	29.98534	6.311707	21.36830	21.264 17

VAR Lag Order Selection Criteria
Endogenous variables: AOPCG CPCG FDG TOG FOG GEG INF EXR INT
Exogenous variables: C D(EXR(-3)) D(INF(-3))
Date: 01/21/22 Time: 15:48
Sample: 1985 2020
Included observations: 32

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-1275.687	NA	1.86e+24	81.41794	82.65466*	81.82788
1	-1165.795	137.3657*	4.30e+23	79.61216	84.55902	81.25190
2	-1044.458	83.41856	2.53e+23*	77.09115*	85.74816	79.96071*

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion



Variance Decomposition of AOPCG:

Period	S.E.	AOPCG	TOG	FOG
1	15.63202	100.0000	0.000000	0.000000
2	21.15617	58.79383	10.39833	0.089092
3	25.53089	41.97316	12.30691	1.604903
4	30.106	33.33903	10.63880	1.178068

	90			
5	32.07147	31.36768	12.29866	1.247637
6	32.64288	30.46146	11.88000	1.714269
7	33.38240	29.56148	11.90832	1.641630
8	34.77923	27.43969	11.00627	1.754737
9	36.59946	25.39484	10.52146	1.949425
10	38.01938	23.66625	10.10648	2.047102

Variance Decomposition of TOG:

Period	S.E.	AOPCG	TOG	FOG
1	13.69863	1.289173	88.29736	0.000000
2	15.40365	0.856862	58.45691	1.601422
3	17.57402	3.607491	46.71037	6.942882
4	19.18716	4.352297	35.43844	10.10865
5	19.70491	4.570852	35.12894	9.681178
6	20.51083	4.346418	32.94678	12.38857
7	20.79311	4.712129	30.59123	13.70813
8	21.55703	4.469930	29.62137	12.94571
9	21.85727	5.183256	28.59823	12.91368
10	22.10124	5.104002	28.36370	12.88605

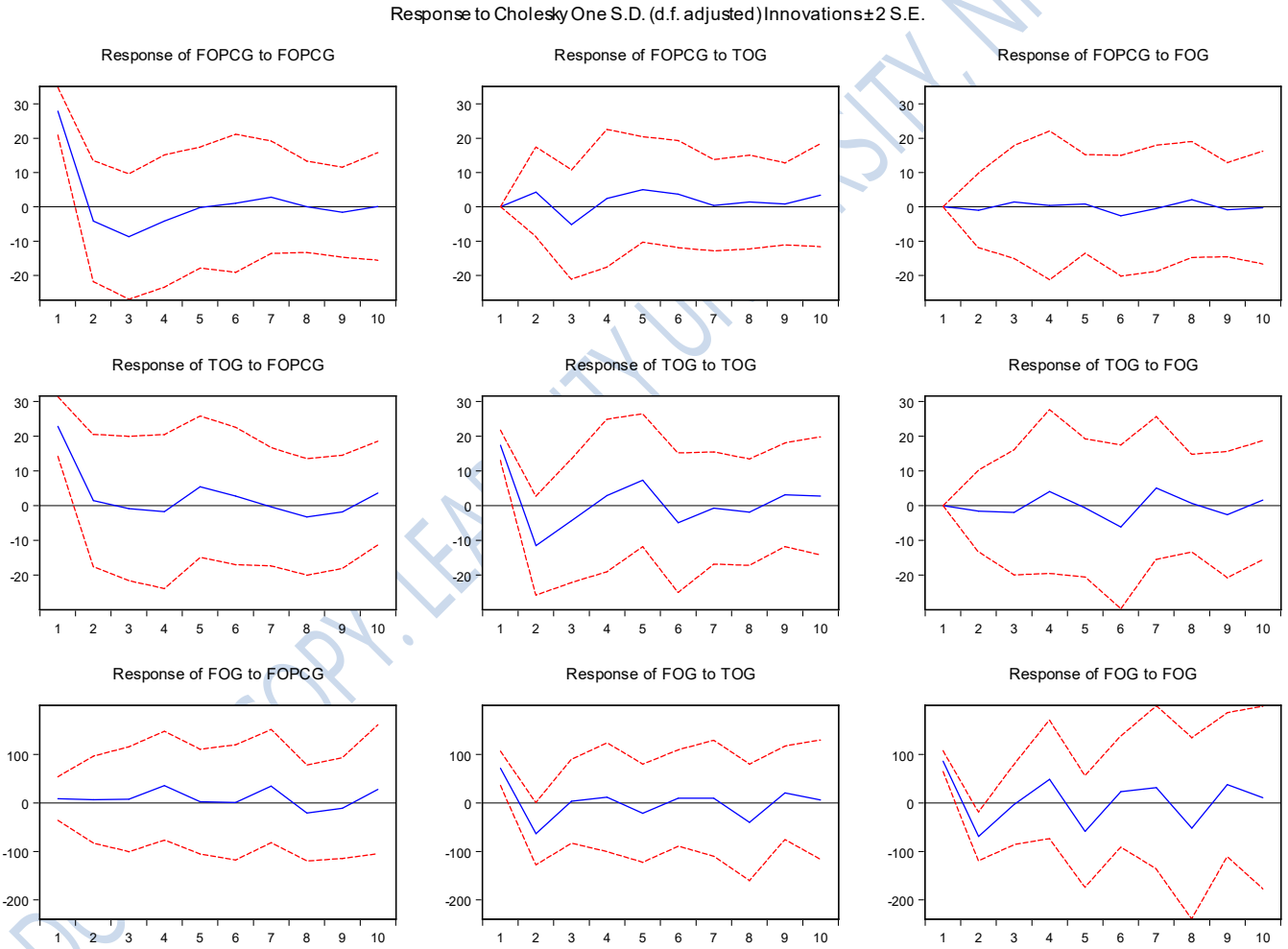
Variance Decomposition of FOG:

Period	S.E.	AOPCG	TOG	FOG
1	14.26011	7.153088	10.75650	67.72716
2	19.44770	2.500559	3.751762	40.73566
3	24.97527	2.326895	5.515290	38.26026
4	27.89149	2.182224	5.052424	39.13682
5	29.51765	2.041813	4.584563	41.08443
6	30.74882	2.472371	4.686452	39.25286
7	31.60895	2.591343	4.811577	39.30081
8	31.85920	2.522186	4.815984	39.59307
9	32.14250	2.582907	4.744020	39.50763
10	32.60083	2.673748	4.790723	39.19467

VAR Lag Order Selection Criteria
Endogenous variables: FOPCG CPCG FDG TOG FOG GEG INF EXR INT
Exogenous variables: C D(EXR(-3)) D(INF(-3))
Date: 01/21/22 Time: 15:58
Sample: 1985 2020
Included observations: 32

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-1301.208	NA	9.16e+24	83.01300	84.24972*	83.42294
1	-1183.379	147.2863*	1.29e+24	80.71118	85.65804	82.35093
2	-1050.391	91.42929	3.67e+23*	77.46193*	86.11893	80.33148*

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion



Variance Decomposition of FOPCG: Period	S.E.	FOPCG	TOG	FOG
1	27.92019	100.0000	0.000000	0.000000
2	32.48941	75.50959	1.753400	0.098856
3	36.56235	65.31131	3.372943	0.223084
4	37.81956	62.24705	3.579764	0.219025
5	39.90159	55.92326	4.806242	0.241227
6	41.12466	52.70906	5.328006	0.631328
7	42.39405	50.03822	5.023880	0.605850
8	43.01946	48.59391	4.984411	0.823980
9	44.19495	46.16682	4.758657	0.817159
10	45.82706	42.93729	4.983384	0.763280

Variance Decomposition of TOG: Period	S.E.	FOPCG	TOG	FOG
1	13.81080	60.77604	35.41179	0.000000
2	14.60512	39.20203	32.75373	0.188088
3	16.19910	31.89887	27.78756	0.393212
4	17.75537	27.40181	24.15797	1.181964
5	18.96690	27.05088	25.16626	1.126781
6	19.97844	25.65999	24.67383	2.799828
7	20.58835	24.55696	23.63161	3.795460
8	21.87959	24.07040	22.87799	3.667457
9	22.98798	22.92316	22.04055	3.750037
10	23.73680	22.56233	21.49452	3.700454

Variance Decomposition of FOG:

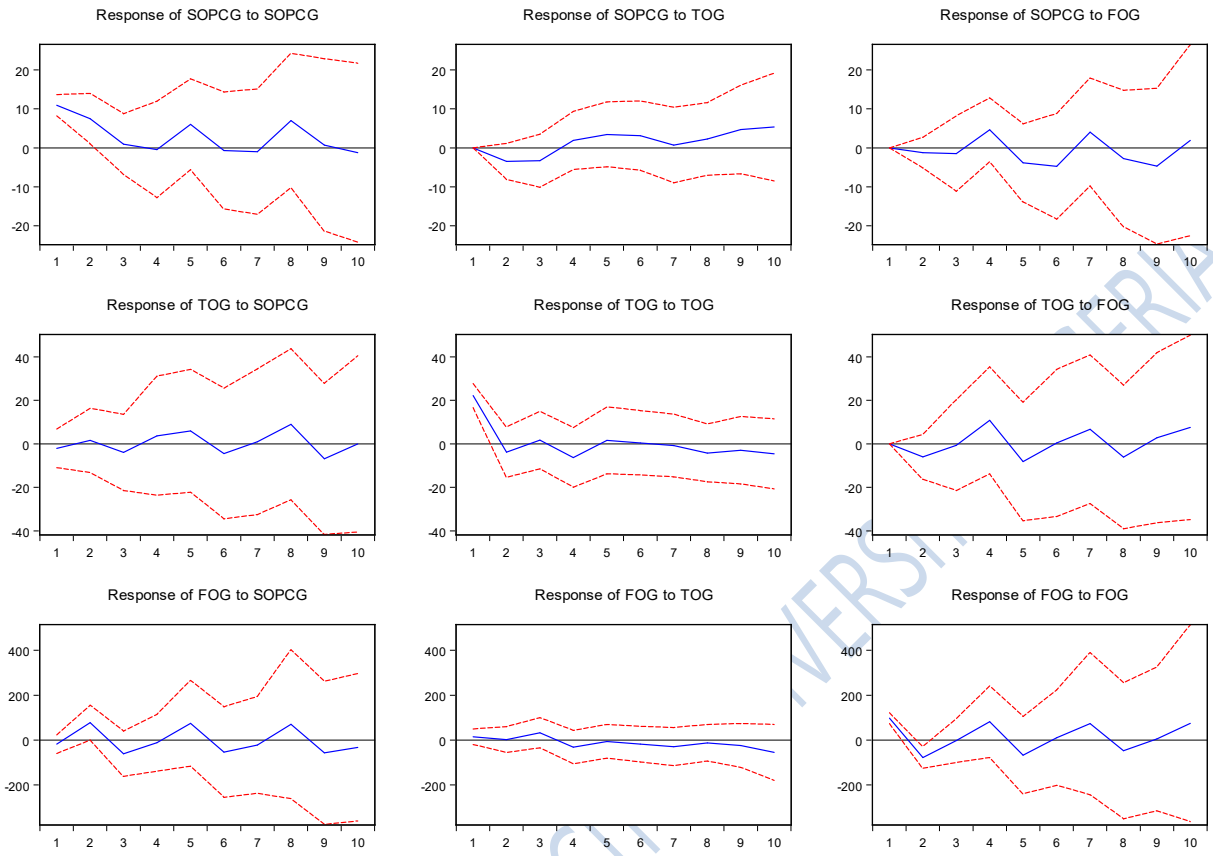
Period	S.E.	FOPCG	TOG	FOG
1	13.19400	0.481947	31.63496	46.23853
2	20.16506	0.340367	26.13911	35.02580
3	24.20006	0.424440	22.25443	29.81131
4	25.55094	2.927491	18.89744	29.74995
5	26.97473	2.319612	15.64044	29.05003
6	27.44118	2.140616	14.56655	27.59757
7	28.05921	3.608477	13.55543	26.81881
8	28.61985	3.737605	14.00382	27.09736
9	29.04929	3.648463	13.64083	27.06104
10	29.49568	4.357965	13.10958	26.05041

VAR Lag Order Selection Criteria
Endogenous variables: SOPCG CPCG FDG TOG FOG GEG INF EXR INT
Exogenous variables: C D(EXR(-3)) D(INF(-3))
Date: 01/21/22 Time: 16:03
Sample: 1985 2020
Included observations: 32

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-1263.975	NA	8.94e+23	80.68593	81.92264*	81.09586
1	-1139.108	156.0837*	8.11e+22	77.94425	82.89110	79.58399
2	-1023.033	79.80147	6.64e+22*	75.75207*	84.40907	78.62162*

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

Response to Cholesky One S.D. (d.f. adjusted) Innovations ± 2 S.E.



Variance Decomposition of SOPCG:

Period	S.E.	SOPCG	TOG	FOG
1	10.92176	100.0000	0.000000	0.000000
2	14.71294	81.09566	5.673426	0.718692
3	16.91829	61.64551	8.099898	1.295985
4	19.78000	45.14649	6.833986	6.445949
5	22.70509	41.35063	7.503134	7.771190
6	25.15417	33.76467	7.650701	9.879005
7	26.39472	30.81244	7.019779	11.31321
8	28.63556	32.17401	6.592399	10.54022
9	33.00304	24.27032	6.990179	9.958574
10	36.64043	19.80676	7.798582	8.357187

Variance Decomposition of TOG:

Period	S.E.	SOPCG	TOG	FOG
1	11.15554	0.680483	77.83051	0.000000
2	12.59202	0.708017	52.57953	3.691533
3	14.92575	1.600111	36.27925	2.559821
4	19.40803	1.945341	29.36647	8.255421
5	20.76991	3.309646	25.20310	10.04075
6	22.80652	4.115434	24.64236	9.820731
7	25.33314	3.849138	22.83197	10.97393
8	26.89895	6.435454	20.99975	11.11926
9	31.41936	7.880702	20.58368	11.01733
10	36.80124	7.385416	19.99493	12.26018

Variance Decomposition of FOG:

Period	S.E.	SOPCG	TOG	FOG
1	13.61089	2.407070	1.633216	69.46695
2	18.30448	18.81943	0.679003	45.94419
3	25.88689	25.20168	3.179769	38.69779
4	27.34049	19.76954	4.389257	42.82840
5	28.93931	20.50384	2.990957	34.55316
6	30.33521	22.98148	3.253774	32.99760
7	30.97734	20.52979	3.761543	34.51182
8	31.57143	21.05650	3.196169	30.11880
9	32.77993	22.61034	3.507785	28.54190
10	34.45452	19.51394	4.984497	27.54594

A. Personal Data

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C. Working Experience with Dates: Oyo State College of Education, Oyo, 2004 till date.

D. Award and Fellowships with Dates (if any): Nil

E. Publications if Any: Nil

1. Thesis/Dissertation

Date & Signature

University Compliance Certification

This is to certify that the thesis is written by Abdulsalam Idowu Sulaiman in the Department of Economics and Development Studies, Faculty of Management and Social Sciences, Lead City University, Ibadan is in full compliance with the approved University Format and Style.

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Name **Date**