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INFRASTRUCTURE GROWTH, EXTERNAL DEBT AND EXCHANGE RATE NEXUS IN AFRICA

BY

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DECLARATION

I do hereby affirm that this work is the outcome of my own research and has not been presented by anyone for any academic award in University of Ghana or any other university. The entire references used in the research have been fully acknowledged.

I take full obligation for all forms of inadequacies.

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CERTIFICATION

This research was supervised in line with the University laid down procedures; We hereby certify.

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DEDICATION

I dedicate this thesis to my family, loved ones and friends for their backing and prayers during the studies.

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Special appreciativeness goes to the God Almighty for His unfailing Grace and Mercy even in the toughest moments. Am forever grateful and indebted to you. You have been my Father, Mother, Counselor, Light, and Strength even in my lowest moment.

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ABSTRACT

The econometric nexus among infrastructure growth, external debt and Exchange Rate in the Sub-Sahara Africa region has been investigated. The study period covered 1980 to the year 2017 for 42 countries in the Sub-Sahara Africa region. The study utilized co-integration and Vector Error Correction Mechanism, a type of Panel Vector Autoregression to test the nexus between infrastructure growth, external debt, and real exchange. Granger causality test examines the causal nexus among the variables. The unit root tests showed all variables to be integrated after taking the first difference. The Johansen cointegration result shows the variables to be co-integrated. The results show a short-run and long-run association among the variables. Moreover, the finding suggests bidirectional Granger causality between infrastructure growth and external debt, a unidirectional Granger causality that runs from Exchange Rate to external debt, and a unidirectional causal relationship running from Exchange Rate to infrastructure growth.

Keywords: Cointegration, External debt, Exchange rate, Granger causality, Infrastructure growth, Unit root, Vector Error Correction, Vector Autoregression.

CHAPTER ONE

INTRODUCTION

1.1 STUDY BACKGROUND

Sub-Saharan Africa is the world's poorest region based on the per capita rankings of the regional blocks with a figure of $1,809 below the world average of $10,300 for the year 2016 (North America $37,477; Oceania $35,087; Europe $25,851; Asia $5,635) (World Bank, 2017). In 2010, it is per capita based on purchasing power parity equaled $2,281, compared to $3,229 in South Asia, $6,672 in developing East Asia and Pacific, $11,192 in developing Latin America and Caribbean (World Bank 2010). The former MDGs and the current SDGs have as one of their objectives to end poverty, the world over and Africa as a developing region in particular.

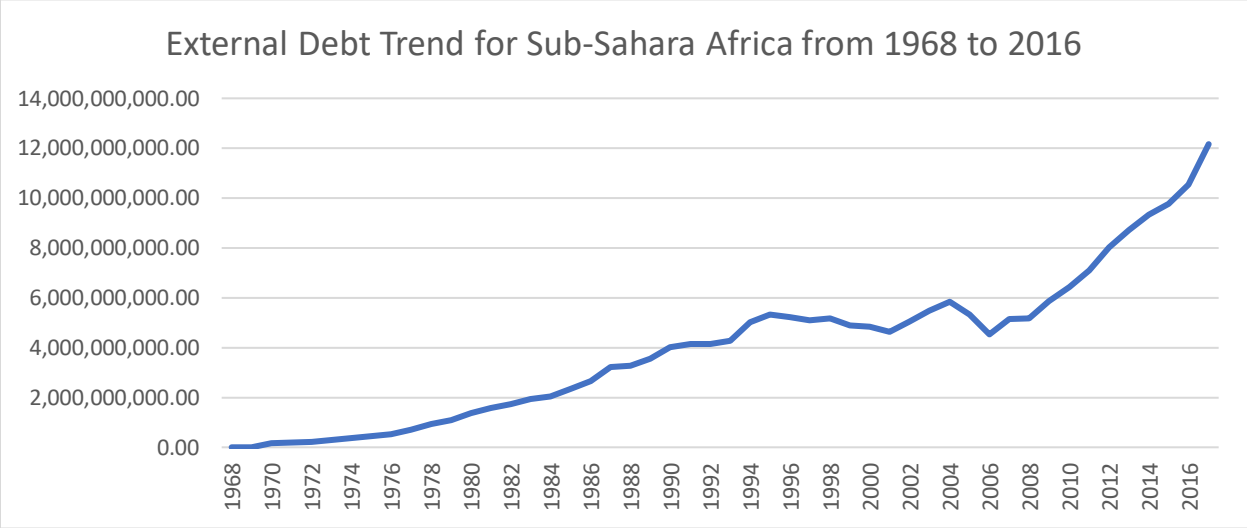
There is a global and local drive to reduce the high levels of poverty. Africa is on the march to industrialize to reduce if not end the persistent teaming poor population. Africa wants to provide the needed jobs for the teaming youth in their millions as they join the job market every year. The call to reduce poverty and persistent youth unemployment level will not be successful without a look at the fundamental structure of the economy. The key to finding a panacea to the issue of unemployment is a drive to industrialize. This can be done by increasing the current stock of productive infrastructures like electricity, water, information communication technology, and transportation services. This will give firms within the region the needed advantage to be competitive in the global market. It is estimated that Africa needs an amount of $130 to $170 billion to meet its annual infrastructure needs. Of this estimated infrastructure need, Africa has an estimated financing gap between $68 to $108 billion on an annual basis. Most governments in Africa are finding it difficult to meet the infrastructure and human investment needs (Edoun &

Mbohwa, 2016). As such this financing gap may have to be sourced outside of the region (Africa Development Bank, 2018; Foster & Briceño-Garmendia 2010). Funds from pensions, insurance firms and sovereign wealth holders which are known as institutional investors globally have more than a hundred trillion dollars in possessions under their supervision (Arezki, Bolton, Peters, Sanama, & Stiglitz, 2017). A fraction of such global excess savings which are normally of low yield can bridge the gap in financing Africa's productive infrastructure needs. Such financing can be done at profit. As such countries in Africa are positioning themselves individually or in a group(s) to attract external funding needed to bridge the gap in financing infrastructure. The African Union through New Partnership for Africa's Development and African Development Bank initiated the program for developing infrastructure on the continent of Africa. They aim to promote socio-economic development and poverty reduction in Africa through improved access to integrated regional and continental infrastructure networks and services (AU & N.E.P.A.D, 2010).

The need to get resources to take care of the gap between the needed resources and the available revenue in bridging the infrastructure gap results in external support either in a form grant which is free or loan which comes at a cost known as Debt. Most countries in the developing or developed world fall on loans when in need to provide for certain expenditures that the country in question cannot currently support but that expenditure is a necessity. They usually fall on debt from internal sources or external sources. But in most cases, both external and internal are utilized. This is a usual practice in bridging the funding gap. Individuals, organizations, and governments borrow to fill the gap between revenue and expenditure. Monies borrowed by the government is normally termed as public debt. This debt is important for effective governance. As can be seen in the figure

below, external is on the increase. From 1980 to date the need for external debt is on the rise except for the year 2006 to 2009 where the world suffered a serious financial crisis.

Figure 1.1 External Debt trends for Sub-Sahara Africa



Source: Fieldwork (2019). The levels of external debt by the 48 countries in the Sub-Sahara Africa region of Africa

In the study of Jhingan (2004) as cited in Nwanne and Eze, (2015), public debts are needed to finance budget deficits, defend territorial integrity, provide support in times of natural catastrophes, execute economic development plans, support public enterprises, and provide utilities and make economies stable (Nwanne & Eze, 2015). Countries after civil wars borrow to reconstruct damage infrastructure. They need such funds to bridge the infrastructure gap due to time wasted in civil wars and conflicts. Accumulating public debt means that, there will be the need to pay back such debt since such monies are not free (Saungweme & Odhiambo, 2019).

Foster and Briceño-Garmendi (2010) said countries in Africa have an infrastructure deficit and a gap in funds to bridge the infrastructure gap. As such, there are sources Africa can fall on to finance the gap and most such sources are external in nature (Arezki, Bolton, Peters, Sanama, & Stiglitz, 2017). Getting funding for the infrastructure needs from an external source will have to be paid

back and this leads us to debt servicing. In the study of Anyanwu (1993), external debt management strategies for debt servicing applied by countries included: limiting the size of debts, limiting debt service payments, refinancing of short-term trade debts, debt rescheduling, new loan facility agreement, debt-equity swap, structural adjustment program (SAP), and debt cancellation.

External Debt with its associated debt servicing obligation is a difficulty for countries all over the world. Sub-Sahara African region is no exception. Paying back such loans denominated in foreign currencies may have some repercussions for the currency of the paying country. It is hoped that improving infrastructure should improve productivity. This productivity then feeds into export with its associated foreign currency income. And this may impact the exchange rate of the exporting country.

The exchange rate is the currency price of one country to the currency price of another country (Ahuja, 2013). The scientific International Organization for Standardization (ISO 4217) defined the exchange rate as "the rate or ratio of which one currency can be exchanged for any other currency at any given point in time" (Gary, 2014). The forces of demand and supply cause exchange rates to change or fluctuate without end. From academics to politicians and the general populace, the exchange rate had always been a macroeconomic commodity of concern over the years. The exchange rate as a macroeconomic indicator affects the life of everyone either directly or indirectly. As no country is an island, countries engage each other. There is continuous trade among individuals and companies across borders and overseas. Therefore, the need to constantly use currencies of other countries.

The optimality debate on different regimes of the exchange rate has long had at its heart the results of exchange rate volatility on trade. It is the view of those who favored the pegged exchange rate regime that since the adoption of floating exchange rate regime, extreme volatility and deviation

from the normal has been the order of the day for exchange rates over a prolonged period of the floating regime (Asab & Cuestas, 2017). Those who hold this opinion, believe that such uncertainty in exchange rate scare firms from entering into the international market and hinders development and progress. Alternatively, the believers of flexible or floating exchange rate hold the opinion that, these changes in the exchange rate is caused by the economic fundamentals, and that changes in fundamentals would require similar, but more abrupt, movements in fixed parities (Devereux & Yu, 2017). So, going for a fixed exchange rate regime will not bring down unanticipated changes or volatility. Besides, more flexibility in the exchange rate enhances the balance of payments adjustment in response to external shocks. This saves us from the need to come out with protective tariff barriers or to put in place capital controls to be in equilibrium. This had become more pronounced after the break down of the Britton Wood system in 1973. All national currencies are gradually moving toward a full float system with its associated fluctuations and movements in the foreign exchange market. Companies, individuals, national and international policymakers are always on the watch out for exchange rate movements and how it impacts policies and lives of individuals, institutions, countries and the international community.

Enders, Müller, and Scholl (2008) in their research found that both the Exchange Rate and the terms of trade whose responses are left unrestricted depreciate in response to expansionary government spending shocks and appreciate in response to positive technology shocks.

In the USA, Kim, and Roubini (2008), Enders, Müller, and Scholl (2008) results suggest that an expansionary fiscal policy shock, depreciate the Exchange Rate. Ravn, Schmitt-Grohe´ and Uribe (2012) with quarterly data from four economies that are industrialized (the United States, the United Kingdom, Canada, and Australia), documented that an increase in government purchases

depreciates the Exchange Rate. Monacelli and Perotti (2010) said government consumption weakens the Exchange Rate.

In Europe and China, works have done on the expansionary government spending shocks causing Exchange Rate appreciation. Both consumption and investment spending shocks result in an appreciation of the exchange rate and this is in agreement with the conventional Mundell-Fleming model (Beetsma et al., 2008; Chen & Liu, 2018).

This paper will analyze the infrastructure growth, external debt and exchange rate nexus. From the theoretical perspective, expansionary government spending shocks like infrastructure spending is expected to lead to Exchange Rate appreciation and this is supported by theories like the conventional Mundell-Fleming model, a wide set of the real business cycle and new-Keynesian models under standard calibrations. But in the empirical literature, the results provided are mixed (Kim & Roubini, 2008; Enders, Müller & Scholl, 2008; Beetsma et al., 2008; Chen & Liu, 2018).

Majority of studies if not all into the effect of fiscal policy shock on the exchange rate had focused on advanced economies. Very little attention has been thrown on emerging and developing economies especially the Sub-Saharan African Region (SSA). SSA in recent years has its budget spending and projections towards bridging the infrastructure gap resulting in various levels of budget deficits. In the Sub-Sahara Africa sub-region, fiscal instruments at the policy level are increasingly becoming more important by the day and it is of grave importance for more attention to be placed on how these fiscal shocks affect Exchange Rate as this has a telling on international competitiveness.

1.2 PROBLEM STATEMENT

Unemployment is a major problem of least developed economies especially those on the Sub-Sahara African continent (Mbeteh, Pellegrini, & Mehtap, 2019). These high levels of unemployment can be attributed to the low levels of production with its associated high levels of importation. Jobs are indirectly shipped to the foreign economies where their importations are coming from (Mbeteh, et al., 2019). To bridge the employment gap, there is a need to revamp the productive and manufacturing sectors of these economies. When this is done, countries in the developing world (like those on the Sub-Saharan African continent) will create opportunities for massive employment. For the needed industrialization and manufacturing boom to be possible, there is a need for massive infrastructure development that enhances the productivity process. Manufacturing boom thrives on the back of strong productive infrastructure (like road network, electricity supply, telecommunication infrastructure, water and sanitation, and others). Okoh (2008) highlights public spending as one of the foremost policy tools employ to promote the development and to tackle poverty not only in the developed nations but also in the developing economies. A boom in public infrastructure hinges on the ability of the local economies to be able to support such a process and or sourcing for funding outside of the local economy. In recent times the Sub-Saharan African region economies have experienced solid growth, influenced by infrastructure development, resilient service sector and strong productive agriculture sector (REO, 2014). So, improved infrastructure is expected to improve growth.

Countries in the sub-Saharan African region over the years have sourced for funding outside of their countries and that of the African continent. These funds are expected for infrastructure development projects and it is expected to continue into the foreseeable future. Sub-Sahara African countries are projected to be spending more on infrastructure in the coming years; that means an

increase in government spending. This anticipated spending of government on infrastructure will have an impact on the exchange rate volatility of these countries. The exchange rate is an important macroeconomic indicator as the indicator has an impact on the level of international trade. Import and export levels in a country are affected by the level of the exchange rate in a country. An appreciating currency for a country means, the country's export becomes relatively expensive and her imports relatively cheaper. So how government infrastructure spending affects the exchange rate is of great relevance for an economy and research community as well.

Majority of studies if not all into the effect of fiscal policy shock on the exchange rate have focused on advanced economies. Very little attention has been thrown on emerging and developing economies, especially the Sub-Saharan African region. Studies into SSA is very necessary because most governments in the region are showing signs of more future spending in infrastructure provision. The budget deficits on the Sub-Saharan African continent is relatively high as compared to other regions of the global space and these high deficits are to support fiscal expansions within the region. In the Sub-Sahara Africa sub-region, fiscal instruments at the policy level are increasingly becoming more important by the day and it is of grave importance for more attention to be placed on how these fiscal shocks affect Exchange Rate as this has a telling on international competitiveness. In contrast to developed economies, developing economies ratios for expenditure to gross domestic product and that of tax to gross domestic product are very low (Jha, 2007). Fiscal stance for developing countries as compared to the developed, are often procyclical. Tax resources generated in developing countries are quite volatile relative to the developed world (Jha, 2007).

Per the existing literature in the area of fiscal policy in terms of government infrastructure spending and how this interacts with the exchange rate within the economic space has a very mixed outcome. There is a set of researchers that came to the conclusion through their empirical research that, the

interaction between government spending both consumer spending and investment spending, and Exchange Rate do not follow the conventional Mundell-Fleming theory and the Business Cycle Theory (Kim & Roubini, 2008; Monacelli & Perotti, 2010; Enders et al., 2011; Ravn et al., 2012). These studies were carried out in America and Europe using both quarterly data and annual data.

Another group of researchers also came to the conclusion through their empirical research that, the interaction between government spending both consumption spending and investment spending, and Exchange Rate to be in agreement with the conventional Mundell-Fleming theory and the Business Cycle Theory (Beetsma et al., 2008; Chen & Liu, 2018) and they undertook their studies in Europe and Asia using both quarterly data and annual data.

Per the literature reviewed, there has been research on Sub-Sahara Africa on fiscal policy with other macroeconomic variables but not the exchange rate. For instance, Adeyemi, Ogunleye and Oloruntuyi (2018) looked at the impact of government capital expenditure on private investment in SSA from the year 1980 to 2015 and revealed that government capital expenditure has an insignificant positive effect on private investment among the selected countries of Sub-Saharan Africa, though variables like debt stock and tax revenue have significant positive impact on private investment among selected countries of SSA. It showed that official development Assistance, inflation and interest rate has an insignificant negative effect on private investment.

Looking at how government spending impact interest rate, inflation, and private investment, Akinlo and Oyeleke (2018) found a negative long-run impact on the interest rate and inflation have a negative but positive impact on private investment.

From the point of how public expenditure influence economic growth Kweka and Morrissey (2000) show that when public expenditure by way of productive expenditure or physical

investment increases, it results in a negative economic growth. But if public expenditure comes by way of consumption, Kweka and Morrissey (2000) says, it influences economic growth positively, and this positive impact on economic advancement is more distinct when it comes to private consumption. Expenditure on human capital investment was insignificant in the regressions, probably because any effects would have very long lags. Results confirm the view that public investment has not been productive but counter the widely held view that government consumption spending is growth-reducing (Kweka & Morrissey, 2000). Influencing reforms in the middle of the 1980s, aid was seen to have had a positive impact on economic growth.

So, in furthering the literature in the area of fiscal policy, this paper seeks to analyze infrastructure growth, external debt, and Exchange Rate nexus. The sub-Saharan region is embarking on infrastructure development where its main source of funding is from external sources that involve foreign currency. That is, to bridge the infrastructure funding gap the sub-region is resorting to international transfers which have may implications for exchange rate either positively or negatively. The existent literature from the developed countries have mixed findings and as such there is the need for more research into the area especially on the sub-Sahara region where more and more external debt is been accrued with its associated debt servicing obligations. So, the need to closely examine the nexus between infrastructure growth, external debt and exchange rate.

1.3 OBJECTIVE OF THE STUDY

The main objective of the study is a look at the nexus that exist between infrastructure growth, external debt, and Exchange Rate. The study will specifically look at the following areas.

i. The nexus between infrastructure growth and exchange rate.

ii. The nexus between external debt and exchange rate.

iii. The nexus between external debt and infrastructure growth.

1.4 RESEARCH QUESTIONS

i. What is the nexus between infrastructure growth and Exchange Rate?

ii. What is the nexus between infrastructure growth and external debt?

iii. What is the nexus between external debt and Exchange Rate?

1.5 STUDY SIGNIFICANCE

The consequence and discoveries of this research shall be beneficial for the following key reasons; Government and other policymakers: if the hypothesis that a country's infrastructural growth has a nexus with the external debt and or Exchange Rate, then it would be prudent for sub-Sahara African governments to contract external debt in a way that will enhance infrastructure and at the same time not depreciating their currencies in an unstainable manner.

Academics and Research: This current paper will add up to the prevailing research on the infrastructure, external debt and exchange rate nexus which are usually tilted towards developed economies. It would, therefore, provide an opening for additional into the minimum levels of infrastructure growth which is usually financed through loans, debt servicing levels that will not hurt growth and their relation with exchange rate changes.

Investors and other industry practitioners: Foreign investors are, especially, interested in safe environments as a host to their investments. In the area of transnational trading activities, this

research is expected to provide empirical evidence of the level of infrastructural developments in African countries. To advise policymakers accordingly, the specific factors that concern the business community and foreign investors will be established.

1.6 STUDY ORGANIZATION

The research is ordered into five chapters shown as follows. Chapter one gives an introductory aspect of the whole study. It includes the study background, study problem, objectives of the research, study questions, significance of the research paper, scope, and limitation of the research and the outline of the research.

Chapter two is the literature review. This chapter gives an extensive and detailed review of existing the theoretical and empirical literature on infrastructure, debt servicing and exchange rate in Sub Sahara Africa.

Chapter three focuses on the methodology. This chapter establishes the econometric model for data analysis. The source of data and variable description and justification are also discussed in this chapter. The reasons for choosing the appropriate method of data analysis are advanced in the third chapter.

Chapter Four delves into the data examination and discussion of results. The chapter presents the descriptive statistics, the Pearson correlation matrix, the results from the Panel Vector Autoregression estimation, unit root test, Kao Residual Cointegration Test and Granger causality Wald test. The discussion of the results from the vector error correction models a typing panel vector autoregression estimation technique is therefore discussed in this chapter.

Chapter five focuses on the conclusion and policy recommendations. This chapter abridges the outcomes from the research, draw varied conclusions and make policy commendations for stakeholders such as governments in Africa and investors who have Africa's development at the heart or those who seek to invest in the Sub-Sahara African region.

CHAPTER TWO

LITERATURE REVIEW

2.1 CHAPTER INTRODUCTION

This chapter reviews the various theoretical foundations of infrastructure growth, debt servicing, and exchange rate. The chapter also gives empirical evidence of existing literature on infrastructure growth, external debt, and exchange rate, with a special attention on the Sub-Sahara Africa region.

2.2 REVIEW OF THEORETICAL LITERATURE

This segment probes into the theoretical literature bordering on infrastructure development, external debt, and debt servicing, and exchange rate.

2.2.1 PURCHASING POWER PARITY

A neo-classical theory in economics known as Purchasing power parity (PPP) looks individually in different countries buying a basket of goods and services in the market at a certain amount of their currencies, and this should be the rate at which such currencies should be exchanged for the other. For instance, if a basket of goods and services in Ghana cost 50 cedis and the same basket of goods and services in Nigeria cost 100 naira; then the exchange rate between the two countries should be that 50 cedis should be exchanged for 100 naira or one cedi should be exchanged for two naira if purchasing power parity holds. So, if there is a change in how much the basket of goods and services cost should reflect in the exchange rate between the two countries' currencies.

In the PPP concept, one can tell what the exchange rate should be between two currencies to be to equate the purchasing power of the two currencies. Exchange Rate deviation from purchasing power parity is a measure of exchange rate deviations.

A shortfall of the purchasing power parity concept is that it fails to account for profits and do not take into account quality differences in goods and services among countries and regions. Products' qualities are normally country-specific. Countries have different standards on issues of quality, safety requirements and how much it cost to transport. Taxes and tariffs imposed on the same goods and services are also country-specific. GDP PPP controls for the diverse costs of living and price levels, typically relative to the United States dollar, enabling a more precise estimate of a country's production level.

2.2.2 RICARDO THEORY OF PUBLIC DEBT

In the public debt theory of Ricardo, it says that the main problem of the society or community is not about how or where public debt is funded or sourced from but the most important burden is from the wasteful nature of how public expenditure is done. When it comes to the issue of funding public expenditure, the opinion is that financing will, by all means, come from the resources of the society or community at the time of expenditure; to it, it does not matter if the funding is gotten through taxes or funding is gotten through loans or debt. If funding is gotten through a loan then it becomes public debt. Where the loan is obtained outside of the country, it becomes external debt. This external debt comes with servicing of the debt which is accompanied mostly by payments in foreign currency. The more or less demand for these hard currencies to service debts contracted in these foreign currencies, this, in turn, causes changes in the exchange rate those foreign currencies and the local currency involved in the exchange.

2.2.3 THRESHOLD SCHOOL OF THOUGHT (DEBT - LATER CURVE THESIS)

Per the school of thought on the threshold, the main difficulty is the issue of external debt and how the relationship between growth and debt is non-linear. The school of thought holds the position that at high debt levels, economic growth fall as the problem of capital flight arises. The fall in growth arises when higher tax levels which are distortionary in nature are placed on the required capital to service debt. Lower investment and lower capital return have resulted which finally leads to lower growth levels. Low debt regimes have a higher growth rate relative to higher debt regimes. The relationship sees debt from external sources as capital inflow with a positive effect on domestic savings and investment and thus on growth which leads to poverty drop through suitable aiming of local savings and investment (Calvo, 1998; Saheed, Sani, & Idakwoji, 2015; Mojekwu, & Ogege, 2012; Udoka, & Ogege, 2012; Isyaku, 2014).

To some economics, less developed countries cannot develop economically without external debt. Public debt to these groups of economics, both external and internal do not help reduce the issue of balance of payment difficulties and pressure from inflation especially in the case of external debt. Because of the availability of public debt, governments of less developed countries get external reserves run down as they engage in ambitious projects and plans which put them into large spending normally financed by fiscal and inflationary monetary policies.

2.3 REVIEW OF EMPIRICAL LITERATURE

This segment probes into the empirical literature bordering on infrastructure development, external debt and exchange rate in the whole world with a special interest in Africa and Sub-Sahara Africa.

2.3.1 INFRASTRUCTURE GROWTH AND ECONOMIC GROWTH

Infrastructure can be in the form of physical or social. Physical infrastructure is an important factor in achieving rapid economic growth. When physical infrastructure is well developed, transaction costs and input costs are reduced; investment and trade are fostered, markets are open up, competition is improved upon, an opportunity for employment, become more productive, economic undertakings are promoted and finally economic growth gets contributed (Mohanty & Bhanumurthy, 2018). In the long run, when there is an investment in social infrastructures like education and healthcare, the economy gets to enjoy improved skills and better human capital that will result in productivity increase and final growth. When communities that are not having access to social amenities like transport, telecommunications, energy, electricity, water and sanitation, education and health services must be provided access to promote all-inclusive development and growth. With these, factor productivity is increased in the development process both directly and indirectly (Mohanty & Bhanumurthy, 2018).

Economic growth is hindered by poor development in infrastructure in Sub Saharan Africa (SSA) region (Calderon & Serven, 2010; World Bank, 2013). In the policy domain, the role played by infrastructure in growing the economy is very key. For example, Africa's huge untapped potential when it comes to productivity huge investment potential is a result of huge infrastructure limitations as per the report of Africa Development Bank (2010). The World Bank (2013) accordingly says firms in the productivity sector of Africa are depressed by forty percent. This is because there is a huge gap in infrastructure development. This continues to be a key lock up on firms undertaking business in Africa (Chakamera & Alagidede, 2017).

The infrastructure quality effect on economic advancement is weak. The effect is a bit weaker in regions with moderately high-quality infrastructure as compared to areas with a relatively low

stock of quality infrastructure. This effect is more pronounced in the long run as compared to the short-run. When the infrastructure index is broken down into units, the supply of electricity places the greatest down pressure on economic growth in the Sub-Sahara African region. There is also evidence of a one-directional causality running from aggregate infrastructure to gross domestic product.

Breaking down the direction of causality between economic advancement and infrastructure is a matter of empirical and theoretical concern. From the theoretical point of view, it is acceptable that infrastructure can increase the capacity of productivity of a country or an economy either by increasing the existing resources or causing an increase in production levels (Munnell, 1992). Looking at it from the other side, economic growth can cause the demand and the subsequent supply infrastructure and this may lead to overvaluation of the influence of infrastructure unless endogeneity is placed in check (Esfahani & Ramirez, 2003). What this means is that infrastructure growth can result in economic advancement and as the economy advances, it will lead to further demand and subsequent supply of more infrastructure. More infrastructure will lead to economic growth and vice versa. The investment in infrastructure can be derived from the availability of more resources to a government and it is also dependent on the choices of government and what the government finds to be more important. The agreement on the direction of causality is not consistent empirically. Some authors (Eberts & Fogarty, 1987; Perkins, Fedderke, & Luiz, 2005) "found evidence for a bidirectional causality. In contrast, Munnell (1992) found the direction of causation not running from public capital to output but the other way around. Kularatne's (2006) estimations revealed feedback effects between physical infrastructure and output per capita . Differences in methods, type of data available and diverse periods of research and many other issues are the main factors that may be contributing to the mixed findings. So, the issue on the real

consequence of infrastructure on a gross domestic product or economic advancement and the causal direction has become a key empirical difficulty (Schiffbauer, 2007, 2008).

On average, information communication technology had contributed positively to economic growth, for instance, developed countries and developing countries benefit from landline and cell phone technologies (with cell technologies' growth effect about twice as strong as landlines). This effect is however more pronounced in developed countries compared to developing countries (Stanley, Doucouliagos & Steel, 2018).

In India Rudra and Tapan (2013) found bidirectional causality running from road transportation to economic advancement and a one-way causal direction running from railway transport to gross capital formation and economic growth and unidirectional causality running from rail transportation to gross capital formation. From a panel of forty-one countries, Canning and Bennathan (2000) showed that the length of paved roads is highly correlated with capital. Fedderke and Bogeti (2006) examined the direct effect of infrastructure investment on labor "productivity and the indirect impact of infrastructure on total factor productivity using the panel data analysis (Achour & Belloumi, 2015).

2.3.2 INFRASTRUCTURE QUALITY

The level of infrastructure and institutional development with the other seven factors influence national competitiveness. Palei (2015) said the level of infrastructure is determined through the road quality, railway system in place, air transportation available, information communication technology infrastructure and the supply of electricity.

The quality of infrastructure significantly explains economic growth while infrastructure stocks have no explanatory power. The results are robust to alternative panel compositions. African countries should, therefore, focus not on providing infrastructure bulk but improving the quality of their existing and envisaged infrastructure stocks (Kodongo & Ojah, 2014). Batuo (2015) employing a dynamic panel data approach model on African countries, economic advancement is influenced big time by information communication technology, specifically telecommunications. And that investing in telecommunication has an increasing return. So, for more development, the continent needs to invest more in telecommunication.

Information communication technology infrastructure, economic advancement, and financial development were found to be cointegrated per the work of Pradhan, Arvin, and Norman (2015). With a short-run and long-run causality among the variables. A causal link between Information communication technology infrastructure and economic advancement, between Information communication technology infrastructure and financial development (Pradhan, Arvin, & Norman, 2015).

In the work of Mohmand, Wang and Saeed (2017) infrastructure do not only improve accessibility but also opportunities in investment and trading activities to get an area that was not connected to basic infrastructure. Because of the multiplier effect in an area under consideration, it brings about access to goods, services, and employment opportunities. The case is also that, it is not only physical infrastructure that brings about boost in areas that are not connected and underdeveloped but also the provision of social infrastructure like social technological development of the equal measure. This is a central point in realizing the full potential of an underdeveloped region in the long run. (Mohmand, Wang & Saeed, 2017).

Production function, as well as the energy demand function, has a stable long-run relationship according to Ishida (2014). When it comes to the production function, information communication technology has an insignificant long-run coefficient estimate but labor, stock, and energy have a significant long-run coefficient estimate. When it comes to the function of energy demand, gross domestic product, energy price, and information communication technology investment coefficients are statistically significant. Ishida (2014) indicated that the long-run information communication technology investment elasticity of energy consumption is negative. All other things being equal, information communication technology investment moderately "contributes to a reduction in energy consumption, but not to an increase in" gross domestic product in Japan (Ishida, 2014). In Japan, Shinjo and Zhang (2004) also found a one-way directional causality running from gross domestic product to information communication technology investment, implying the rejection of the information communication technology-led growth hypothesis.

In India, it was found that the source of funding for infrastructure has an impact on the effect of an infrastructure project. Chotia and Rao (2018) saw in their research that a partnership with the private sector to finance was found to make the maximum positive impact on the gross domestic product. Considering the four sub-sectors individually, it was concluded that the private mode of financing in roads, energy and telecom sectors has the maximum positive impact on the gross domestic product, while a partnership with the private sector to finance gives optimal benefit to the seaports sector (Chotia & Rao, 2018). A study by Chotia and Rao (2015) had proven that composite infrastructural growth and economic growth go hand in hand .

Given the available literature, infrastructure growth creates economic value and that the economies that deliver infrastructure growth have an advantage of its delivery. Infrastructure is usually seen as the drive for advancement in the economic wellbeing, the developed economies do not provide

a positive risk-adjusted return. Developed economies or rich democracies are seen to invest in an unproductive infrastructure. In such instances, the economic boom is experienced as long as the infrastructure is under construction but it stops the moment construction is over. The anticipated benefit of providing such an infrastructure never see the light of day. These constructions become a white elephant and a drag on the economy. If the source of funding is from debt and such funds are been placed in unproductive undertakings. This will result in heavy debt accumulation, expansion in monetary terms, the financial market will become unstable and the economy will become fragile. This is the case of China today, investing in unproductive infrastructure (Ansar, Flyvbjerg, Budzier, & Lunn, 2016). When investment into infrastructure is poorly managed, Ansar et al. (2016), what happens is financial and economic problems as is the case in China. This problem will persist until China decides to invest in infrastructure that is at the lower spectrum of the infrastructure of higher-quality. China is moving towards an economic and financial crisis caused by investing a lot in unproductive infrastructure. This may translate into an international economic crisis. As such, this model China's infrastructure investment is not an example to be followed but one to avoid (Ansar et al., 2016).

There is a substantial spatial dependence on economic advancement in less developed counties. Infrastructure development in terms of road network impact economic advancement positively, and this outcome may be overemphasized if spatial factors are not considered. Taking into account the spatial factors, infrastructure in the road network gets to encourage advancement in the economy of the areas close to an area with road infrastructure through the spillover effect, but the spillover effect is restricted by the distance factor (Hu & Luo, 2017).

In the study of Chen, Salike, Luan and He (2016), having transportation infrastructure in terms of highways and railways between cities, it contributes to 6 percent growth of the cities concerned

and 2 percent growth in the city if there is intra-city transport infrastructure. These benefits are more pronounced at the core of cities than the peripheral cities. With the aid of the vector error correction model, a two-way causal direction was found between transport infrastructure and economic advancement in the short run. Particularly, the impacts of transportation infrastructures on economic advancement are most noticeable in the west but slightest in central China. Eastern China benefits sturdily from investments in transport infrastructure through such infrastructure is plentiful (Chen et al., 2016).

"This suggests that shoreline stabilization (Coastal Infrastructure Improvement) works may not only help preserve fragile ecological conditions but further lead to sustainable growth in the local economy" (Corral, Schling, Rogers, Cumberbatch, Hinds, Zhou & Lemay, 2016).

In the Middle East and North Africa region (MENA) Transportation energy usage most importantly adds on to an advancement in such economies, N-GCC (containing countries that are not members of the Gulf Cooperation Council) and MATE regions (Morocco, Algeria, Tunisia and Egypt) according to Samir, Shahbaz and Akhtar (2018). In all regions, economic growth is contributed to by transport infrastructure positively. In showing the causal relationship between transportation energy and transportation infrastructure in one instance and economic advancement in another instance. This was established using the Dumitrescu-Hurlin panel causality analysis. It came prominently the need to invest in recent modern transportation infrastructure that enhances the efficient use of energy and also investing in technologies that do not just ensure efficient energy usage but also have minimal negative externalities on the economies (Samir et al., 2018).

2.3.3 EXTERNAL DEBT

Debt could be from within a nation's border (Internal) or from outside (External). External debt is a debt owed to outside residents repayable in terms of foreign currency, food or service (World Bank, 2004). Before the early 1970s, the external debt of developing countries was relatively small and primarily an official phenomenon, the majority of creditors being foreign governments and international financial institutions such as the IMF, World Bank, and regional development banks (Todaro & Smith, 2012) . The advent of active participation of commercial banks in the debt market with high-interest rates debt was not a major difficulty for developing economies. Until the 1980s, developing economies were taking on debt only at concessional interest rates. Debt accumulation is now a big problem for developing countries to deal with. How the economies of developing countries perform is dependent on the levels of accumulated debt and amount debt servicing obligations. So, on the international stage, the developing economies are less competitive and witness trade loses as their exchange rates adjust improperly. Economic advancement in developing countries is stagnated as terms of trade are worsen by the day. On top of this, there is poor governance and mismanagement within the developing economies (Siddiqui & Malik, 2001). Siddiqui and Malik (2001) say the slowdown in the economic advancement of the developing countries is a result of higher debt burden with higher rates of interest, lowering foreign inflows, lesser export earnings, lower domestic output, and fewer imports .

The issue of debt burden facing developing economies is a serious one and it more serious because the debts are self-reinforcing in nature. So, it very necessary for the debt crisis to be eradicated. Funds gotten from exports and local savings by developing countries are not sufficient to satisfy their demand and need for investment as shown in the study of Chenery and Strout (1966). To meet the gap in investment needs, these countries go in for debts from external sources. In the

immediate, when the funds flow in, it boosts economic growth due to increased investment. It is very paramount to inject such borrowed funds into the productive sectors of the economy so to realize the full growth potential.

A lot of research had focused on how public debt impacts economic advancement. As such, there is enormous empirical and theoretical literature on the impact of public debt on economic advancement. The impact of public debt on economic advancement is not consistent and diverse. So many varying conclusions in the empirical literature. Reinhart and Rogoff (2010a) examined the connection between economic advancement and public debt for sixty years in twenty developed countries. In their research, when public debt is ninety percent and above, public debt negatively affects economic advancement but no relationship was when public debt levels are below ninety percent. They also saw no nexus between inflation and advancement in the economies. Patillo et al. (2002) evaluated the effect of external debt on gross domestic product per-capita growth for twenty-eight years using a panel dataset of 93 less developed economies (Zouhaier, & Fatma, 2014). When external debt levels reach thirty-five to forty percent, external debt has a negative impact on gross domestic product per-capita growth. Clements et al. (2003) saw a negative connection between external debt and economic advancement fifty-five less developed economies for twenty-nine years.

Divergent to believe about public external debt, eternal public debt does not have a major influence on economic growth per the findings of Ramakrishna (2015). In the view of the research, Ethiopia should carry on with her agricultural and service sector policies and should not worry much about her growing foreign debt (Ramakrishna, 2015).

From the study of Owusu-Nantwi and Erickson (2016), it revealed a positive and statistically significant long-run relationship between public debt and economic growth but in the short run, a

bidirectional Granger causality link between public debt and economic growth. Ghana is encouraged to acquire public debt for very high priority projects and programs that are self-sustained and well appraised that could contribute positively to economic growth (Owusu-Nantwi & Erickson, 2016).

Broadly speaking, Riffat, and Munir (2015) and Oleksandr (2003) have "divided the strands of literature on debt in general and economic advancement into three. The first opinion in "the findings of the literature is that there is a negative association between debt in general and economic advancement or growth. It is believed that when debt levels are rising, the government will impose taxes to be able to pay back or service such as increasing debt levels. Such an opinion held by investors will a huge drop investment which adversely affects economic growth (Geiger, 1990; Cunningham, 1993; Afxentiou, 1993; Cohen, 1993; Swada, 1994; Rockerbie, 1994; Deshpande, 1997; Were, 2001). Most of the studies in the body research found an opposite connection between debt and economic advancement (Sach, 1989; Saint-Paul, 1992; Krugman, 1998; Iqbal & Zahid, 1998; Aizenman, Pinto & Radziwill, 2007; Boopen, Kesseven & Ramesh, 2007; Hameed, Ashraf & Chaudhary, 2008; Cholifihani, 2008; Adesola, 2009; Ali & Mustafa, 2012;). Zouhaier and Fatma (2014) focusing on developing countries found that with both the variables of debt i.e. foreign debt as a ratio of GDP and foreign debt as a percentage of GNI, the impact remained detrimental to economic growth. Fosu (1999) in a study said debt proves to be destructive for economic growth for Sub-Sahara Africa countries. Debt at high levels is very destructive to Africa and may lay credence to the politically unpopular austerity measures with constraints on government spending financed by borrowing (Hussain, Haque & Igwike, 2015).

Were (2001) showed that when debt from an outside source is lumped up it visits an unwelcoming impact on economic growth and investments made in the private sector in Kenya. They're also an

inverse effect of debt repayment on economic growth as a result of the crowding-out effect of rising external debt stock as the co-efficient of external debt service was negative and statistically significant, indicating that rising debt service associated with high levels of external debt stock limits the use of limited resources (revenue) from being channeled to productive public investments that would accelerate economic growth (Jarju, Nyarko, Adams, Haffner & Odeniran, 2016). Ali, Farooq, and Mumtaz (2016) indicated that external debt and capital formation have an inverse relationship with economic growth. Both in the short and long run, FDI, aid, and external debt (capital flows) have negative effects on economic growth. This is consistent with the idea of an exaggerated impact of capital flows in Africa (Klobodu & Adams, 2016). According to Lee and Ng (2015), public debt in Malaysia increased because of fiscal expansions. Public debt over time has a negative impact on GDP and it was found that budget deficit, government consumption, and external debt service are a decreasing function of GDP (Lee & Ng, 2015). The negative influence of external debt on economic growth in Oman (Kharusi & Ada, 2018). External debt exhibited a negative relationship with economic growth in both the long and short run for Pakistan and EU countries with high levels of government debt (Dritsakis & Stamatiou, 2016; Hussain, Khan, Khan, Khalid, Kiran & Hussain, 2017) .

The second group of the research findings is that there is a direct relationship between debt and economic advancement (Nwannebuike, Ike & Onuka, 2016; Patillo et al., 2004; Baker & Hassan, 2008). Fincke and Greiner (2015) found a statistically significant positive correlation between public debt and the growth rate of per capita GDP for selected emerging market economies. Internal debt has a positive effect on economic growth (GDPPC growth) for East Africa Countries (Babu, Kiprop, Kalio & Gisore, 2015). There is a positive correlation between economic growth and external debt and the exchange rate. The positive impact of external debt, exchange rate and

inflation rate on economic growth. External debt promotes economic growth in Nigeria (Okoye, Modebe, Erin, & Evbuomwan, 2016). Public debt, total revenue receipts and total credit in India have a favorable effect on economic growth (Mohanty, Patra, Kumar & Mohanty, 2016). Debt was found to impact positively the GDP growth of Greece (Spilioti & Vamvoukas, 2015).

The third strand put together these two schools and placed forward that the impact of debt on economic advancement has a nonlinear tendency (Elbadawi Ndulu, & Ndung'u, 1997; Cohen, 1997; Siddiqui & Malik, 2001; Clements et al., 2003; Reinhart et al., 2003; Checherita & Rother, 2012; Akinkunmi, 2017). The causation between external debt and economic growth is weak in the Nigerian context and it could not be used to forecast economic growth" (Ibi, & Aganyi, 2015).

As Rosen and Gayer (2008) put it Economic development requires investment in infrastructure, education, social welfare, health and other sectors of the economies. The huge expenditures associated with such investments make it challenging for countries to fund them from tax revenues, and mostly leads to budget deficits. Budget deficits caused by such investments have to be financed, but the key question that confronts policymakers and most government economists are; how should the budget deficit be funded? Public finance provides three alternative sources of financing deficits; taxes, debts and user fees (Rosen & Gayer, 2008) .

Developing nations, faced with weak tax regimes and low incomes, opt for debt as the best option for financing the government budget. Given this, it is not surprising that public debt plays a particularly important role in developing countries. Public debt enables fiscal authorities to play their role in stabilizing their economies and stimulate aggregate growth (Caribbean Development Bank, 2013)". It is important for countries to continuously invest in the productive sectors of the economy to ensure sustained growth . Countries in sub-Sahara Africa like Ghana have a very weak "tax system and, as a result, do not generate enough tax revenues to fund its expenditures.

Therefore, taxes are not considered a good option for funding budget deficits (Bagahwa & Naho, 1995) .

Some studies have emphasized the significance of public debt (which external debt is a portion) to economic growth and notable among them are Modigliani (1961), Buchanan (1958), Meade (1958) and Diamond (1965). However, few empirical studies have examined the impact of public debt on developing economies. Numerous studies have analyzed the impact of public debt on economic growth developed economies. This is demonstrated through a large body of the theoretical and empirical literature on the impact of public debt on economic growth. Even that, the empirical evidence provides mixed and inconsistent predictions about the effect of public debt on economic growth. Reinhart and Rogoff (2010a) analyzed the relationship between economic growth and public debt for the period 1949 to 2009 for 20 developed economies. Their study found that high levels of debt and economic growth are negatively correlated; however, they found no link between debt and economic growth when public debt is below 90 percent of GDP . Patillo et al. (2002) empirical results indicate that the effect of external debt on per capita GDP growth is negative for the net present value of debt levels above 35–40 percent of GDP. Clements et al. (2003) reported a negative correlation between external debt and growth for a panel of 55 low-income countries for a period that spanned from 1970 to 1999. Panizza and Presbitero (2012) also concluded that there is a negative relationship between debt and growth. Checherita-Westphal and Rother (2010) study reported a non-linear impact of debt on economic growth, indicating that the government debt-to-GDP ratio has a negative effect on long-term growth when debt is about 90–100 percent of GDP .

Kumar and Woo (2010) said there is a long-run negative relationship between debt and growth. The same was found by El-Mahdy and Torayeh (2009) Egypt's economy using data spanning

1981–2006. Tchereni, Sekhampu, and Ndovi, (2013) reported a statistically insignificant negative relationship between foreign debt and economic growth in Malawi. Schclarek (2004) found no robust relationship between debt and growth. Additionally, Ogunmuyiwa (2011) using a vector error correction model for the estimation, found a weak and insignificant relationship between debt and growth. Shah and Shahida (2012) indicated that public debt does not affect economic growth. Baum et al. (2012) saw a positive and high statistically significant impact of debt on GDP when the debt-to-GDP ratio was less than 67 percent; after which point, there was no relationship between debt and GDP .

Egbetunde (2012) and Amin and Audu (2006) found a positive relationship between public debt and growth. Also, the study reported a bidirectional link between public debt and economic growth in Nigeria and this indicates that changes in public debt will cause variation in Nigeria's economic growth and vice versa. According to Maghyereh (2003), at a debt level of 53 percent of GDP, there is a positive and statistically significant relationship between external debt and economic growth . In Nigeria, Anyanwu and Erhijakpor (2004) reported that current debt has a significant negative impact on economic growth and this is attributed to a high domestic interest rate. Additionally, the study revealed that past domestic debt has a significant and positive effect on Nigeria's economic growth. While public debt is relevant to economic growth, high public debt could adversely impact medium and long-term growth through several channels (Kumar & Woo, 2010). Specifically, excessive public debt could have an inauspicious effect on capital accumulation and growth through interest rates (Gale & Orszag, 2003; Baldacci & Kumar, 2010), higher future discretionary taxation (Barro, 1979; Dotsey, 1994), and inflation (Sargent & Wallace, 1981; Barro, 1995; Cochrane, 2010) (cited in Kumar & Woo, 2010). Aghion and Kharroubi (2007) also point out

that high public debt could trigger banking and currency issues which may result in higher volatility and lower growth .

Riffat and Munir (2015) suggested in their paper that in South Asia, there is an indirect relationship between economic growth and debt and the channels through which the economy is impacted by debt are public investment, total factor productivity, and private investment. Per their findings, decreasing the level of debt accumulation on its own cannot reverse the nonlinear relationship except it is supported by sound macroeconomic policies and this means reducing dependency on foreign aids, removing political constraints, improving governance, macroeconomic imbalances, and eliminating structural distortions (Riffat & Munir, 2015).

2.3.4 EXCHANGE RATE AND ECONOMIC GROWTH

Real effective exchange rate (REER) depreciation, in general, promotes regional economic growth, through increasing net exports and lowering FDI costs (Yan, Li, Lin, & Li, 2016; Alobari, Paago, Igbara, & Emmah, 2016). Jakob (2016) saw that it has been a challenge to identify a direct correlation between exchange rate regimes and economic growth. One of the most important issues in international finance is the debates over which type of exchange rate can best stimulate economic growth. Jakob (2016) found a positive correlation between the pegged exchange rate and growth in GDP. The exchange rate is said to have a double-edged effect on growth and helps to revise trade policy (Hafeez, Shahab & Mahmood, 2015).

Ahmad, Draz and Yang (2016) said Exchange rate depreciation affects the volume of FDI and promotes growth in the long run. Economic development and inflows are also associated with exchange rates. The causality test also suggested a long run interdependent link between these

three macroeconomic factors. The results provide evidence for the existence of both short- and long-term relationship between economic growth and real effective exchange rate (Yıldız, Ide & Malik, 2016). Increasing oil prices are an important factor for economic growth and that depreciation of rouble against the dollar will have a limited effect on economic growth in the long run". (Kaplan, 2015) According to Ribeiro, McCombie and Lima, (2017) relationship between changes in the Exchange Rate and growth can be characterized by two conflicting partial effects, as follows: i) undervaluation stimulates technological change and knowledge spillovers, thus affecting positively output growth; ii) undervaluation raises income inequality and hence harms output growth. Though there are a vast number of empirical studies presenting robust evidence of a positive relationship between currency undervaluation and growth for developing economies (Ribeiro et al., 2017).

The Exchange Rate only affects growth indirectly through its impacts on functional income distribution and technological innovation. The indirect impact of undervaluation on growth in developing countries is negatively signed (Ribeiro, McCombie & Lima, 2017). In both the short-run and long-run, exports and imports were chiefly influenced by the Exchange Rate, Exchange Rate volatility, foreign income, gross domestic product, terms of trade and changes in exchange rate policies. Exchange rate volatility depressed exports and imports in the long-run. Pairwise Granger causality test revealed unidirectional causality running from export to exchange rate volatility and from exchange rate volatility to import and a unidirectional causality flow from RGDP to imports and exports (Odili, 2015).

The main findings of that paper by Pavlic, Svilokos and Tolic (2014) confirms the stability of the long-run equilibrium relationship between tourist arrivals, the openness of the economy and the real effective exchange rate as the independent variable and gross domestic product as the

dependent variable in Croatia. Furthermore, the results indicate short-run causality between the openness of the economy and gross domestic product, as well as between real effective exchange rate and gross domestic product. The results of Alagidede and Ibrahim (2017) showed that while shocks to the exchange rate are mean reverting, misalignments tend to correct very sluggishly, with painful consequences in the short run as economic agents recalibrate their consumption and investment choices. About three-quarters of shocks to the Exchange Rate are self-driven, and the remaining one quarter or so is attributed to factors such as government expenditure and money supply growth, terms of trade and output shocks. Excessive volatility is found to be detrimental to economic growth; however, this is only up to a point as the growth-enhancing effect can also emanate from innovation, and more efficient resource allocation (Alagidede & Ibrahim, 2017).

A dual open-economy model which incorporates a flow of public infrastructure as a factor of production to investigate the effects of a competitive exchange rate policy under different levels of provision of public infrastructure. It is suggested that an exchange rate policy coordinated with a public infrastructure policy should produce better results. By increasing productivity in the tradable sector and reducing inflationary pressures, this supply-side public policy contributes to the success of an economic growth strategy led by a competitive currency (Neto & Lima, 2016).

This article analyses macroeconomic policies capable of influencing the long-run Exchange Rate (RER). In this vein, it identifies economic policy tools that can devalue RER, covering a theoretical issue neglected by the economics literature, which argues that competitive exchange rate enhances growth. After `discussing the Trilemma, it identified those variables that could affect RER without constraining monetary policy or exchange rate regime choice (Barbosa, Jayme & Missio, 2018).

Exchange rate (ER) has an opposite but statistically insignificant nexus with economic advancement while oil revenue ratio (OR) is positive and statistically significant in model 1, but

became negative and statistically insignificant in model 2. The interaction between the ER and OR ratios is positive. Given the positive value of the interaction variable, ER and OR play a complementary role in Nigeria's economic growth and that oil revenue is constrained by the exchange rate (Ajibola, Enilolobo & Theodore, 2017).

Various literature has attested to the vital roles of foreign capital inflow in bridging the savings-investment gaps in the developing countries in other to bring about the so much desired development. The impediment of exchange rate volatility on sourcing for this much-desired foreign capital is also notable. However, it was observed in the study of Ajayi, Akinbobola, Okposin and Ola-David (2016) that the negative effect could be mitigated by the level of financial development prevalent in the country. This study investigates the interaction of financial development with exchange rate volatility on one hand and of financial development with capital inflows on the other hand. The result of the GMM estimation indicates a significant positive effect of foreign direct investment, FD, the interaction of FDI with FD and interaction of exchange rate volatility with FD on gross domestic product. However, remittance, lag of EXRV and interaction of remittance with FD have a significant negative impact on GDP. This study posits that the government in its efforts to diversify the economy for future growth should promote infrastructure and adequate financial development that will attract foreign direct investment to Agric and agro-allied industries and diversify remittances from consumption into investment (Ajayi et al., 2016).

Gbatu, Wang, Wesseh and Tutdel (2017) saw no relationship between ERV and Liberia's RGDP in the short-run, but variance decomposition analysis reveals that innovations to Liberia's RGDP lead to fluctuations in ERV in the long-run. Technological innovation is required to boost domestic production to offset the negative effect of ERV on trade .

Wang, Ye & Li (2017) results show a significant negative relationship between the real effective exchange rate rise and import and export trade, but the time of the influence on the import is shorter than the export, therefore, in the long term, the increase of the RMB real effective exchange rate may cause a decline in net exports. The real effective exchange rate volatility has a negative impact on FDI both in the short term and long term, but the effect is not significant. Increase in the RMB real effective exchange rate may have a positive impact on economic growth in the short term, but in the long run, it will have a significant negative effect on economic growth (Wang, Ye & Li, 2017)

2.4 CHAPTER CONCLUSION

This chapter reviewed the various theoretical foundations of infrastructure growth, debt servicing, and exchange rate. The chapter also gave empirical evidence of existing literature on infrastructure growth, debt servicing, and exchange rate, with special focus on the Sub-Sahara Africa region.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 CHAPTER INTRODUCTION

In the chapter under consideration, the methodologies, tools and estimation procedures used to achieve the objectives set for the research had been outlined and discussed. The scope of the study and sources of data needed for our analysis in attending to the objectives of the study had been outlined. Further, the econometric models used for the study are specified and justified. The justification and reasons for use of the explanatory variables are provided and the impact expected of the explanatory variables on the various dependent variables are also provided. Thus, sequentially paid closed attention to the scope and sources of data, conceptual and functional econometric models, estimation procedure, the arguments for the choice and justification of variable. We finally concluded.

3.2 DATA SOURCES AND SCOPE OF THE STUDY

The study's data sources of the variables used in the econometric models and the scope of the study have been considered under this section. Per the objective of the study to consider infrastructure growth, external debt and exchange rate nexus in the Sub-Sahara African region, the study employed data on forty-eight (48) countries in the Sub-Sahara African Region spanning the period, 1980 to the year 2017 for the study. These periods were chosen because most of the key variables under each of the objectives were available within the chosen periods.

The data used in the study were sourced from the World Development Indicators (WDI) of the World Bank. Variables used in the study, their sources, measurement units, and the expected signs have been discussed below.

3.3 INFRASTRUCTURE INDEX

According to World Bank, there are four broad categories of infrastructure, that is Transportation, Telecommunication, Power (or energy) and Water and sanitation. Following Yılmaz and Çetin (2017), Richardson (2009), Pearson (1901), and Hotelling (1933), the analysis is premised on three of the four categories; Telecommunication, Power (or energy) and Water and sanitation and this is due to data constraint. The telecommunication is measured using fixed-line connection per hundred persons. In the power or energy sector, access to electricity as a percentage of the population has used a measure. With water and sanitation, the measure used is people using at least basic drinking water services as a percentage of the population.

However, when these infrastructure indicators are used together, it results in the problem of having all these indicators been correlated. Using these indicators in the models, there will be very high standard errors and a resultant low t statistic and this is because of the issue of multicollinearity in the model. The fact of a high correlation among the indicators of infrastructure is shown in table 3.1 below. The indicators are positively correlated highly.

Loayza and Odawara (2010), Calderon and Serven (2011, 2014), and Sahoo and Dash (2012) came out with construction for infrastructure index. To make every indicator count, the index was constructed using the principal component analysis technique. That means every indicator is made to count in the final index generated using the principal component analysis.

Table 3.1 Correlation Table on Infrastructure Variables

	Telecommunication	Power (or energy)	Water and sanitation
Telecommunication	1.00		
Power (or energy)	0.7019	1.00	
Water and sanitation	0.7254	0.6890	1.00

Source: Fieldwork (2019). The table above shows the statistical correlation levels among the variables (telecommunication, energy or electricity suppl, and water and sanitation provision) used for constructing the proxy for infrastructure.

The principal component analysis is the well-known technique of multivariate analysis and the oldest for that matter. The principal component analysis was introduced by Pearson (1901) and Hotelling (1933). Reducing the dimensionality of a data set made up of a large number of interrelated variables and still having the variations in the data set present is the main idea of principal component analysis. It was done by coming out with a new set of variables. The principal components arrived at are uncorrelated and are ordered in a way that the earlier components retain most of the variation present in all of the initial variables (Jolliffe, 2002).

Yilmaz and Cetin say PCA is the general name for a technique that uses sophisticated underlying mathematical principles to transform several possibly correlated variables into a smaller number of variables called principal components. In general terms, PCA uses a vector space transform to reduce the dimensionality of large data sets. Using mathematical projection, the original data set, which may have involved many variables, can often be interpreted in just a few variables (the principal components). It is therefore often the case that an examination of the reduced dimension data set will allow the user to spot trends, patterns and outliers in the data, far more easily than would have been possible without performing the principal component analysis (Richardson, 2009). The results for PCA are given in Table 3.2

Like factor analysis, in PCA, we must use Eigenvalues. As could be followed from Table 3.2, there is one principal component (Eigenvalue is greater than 1) and we use only this component for the regression estimation. This component explains approximately 81% of the explanatory variables (telecommunication, electricity and water and sanitation). The correlation between the first component and the variables are given in Table 3 .3.

Table 3.2 PCA Eigenvalues and Proportions

Component	Eigenvalue	Proportion
Component 1	2.41764	0.8059
Component 2	0.318759	0.1063
Component 3	0.263601	0.0879

Source: Fieldwork (2019). Principal component analysis eigenvalues and proportions for the three variables telecommunication, electricity and water and sanitation to aid in producing a proxy for infrastructure.

Table 3.3 Component Loading

Variable	Component 1	Component 2	Component 3	Unexplained
Telecommunication	0.5827	-0.3027	-0.7542	0
Power/Energy	0.5700	0.8137	0.1138	0
Water and Sanitation	0.5793	-0.4963	0.6467	0
First Component - Telecommunication			0.5827	
First Component - Power/Energy			0.5700	
First Component - Water and Sanitation			0.5793	

Source: Fieldwork (2019). How each of the three variables; telecommunication, electricity and water and sanitation loaded onto each of the three components

To summarize; with this equation and the tables we have displayed above, we can note that, the first principal component of variables accounts for 86% of their overall variance. Furthermore, as expected, it is highly correlated with each measure included. Specifically, the correlations between the first principal component and the variables are high. Besides, as can be seen, all three infrastructure variables enter the first principal components with approximately similar weights (0.725, 0.712 and 0.682). Thus, this synthetic index obtained from Principal Component Analysis (PCA), can be used as an explanatory variable in panel estimation .

3.4 ECONOMETRIC SPECIFICATION

To estimate the effect of external debt on infrastructure growth, the standard linear specification for a panel data regression model was followed.

$$y_{it} = \beta X_{it} + \alpha_i + \varphi_t + \varepsilon_{it} \qquad (1)$$

Where y_{it} is the dependent variable for individual i at time t, with $i = 1 \ldots, N$ (number of observations) and $t = 1 \ldots, N$ (time periods), X_{it} is a vector of independent variables for country i at time t, β is a vector of coefficients of the variables, α_i is the country specific error term, φ_t is the time specific error term and ε_{it} is the error term.

In order to find the nexus between infrastructure growth, external debt and exchange rate, the study used cointegration and panel vector autoregression models. Following the work of Shittu, Hassan and Nawaz (2018) Huang (2016), granger causality is used in investigating the causality and the direction of causality for each pair of the variables under consideration.

3.5 UNIT ROOT TEST

Most of the variables at this point are non-stationary. In the words of Granger and Newbold (1974), such variables will result in spurious or bogus regression. As such, the study employed unit root test to explore the order of integration.

$$\Delta y_{it} = \mu_i + \beta_i t + \varphi_i y_{i,t-1} + \alpha_{i1}\Delta y_{i,t-1} + \cdots + \alpha_{ip}\Delta y_{i,t-p} + u_{it} \quad (2)$$

where Δ stands for the first difference operator. y_{it} stands for the variable or the individual time series in country i at time t. That is y denotes Exchange Rate (RER), infrastructure growth (INF-Growth) and external debt (Ex-Debt) whose stationarity tests are required in order to determine the presence of unit root. μ_i stands for the intercept. β_i stands for u_{it} is the error term. For the unit root test, three tests are performed. The Fisher-type unit-root test based on augmented Dickey-Fuller tests (Dickey & Fuller, 1979; 1981) is used. Augmented Dickey-Fuller (ADF) tests has the null hypothesis saying all panels contain unit roots (Ho: All panels contain unit roots) and the alternative hypothesis says at least one panel is stationary (Ha: At least one panel is stationary). The ADF is performed both at level and at first difference. The Levin-Lin-Chu test and the Hadri (2000) Lagrange multiplier (LM) test are used. For the Levin-Lin-Chu test, it has a null hypothesis which says that the panel contains unit roots (Ho: Panels contain unit roots) and an alternative hypothesis which says that the panels are stationary (Ha: Panels are stationary). The Levin-Lin-Chu test is performed at level and at first difference. In the case of Hadri Lagrange multiplier (LM) test, it has a null hypothesis which says all panels are stationary (Ho: All panels are stationary) and the alternative hypothesis says some panels contains unit roots (Ha: Some panels contain unit roots). The Hadri Lagrange multiplier (LM) test is performed at both level and first difference.

3.6 COINTEGRATION TEST

When the unit root test which is used to test stationarity is completed, the next thing to do is to examine the level of cointegration among the variables by using the Johansen Test. Johansen (1988) and Johansen and Juselius (1990) have developed two tests to detect the number of cointegrating vectors: the maximum-likelihood test and the trace test. This examines whether the stochastic trends in the examined variables have a long-term relationship. This test is more appropriate than the Engle and Granger test since it allowed more than one long run association and, it is based on the ADF test which considers one long-run association (Yusuf & Said, 2018).

3.7 VECTOR AUTO REGRESSION (VECTOR ERROR CORRECTION MODELS)

The vector error correction model, a type of vector autoregression model is used when the variables under consideration are not stationary at level form but becomes stationary after the first difference. So, the right econometric specification for two or more variables that are nonstationary but are cointegrated is the vector error correction model. According to Engle and Granger, such variables are either unidirectional or bidirectional.

Once the variables are proved to be cointegrated, two different kinds of equations can be derived (Saad, 2012; Dritsaki, 2013; Shittu et al., 2018):

The equation for the long run is shown below.

$$RER_{it} = \pi_1 INF\_G_{it} + \pi_2 ExDbt_{it} + \propto_i + \infty_t + \partial_{it} \quad (3)$$

where the RER_{it}, the dependent variable stands Exchange Rate of country i at time t. INF_G_{it}as an independent variable stands for infrastructure growth of country i at time t, and $ExDbt_{it}$ represents external debt of country i at time t. π_1 and π_2 are the coefficients of the variables. $\propto_i$

is the individual or country specific error term; ∞_t is the time specific error term and ∂_{it} is the general error term.

The equation for the short-run are as follows.

$$D.RER_{it} = \sum_{a=1}^{p-1} \beta_1 D.RER_{it-a} + \sum_{a=1}^{p-1} \beta_2 D.INF\_G_{it-a} + \sum_{a=1}^{p-1} \beta_3 D.ExDbt_{it-a} + \emptyset_1 ECT_{it-1} + v_i + z_t + \varepsilon_{it} \quad (4)$$

$$D.INF\_G_{it} = \sum_{a=1}^{p-1} \delta_1 D.RER_{it-a} + \sum_{a=1}^{p-1} \delta_2 D.INF\_G_{it-a} + \sum_{a=1}^{p-1} \delta_3 D.ExDbt_{it-a} + \emptyset_2 ECT_{it-1} + k_i + w_t + \vartheta_{it} \quad (5)$$

$$D.ExDbt_{it} = \sum_{a=1}^{p-1} \gamma_1 D.RER_{it-a} + \sum_{a=1}^{p-1} \gamma_2 D.INF\_G_{it-a} + \sum_{a=1}^{p-1} \gamma_3 D.ExDbt_{it-a} + \emptyset_3 ECT_{it-1} + n_i + m_t + \theta_{it} \quad (6)$$

where $D.$ represents first difference operator. To specify error correction model, the vector autoregression model is differentiated, so one lag is lost in the process. $p-1$ represents the lag length reduced by 1. RER_{it}(Exchange Rate of country i at time t), INF_G_{it}(infrastructure growth of country i at time t), and $ExDbt_{it}$(external debt of country i at time t) are the dependent variables from the equations above. RER_{it-a} is the lagged dependent variable for Exchange Rate of country i at time $t-a$. $INF_G_{it-a}$is the lagged dependent variable for infrastructure growth of country i at time $t-a$. $ExDbt_{it-a}$is the lagged dependent variable of external debt of country i at time $t-a$. ECT_{it-1} represent the correction error term and this the lagged value of the residuals obtained from the cointegrating of the dependent variable on the regressors. It contains the long run

information obtained from the long run cointegrating relationship. β_1, β_2, β_3, δ_1, δ_2, δ_3, γ_1, γ_2, and γ_3 are the coefficients of the variables which represents the slops of the variables. v_i, k_i and n_i are the individual or country specific error terms. z_t, w_t and m_t are time specific error terms. ε_{it}, ϑ_{it} and θ_{it} are general error terms. $\emptyset_i$ is the speed of adjustment parameter with a negative sign

3.8 GRANGER CAUSALITY TEST

After testing for the cointegration relationship and if such a relationship exists among the variables, then there is at least a causal effect among the variables. Logically the next thing to do is to test for Granger causality. Per Granger (1988), the granger causality test is performed on variables that are cointegrated to test their causal relationship and the same is followed. To Granger (1988), the Granger method seeks to determine how much of a variable, Y, can be explained by past values of Y and whether adding lagged values of another variable, X, can improve the explanation. Once the co-integrating test is completed, this study will likely undertake the granger causality test to test the casual direction between variables .

3.9 VARIABLE DESCRIPTION AND MEASUREMENT

Exchange Rate index (2010 = 100)

From the theoretical perspective, expansionary government spending shocks like infrastructure spending is expected to lead to Exchange Rate appreciation and this is supported by theories like the conventional Mundell-Fleming model, a wide set of real business cycles and new-Keynesian models under standard calibrations. But in the empirical literature, the results provided are mixed

(Kim & Roubini, 2008; Enders, Müller & Scholl, 2008; Beetsma et al., 2008; Chen & Liu, 2018). According to the world development indicators, the Exchange Rate used the value of one currency to a weighted average of many foreign currencies and such a weighted average is divided by a price deflator or cost index (International Monetary Fund, 2019; International Financial Statistics, 2019).

External Debt

The funds obtained outside of the borrowing country for bridging the infrastructure gap should lead to an improved productivity which is expected to feed into export to bring in foreign currency which should impact the exchange rate positively. External debt is expected to be positively related to infrastructure growth. It is expected to cause Exchange Rate appreciation as inflow but otherwise if it is service previous external debt.

Total external debt or outside obligation is an obligation owed to out-of-state people repayable in money, merchandise, or administrations. Total outside obligation is the total of open, freely ensured, and private nonguaranteed long-haul obligation, the utilization of IMF credit, and transient obligation. Momentary obligation incorporates all obligation having a unique maturity of one year or less and enthusiasm or interest for back payments on long haul obligation.

GNI (in the past GNP) is the aggregate of significant worth included by every inhabitant maker in addition to any item charges (less endowments) excluded in the valuation of yield in addition to net receipts of essential salary (remuneration of representatives and property pay) from abroad (World Bank, International Debt Statistics).

Water (sanitation)

The number of individuals with access to improved drinking water (sanitation) per every 1000 people. The WHO or UNICEF perceives various wellsprings of water: channeled water into dwelling, piped water into yard or plot, open tap or standpipe, tube well or borehole, secured spring and gathered rainwater as 'improved' sources. ‘Improved' sanitation incorporates flush toilets, piped sewer framework, septic tank, and flush or pours flush to a pit lavatory. Since we can't get the genuine stock information of these improved sources, we depend on the quantity of individuals with access to improved water and sanitation offices as an intermediary or a proxy (World Development Indicator, 2018).

Access to Electricity (% of the population)

Access to power or electricity is the level of the populace with access to power. Electrification data or information is gathered from industry, national studies and universal sources (World Bank, Sustainable Energy for All (SE4ALL) database from the SE4ALL Global Tracking Framework drove together by the World Bank, International Energy Agency, and the Energy Sector Management Assistance Program).

3.9 DYNAMIC PANEL DATA ESTIMATION

Falling on the works of Saad (2012), that explored the relationship among economic growth, export and external debt servicing employed vector error correction model and the granger causality technique to examine the presence of causality among the variables. Yusuf and Said (2018) made use of the vector error correction model, a type of vector autoregression model to test

for nexus between public debt and economic growth and also used grander causality to test for causal nexus.

Dritsaki (2013) using the vector error correction models (VECM) and Granger causality technique, respectively examined the nexus between three variables and the causality among these variables.

Large country dimension (N=42) relative to thirty-seven-year (1980-2017) time dimension (T=37) was used for the panel regression in the research work. The potency of panel vector autoregressive estimation to solve the economic problem coming having a high N against a lower T and the fact that the models used are the system of equations makes the panel vector regression technique the preferred choice. With the fixed effect model where there is large N relative to T, endogeneity problems due to the dynamics in the data emerged. So, a serious and consistent fixed effect estimates are possible.

3.10 ETHICAL CONSIDERATIONS

It is always fundamental that all researchers are conscious of research ethics. Ethics relates to two groups of people; the conductor for research purposes and the "researched upon", who have basic rights that should be protected (Samkange, 2011). The study, therefore, will be conducted with fairness eliminating all possible risks to any entity concerned.

Before any entity's involvement in the study been undertaken, the purpose of the study will be fully explained in the language entities are well acquainted with, as well as highlighting the risks and benefits.

3.11 CHAPTER CONCLUSION

The chapter looked at the methodologies used to achieve the objectives set for the research and these were outlined and discussed. The justifications and reasons for use of the explanatory variables are provided and the impact expected of the explanatory variables on the various dependent variables are also provided.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 CHAPTER INTRODUCTION

The chapter takes a special look at data analysis, discussion of findings and results based on the econometric model estimated in the chapter before this very chapter. Specifically looking at data analysis and presentation, descriptive statistics, correlation, discussion of findings, hypothesis testing or evaluation of research questions with much emphasis on the nexus existing among infrastructure growth, external debt and exchange rate.

4.2 DESCRIPTIVE STATISTICS

In table 4.1 below, the descriptive statistics are presented. The number of observations, the mean standard deviation, the minimum and the maximum for both the dependent and independent variables as the details of the summary statistics has been given in the table.

Table 4.1 **Descriptive Statistics**

Variable	Observations	Mean	Standard Deviation	Minimum	Maximum
RER	908	151.4	41.945	46.397	3444.639
INF-Growth	916	0.313	2.6457	-1.0000	62.18803
Ex-Debt	918	83.303	113.370	3.899	1380.767

Source: Fieldwork (2019) *RER is the Exchange Rate; INF-Growth is the infrastructure growth a proxy generated from electricity access, water and sanitation and telephone and internet access; Ex-Debt is the total external debt.*

From Table 4.1, the average Exchange Rate for the population under study is 151.4. the maximum and the minimum for the same variable is respectively 3444.639 (recorded by Ghana in the year 1983) and 46.397 (recorded by Zambia in the year 1992).

In the study, infrastructure growth is an index obtained by finding the principal component from three of the four infrastructure indicators: telecommunication, electricity access (or energy) and Water and sanitation. This produced an average figure of 0.3132046 which happens to be on the low side as compared to other regions in the developing world. In the year 1990, Equatorial Guinea recorded the highest infrastructure growth figure of 62.18803 for the period and countries under study. Guinea, Guinea-Bissau, South Sudan, and the Congo Democratic Republic in 2017 all recorded an infrastructure growth of -1.0000 meaning a retrogress in the growth of infrastructure which is not good for development and the drive for job creation.

On external debt on the sub-Sahara region, the region had an external debt mean of 83.30294 and the standard deviation from the mean of 99.44071. The highest external debt figure of 1380.767 was recorded by Liberia in 2003 and the minimum external debt for the study period is 3.899214 recorded by Botswana in the year 2006.

4.3 CORRELATION MATRIX OF VARIABLES

In table 4.2 below, the Pearson correlation matrix for the variables used in the regression models is presented.

There is generally a clear case of weak relationships among the variables. None of the variables have a correlation up to 60%. The correlations from the table range from 0.1609 to 0.3395 as can be seen from table 4.2. in the words of Kennedy (2008), any coefficient of correlation that is below 80% or 0.80 will not have multicollinearity problem when it gets to the estimation of the regression model.

Table 4.2 Pearson Correlation Matrix (***1% significance, 5% significance and 10% significance levels)

	RER	INF_Growth	Ex_Debt
RER	1.0000	0.3395***	0.2327***
INF_Growth	0.3395***	1.0000	0.1609***
Ex_Debt	0.2327***	0.1609***	1.0000

Source: Fieldwork (2019) *RER is the Exchange Rate; INF-Growth is the infrastructure growth a proxy generated from electricity access, water and sanitation and telephone and internet access; Ex-Debt is the total external debt.*

4.4 UNIT ROOT TEST

One of the preliminary steps in this research is to define the degree of integration of each variable. For this reason, the Levin-Lin-Chu unit root test and Hadri Lagrange multiplier (LM) test were used in carrying out the unit root test for the variables at level and at first difference. Table 4.3 reports the results of the Levin-Lin-Chu unit root and Hadri LM stationarity tests.

Table 4.3 Unit Root Tests

	Augmented Dickey-Fuller		Levin-Lin-Chu		Hadri LM Stationarity	
Variable	Level	First Difference	Level	First Difference	Level	First Difference
RER	-2.0809	16.0963***	1.6739	-8.3369***	-3.4282	-6.2599
INF-Growth	1.5505	35.4513***	7.7825	-9.3558***	4.0502***	-6.0033
Ex-Debt	-2.6437	16.8409***	-2.7635***	-8.8032***	48.0526***	3.8588

Source: Fieldwork (2019) ***, **, * stands for the rejection of null hypothesis at the 1%, 5% and 10% level of significance respectively. *RER is the Exchange Rate; INF-Growth is the infrastructure growth a proxy generated from electricity access, water and sanitation and telephone and internet access; Ex-Debt is the total external debt.*

From the table above, two of the variables were not stationary at level in each of the tests. In the Levin-Lin -Chu test, Exchange Rate and infrastructure growth were not stationary at level. For the case of Hadri LM test, infrastructure growth and external debt were not stationary at level. At level, infrastructure growth was not stationary in both tests. All the variables became stationary in their

first differences; hence they can be described as integrated of order one at a significance level of 5 percent (Dritsaki, 2013). This is in line with the findings of Yusuf and Said who found their variables been significant at first difference (Yusuf & Said, 2018). Stating it differently, all the variables are integrated of order one (Musibau, Mahmood, Ismail, Shamsuddin & Rashid, 2018).

4.5 ORDER SELECTION CRITERIA

Table 4.4 Lag Length Selection/ Order selection criteria

Lag	CD	J	J p-value	MBIC	MAIC	MQIC
1	0.9998437	33.03547	0.195902	-143.061	-22.96453	-68.22508
2	0.9992683	14.26833	0.711439	-103.1293	-21.73167	-53.2387
3	0.0000000	0.000000	0.000000	1.30e+19	1.30e+19	1.30e+19

Source: Fieldwork (2019). The various order selection criteria or lag length selection criteria. These are MBIC (Bayesian information criterion), MAIC (Akaike information criterion), and MQIC (Hannan–Quinn information criterion)

Based on the three model selection criteria by Andrews and Lu (2001) and the over-all coefficient of determination, first-order panel vector autoregression is the preferred model, since this has the smallest MBIC (Bayesian information criterion), MAIC (Akaike information criterion), and MQIC (Hannan–Quinn information criterion). While we also want to minimize Hansen's J statistic, it does not correct for the degrees of freedom in the model like the model and moment selection criteria by Andrews and Lu. Based on the selection criteria, we fit a first-order panel vector autoregression model.

After testing for the unit root (which is used to test stationarity is completed) the next thing to do is to examine the level of cointegration among the variables by using the Johansen Test. Johansen

(1988) and Johansen and Juselius (1990) have developed two tests to detect the number of cointegrating vectors: the maximum-likelihood test and the trace test.

4.6 COINTEGRATION TEST

Table 4.5 Kao test for cointegration

Ho: No cointegration	Number of panels	=	42
Ha: All panels are cointegrated	Number of periods	=	20
Cointegrating vector: Same			
Panel means: Included	Kernel: Bartlett		
Time trend: Not included	Lags: 1.83 (Newey-West)		
AR parameter: Same	Augmented lags: 1 (AIC)		

	Statistic	p-value
Modified Dickey-Fuller t	-36.6222	0.0000
Dickey-Fuller t	-25.2741	0.0000
Augmented Dickey-Fuller t	-16.0657	0.0000
Unadjusted modified Dickey-Fuller t	-36.6225	0.0000
Unadjusted Dickey-Fuller t	-25.2741	0.0000

*Source: Fieldwork (2019) ***, **, * denotes rejection of null hypothesis at the 1%, 5% and 10% level of significance respectively.The Kao test statistics are calculated by pooling all the residuals of all cross-sections in the panel. It is assumed in Kao's test that all the cointegrating vectors in every cross-section are identical*.

This examines whether the stochastic trends in the examined variables have a long-term relationship. This test is more appropriate than the Engle and Granger test since it allowed more than one long run association and, it is based on the ADF test which considers one long-run association (Yusuf & Said, 2018). From the table 4.5 on Kao test for cointegration, where the null hypothesis says, there is no cointegration and the alternative hypothesis saying all panels are cointegrated. The output shows a rejection of the null hypothesis at 1 percent confidence interval. It can therefore be said that, all panels are cointegrated.

4.7 VECTOR AUTOREGRESSION (VECTOR ERROR CORRECTION)

Variables that are cointegrated are in effect seen as variables for error correction models per the research of Engle and Granger (1987) their error-representation theorem. Besides performing just any regression on variables that are cointegrated at first difference will provide the meaningless result or misspecification of error. To get meaningful results, then it is appropriate to a type of vector autoregression model called the vector error correction model. In accordance, the vector autoregression is formulated in a Vector Error Correction Model (VECM) to analyze the dynamics of the relationship. This involves the inclusion of the lagged errors of the cointegrating regression as one of the independent variables in the regression equation (Hailemariam, 2011; Engle & Granger, 1987; Green, 2003; Gujarati & Porter, 2009; Wooldridge, 2009).

Furthermore, the Error Correction Model (Engle & Granger, 1987) was then considered and estimated. The estimated error-correction equations are not subject to residual autocorrelation at the 5% significance level .

From the table 4.6 below, the dependent variables do not significant have long- run relationship with Exchange Rate. In the short-run, first and second lags of real interest rates impacts current Exchange Rates. A unit change in the first lag of Exchange Rate leads to 621357.0303 units change in Exchange Rate at current level in short-run. For the second lag of Exchange Rate unit change will lead to a change in Exchange Rate of -187194.7308 units.

There is a long-run relationship between the dependent variables and infrastructure growth. External debt has a long run nexus with the dependent variables that is Exchange Rate and infrastructure growth.

Table 4.6 Nexus between Exchange Rate and Infrastructure growth and External Debt

Vector Error Correction Estimates

Error Correction:	D(RER)	D(INF_GROWTH)	D(EX_DEBT)
CointEq1	-25.40515983	-0.000118974	0.0006207
	166.5107639	5.53E-06	8.47E-05
	[-0.15257]	[-21.5209]	[7.33080]
D (RER (-1))	621357.0303	0.000106801	0.001698574
	6475.990923	0.000215009	0.003293019
	[95.9478]	[0.49673]	[0.51581]
D (RER (-2))	-187194.7308	-2.38E-05	-0.016383024
	17968.0423	0.000596555	0.009136688
	[-10.4182]	[-0.03991]	[-1.79310]
D (INF_GROWTH (-1))	501093.9736	0.033467141	-4.08302365
	1186221.814	0.039383606	0.603189761
	[0.42243]	[0.84977]	[-6.76905]
D (INF_GROWTH (-2))	-110175.0085	0.016904503	-2.494698374
	831305.7174	0.02760008	0.422716132
	[-0.13253]	[0.61248]	[-5.90159]
D (EX_DEBT (-1))	-95677.44728	0.000112925	0.050929775
	52669.80581	0.001748684	0.026782417
	[-1.81655]	[0.06458]	[1.90161]
D (EX_DEBT (-2))	-12782.99341	-0.002295367	0.108147665
	52294.85975	0.001736235	0.026591758
	[-0.24444]	[-1.32204]	[4.06696]
C	-9190560.12	-0.031942063	-0.921701691
	1835520.472	0.060940892	0.933355921
	[-5.00706]	[-0.52415]	[-0.98751]
R-squared	0.87430535	0.505483199	0.058954478
Adj. R-squared	0.873641803	0.502872627	0.053986667
Sum sq. resids	5.68E+18	6257.803951	1467908.27
S.E. equation	65431916.69	2.172397101	33.27190724
F-statistic	1317.624999	193.6293366	11.86729268

Source: Fieldwork (2019) *RER is the Exchange Rate; INF-Growth is the infrastructure growth a proxy generated from electricity access, water and sanitation and telephone and internet access; Ex-Debt is the total external debt C is the constant.*

The speed of adjustment to equilibrium with respect to exchange rate is 25.40515983 that is about 25 percent. A percent change in the first lag of infrastructure growth will lead to a 501094-percentage change in exchange rate in the short run if all other things remaining equal. Again, a

percentage change in the second lag of infrastructure growth will lead to 110175.0085 reduction in exchange rate in the short run all other things remaining equal. A percent change in the first lag of external debt will lead to a 95677.44728-percentage reduction in exchange rate in the short run if all other things remaining equal. For a percentage change in the second lag of external debt leads to 12782.99341 percent change in exchange rate in the short run if all other things remain equal.

The speed of adjustment to equilibrium with respect to infrastructure growth is 0.000118974 that is about 0.012 percent. A percent change in the first lag of Exchange Rate will lead to a 0.0001068 percent increase in infrastructure growth in the short run if all other things remaining equal. Again, a percentage change in the second lag of Exchange Rate will lead to 0.0000238 reduction in infrastructure growth in the short run all other things remaining equal. A percent change in the first lag of external debt will lead to a 0.000112925 percent increase in infrastructure growth in the short run if all other things remaining equal. For a percentage change in the second lag of external debt leads to 0.002295367 percent reduction in infrastructure growth in the short run if all other things remain equal. This is usually about the time that debt servicing has to start for some of the external debt used for infrastructure development and other expenditures.

The speed of adjustment to equilibrium with respect to external debt is 0.0006207 that is about 0.06 percent. A percent change in the first lag of Exchange Rate will lead to a 0.001698574 percent increase in external debt in the short run if all other things remaining equal. Again, a percentage change in the second lag of Exchange Rate will lead to 0.016383024 reduction in external debt in the short run all other things remaining equal. A percent change in the first lag of infrastructure growth will lead to a 4.08302365 percent reduction in external debt in the short run if all other things remaining equal. For a percentage change in the second lag of infrastructure growth leads to 2.494698374 percent reduction in external debt in the short run if all other things remain equal.

In the short run, first and second lags of infrastructure growth, and second lag of external debt have an impact on external debt. In the short run, first and second lags of infrastructure growth, and second lag of external debt have an impact on external debt. This is in line with the work of Yusuf and Said (2018) which saw positive relationship or pass through from external debt through expenditure on infrastructure to final economic growth. So, infrastructure growth positively impacts how external debt impact economic growth. The first and seconds of Exchange Rate, and the first lag of external debt does not have a significant impact on external debt.

4.8 GRANGER CAUSALITY TEST

In the panel VAR-Granger causality Wald test, the hypothesis tested was: the null hypothesis says the variables that are not included does not granger cause variables in the equation (Ho: Excluded variable does not Granger-cause Equation variable) and the alternative hypothesis says the variable that is not included granger causes equation variable (Ha: Excluded variable Granger-causes Equation variable).

Based on the output of the cointegration results, the variables are cointegrated and therefore the variables are related causally. With the granger causality test, the direction of the causality is examined. To determine which variable result in or influence which variable .

From the results above, infrastructure growth granger causes Exchange Rate and the Exchange Rate also granger cause infrastructure growth. There is bidirectional causality between Exchange Rate and infrastructure growth. Also, at a five percent significance level, external debt granger causes Exchange Rate and Exchange Rate granger causes external debt. That is bidirectional causality between Exchange Rate and external debt. Again, between infrastructure growth and

external debt, there is unidirectional causality. External debt granger causes infrastructure growth but not the other way around at a 5 percent significance level.

Table 4.9 VAR-Granger causality Wald test

Equation\Excluded		Chi2	df	Prob > chi2
RER				
	INF_Growth	4.055	1	0.044
	ExDebt	28.954	1	0.000
	ALL	30.839	2	0.000
INF_Growth				
	RER	21.085	1	0.000
	ExDebt	22.258	1	0.000
	ALL	47.694	2	0.000
ExDebt				
	RER	4.164	1	0.041
	INF_Growth	1.787	1	0.181
	ALL	16.633	2	0.000

Source: Fieldwork (2019) *RER is the Exchange Rate; INF-Growth is the infrastructure growth a proxy generated from electricity access, water and sanitation and telephone and internet access; ExDebt is the total external debt.*

Taking infrastructure growth together with external debt, at a 5 percent significance level, granger causes Exchange Rate. Exchange Rates taken together with external debt granger causes infrastructure growth. Also, the Exchange Rate taken together with infrastructure growth granger causes external debt.

So, for all the variables except for infrastructure growth on external debt, the null hypothesis that "Excluded variable does not Granger-cause Equation variable" has been rejected and the alternative hypothesis that "Excluded variable Granger-causes Equation variable" have been accepted. This is line with the findings of Yusuf and Said (2018).

4.9 DISCUSSION OF EMPIRICAL RESULTS

A negative C (1) which is significant means there is a long-run causality running from the independent(s) to the dependent variables or that negative significant coefficient is the speed of adjustment toward the long-run equilibrium if all other things remain constant. From the table below the coefficient for the model having a Exchange Rate as the dependent variable is negative but insignificant. This is in line with Kim and Roubini (2008), Enders et al. (2008) and Patrawimoporn (2007). But this is in contrast to Beetsma et al. (2008) and Chen and Lui (2018). That means there may be a long-run relationship between Exchange Rate and the independent variables that is infrastructure growth and external debt but this long-run relationship is not significant. The first and second lags of the Exchange Rate, infrastructure growth and external debt which are the independent variables do not have long-run causality with the Exchange Rate. So, the past exchange rate does not have a long-run impact on the Exchange Rate. Infrastructure developments that took place in the past do not culminate in a long-run impact on the Exchange Rate.

Table 4.10 Least Square Estimation under Vector Autoregression.

Estimation Method: Least Squares			
Sample: 1984 2017			
Included observations: 1349			
Total system (unbalanced) observations 4032			
	Coefficient	Std Error	t-Statistic
C (1)	-33.28065	171.4823	-0.194076
C (2)	615465.1***	6643.331	92.64406
C (3)	-208666.3***	18345.13	-11.37448
C (4)	563199.4	1221898	0.460922
C (5)	-86116.3	856449.9	-0.100550
C (6)	-99454.56*	54064.75	-1.839545
C (7)	-11520.03	53871.07	-0.213844
C (8)	-8926217***	1885549	-4.734015
C (9)	-0.000119***	0.000006	-21.56599
C (10)	0.000119***	0.000006	21.56609
C (11)	-3.33E-05	0.000585	-0.056882
C (12)	0.03282	0.039272	0.835716
C (13)	0.016546	0.027527	0.601075
C (14)	3.69E-05	0.001737	0.021228
C (15)	-0.002274	0.001731	-1.313638
C (16)	-0.034668	0.060509	-0.572938
C (17)	0.00062***	0.000084	7.354399
C (18)	-0.00062***	0.000084	-7.354286
C (19)	-0.01517	0.008836	-1.716838
C (20)	-4.080369***	0.600399	-6.796095
C (21)	-2.491046***	0.420782	-5.920035
C (22)	0.051888*	0.026638	1.947871
C (23)	0.108615***	0.026466	4.103869
C (24)	-0.851286	0.923547	-0.921757
R-squared	0.865525		
Adjusted R-squared	0.86482		
S.E. of regression	67425184		
Durbin-Watson stat	1.844278		

Source: Fieldwork (2019) ****, **, * stand for rejection of null hypothesis at the 1%, 5% and 10% level of significance respectively.*

In the same vain past or accumulated external debt does not have long-run causality with the Exchange Rate. This is in contrast to the findings of Sene (2004) and that of Lin (1994).

The coefficient for the model having infrastructure growth as the dependent variable is negative and significant. This means there is a long-run causality between infrastructure growth and the independent variables, Exchange Rate, and external debt. So, the speed of adjustment caused by the Exchange Rate and external debt on infrastructure growth towards the long-run equilibrium is 1.0455.

Past infrastructure growth influences the level of infrastructure growth in the long run as the coefficient of infrastructure growth is significant with respect to the second model in the table above.

The first and second lags of the Exchange Rate and external debt culminate into a long run causality with infrastructure growth. There is long-run unidirectional causality running from Exchange Rate to infrastructure growth.

Again, the coefficient for the model having external debt as the dependent variable is negative and significant. This means there is a long-run causality between external debt and the independent variables, Exchange Rate, and infrastructure growth. So, the speed of adjustment caused by the Exchange Rate and infrastructure growth on external debt towards the long-run equilibrium is 0.0179. The first and second lags of external debt have a long run causality with external debt. The level of infrastructure growth at least from the past two years have a long-run impact on external debt. That means, there is a long-run bidirectional causality between infrastructure growth and external debt. With regards to the Exchange Rate, there is unidirectional long-run causality running from Exchange Rate to external debt.

4.11 DIAGNOSTIC TEST

The diagnostic is performed to test the appropriateness of the model used and the accuracy of the result. The tests performed are Vector Error Correction Residual Serial Correlation LM Tests, and Vector Error Correction Residual Normality Tests

Table 4.12 VEC Residual Serial Correlation LM Tests

Sample: 1980 2017
Included observations: 1334

Null hypothesis: No serial correlation at lag h

Lag	LRE* stat	df	Prob.	Rao F-stat	df	Prob.
1	16.437242	9	0.258293507	1.8290406	(9, 3215.1)	0.2582937
2	27.683315	9	0.107725939	3.0858307	(9, 3215.1)	0.1077272

Null hypothesis: No serial correlation at lags 1 to h

Lag	LRE* stat	df	Prob.	Rao F-stat	df	Prob.
1	16.437242	9	0.258293507	1.8290406	(9, 3215.1)	0.2582937
2	43.853346	18	0.105399043	2.4454033	(18, 3728.4)	0.1054256

Source: Fieldwork (2019)

From table 4.12 above, the probability values for are bigger than 5 percent significance level. That means that null hypothesis saying there is no serial correlation at 1 and 2 holds. Which means, we fail to reject the null hypothesis. So, there is no serial correlation in the estimation.

Also, from the diagnostic test in table 4.13 below, the residuals are multivariate normal. From the Jarque-Bera test below, all the three variables have p-values greater than 5 percent significant levels. As the Jarque-Bera test factor in both the skewness and the Kurtosis in its calculations. So, variables if taken individually and taken jointly are insignificant at 5 percent significance level. So, there is multivariate normality and the estimations are fit for purpose.

Table 4.13 VEC Residual Normality Tests (Orthogonalization: Cholesky (Lutkepohl))

Null Hypothesis: Residuals are multivariate normal

Sample: 1980 2017

Included observations: 1334

Component	Skewness	Chi-sq	df	Prob.*
1	-0.279753429	0.966556	1	0.32550
2	11.00263625	2.692296682	1	0.10220
3	0.521013926	1.353608745	1	0.15820
Joint		5.012461426	3	0.0863

Component	Kurtosis	Chi-sq	df	Prob.
1	4.107753811	2.540628	1	0.1441
2	4.318402189	1.596316	1	0.1999
3	4.95953683	0.520242	1	0.4561
Joint		4.657186	3	0.2277

Component	Jarque-Bera	Df	Prob.
1	2.71361349	2	0.2122
2	3.52598423	2	0.1905
3	2.54385125	2	0.2799
Joint	8.78344897	6	0.1348

Source: Fieldwork (2019)

4.11 CHAPTER CONCLUSION

In the chapter concluding, detail analyses of the relationships that exist among infrastructure growth, external debt and Exchange Rate on 42 Sub-Saharan African countries between the years 1980 and 2017. The result suggested that the Exchange Rate can influence infrastructure growth and external debt but not the other way around in the short run and the long run if all other things

remain constant per the estimations are undertaken in the study. There is bidirectional nexus between infrastructure growth and external debt in the long run. As such more attention needs to place on the exchange rate as it influences infrastructure growth and external debt both in the short run and in the long run than the other way around.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 CHAPTER INTRODUCTION

This chapter brings closure to the study. So, a summary of the whole study is presented; followed by the various conclusions drawn based on the panel vector autoregressive estimates used in the study and then recommendations are made to guide future study and for policy implementation. The chapter ends with a discussion of the study's limitations and suggestions for the future.

5.2 SUMMARY OF KEY FINDINGS

The research undertook to study infrastructure growth, external debt and exchange rate nexus in the Sub-Sahara Africa Region. The study period covered is from the year 1980 to the year 2017, covering forty-two countries. A study of this magnitude provides the region and the world the chance to understand the dynamics that play out among these important economic variables and to drive policy in that regard.

To be able to realize the research objectives, exchange rate, infrastructure growth, and external debt models were estimated using panel vector autoregression estimation technique especially the vector error correction model due to stationarity at first difference and not at level. The variables used in the study include exchange rate; infrastructure growth a proxy generated from electricity access, water and sanitation and telephone and internet access; and external debt.

The result suggested that the Exchange Rate can influence infrastructure growth and external debt but not the other way around. There is bidirectional nexus between External debt and infrastructure growth in the long run.

5.3 CONCLUSION OF THE STUDY

The objective of this research work was to investigate empirically the nexus among these variables' infrastructure growth, external and exchange rate as these variables are on increasing importance on the Sub-Saharan African economic landscape more in recent two decays. This research was driven by the continuous call for countries in Sub-Saharan African to provide infrastructure to boost productivity and in the end provide jobs for the teeming unemployed. At the same time bridging this gap required a lot of resources that are not readily available on the Sub-Saharan African region and therefore the need to source external support in other to bridge the gap in financing the infrastructure gap. That means the foreign currency will be involved and therefore exchange rate. It was, therefore, necessary for much attention on how these three variables relate in the context of the Sub-Saharan African region as most research in these areas is biased toward more developed economies and other sun regions.

This study estimated the nexus that exist between infrastructure growth and Exchange Rate, between infrastructure growth and external debt, and between Exchange Rate and external debt in Sub-Saharan African from 1980 to the year 2017. The result suggested that the Exchange Rate can influence infrastructure growth and external debt but not the other way around There is bidirectional nexus between External debt and infrastructure growth in the long run.

5.4 RECOMMENDATIONS

To ensure a better economy-friendly exchange rate especially with regards to external debt and debt servicing, external debt or loans should be used for a production-based project that can easily self-liquidate to be able to service such debts. Therefore, debt with lower cost (concessionary loans) and longer periods of maturity should be favored as production-based projects normally required a longer period of infrastructure build before the first repayment amount can be generated.

To avoid higher debt servicing obligations, servicing should be done promptly to prevent the issue of accumulated compound interest as higher debt servicing obligations impact negatively on the exchange rate.

From the study, infrastructure growth causes exchange rate appreciation. So, if the more of the external debt contracted are channeled into infrastructure development, it will lessen the impact of debt servicing that results in exchange rate depreciating. The paper contributes to the scanty and mixed literature on infrastructure growth, external debt and exchange rate nexus in Sub-Sahara Africa, a developing region as other papers focused on advanced economies.

The unavailability of the data on all the economies in the Africa region for the entire period of the study is the main limitation for the study but that notwithstanding, the results are generalized to cover the entire sub-Saharan region. This limitation does not have a serious effect on the quality of the research outcome and therefore stands robust and can be accepted generally as the appropriate methodology of analysis was used to overcome this challenge.

Future studies can include more infrastructure indicators in the infrastructure proxy for a more representative infrastructure indicator.

REFERENCES

Achour, H., & Belloumi, M. (2016). Investigating the causal relationship between transport infrastructure, transport energy consumption and economic growth in Tunisia. *Renewable and Sustainable Energy Reviews*, *56*, 988-998.

Adams, S., & Klobodu, E. K. M. (2016). Remittances, regime durability and economic growth in Sub-Saharan Africa (SSA). *Economic Analysis and Policy*, *50*, 1-8.

Adesola, W. A. (2009). Debt servicing and economic growth in Nigeria: An empirical investigation. *Global Journal of social sciences*, *8*(2).

Adeyemi, P. A., Ogunleye, E. O., & Oloruntuyi, A. O. (2018). the impact of government capital expenditure on private investment in SSA. *International Journal of Economics, Commerce and Management*, 6(7), 104-125.

Afxentiou, P. C. (1993). GNP growth and foreign indebtedness in middle-income developing countries. *International Economic Journal*, *7*(3), 81-92.

Agénor, P. R., & Neanidis, K. C. (2015). Innovation, public capital, and growth. *Journal of Macroeconomics*, *44*, 252-275.

Aghion, P., & Kharroubi, E. (2007). Cyclical macro policy and industry growth: the effect of countercyclical fiscal policy. *WP Harvard University*.

Ahmad, F., Draz, M. U., & Yang, S. C. (2015). Impact of Macroeconomic Fundamentals on

Exchange Rates: Empirical Evidence from Developing Asian Countries. *Available at SSRN 2707089*.

Ahmad, F., Draz, M. U., & Yang, S. C. (2016). Exchange rate, economic growth and foreign direct investment in emerging Asian economies: Fresh evidence from long run estimation and variance decomposition approach.

Ahuja, H. L. (2013). Modern Economics, 10(4), 545. *New Delhi: S. Chard & Company Pvt. Ltd*

Aizenman, J., Pinto, B., & Radziwill, A. (2007). Sources for financing domestic capital–Is foreign saving a viable option for developing countries? *Journal of International Money and Finance*, *26*(5), 682-702.

Ajayi, O. E., Akinbobola, T. O., Okposin, S. B., & Ola-David, O. (2016). Interactive effects of exchange rate volatility and foreign capital inflows on economic growth in Nigeria.

Ajibola, A. A., Enilolobo, O. S., & Theodore, N. I. (2017). Impact of Oil Revenue and Exchange Rate Fluctuation on Economic Growth in Nigeria (1981-2015). *Journal of Management & Administration*, *2017*(2), 77-104.

Akinkunmi, M. A. (2017). Empirical investigation of external debt-growth nexus in Sub-Saharan Africa. *African Research Review*, *11*(3), 142-152.

Akinlo, T., & Oyeleke, O. J. (2018). Effects of Government Expenditure on Private Investment in Nigerian Economy (1980–2016). *Emerging Economy Studies*, *4*(2), 147-156.

Alagidede, P., & Ibrahim, M. (2017). On the causes and effects of exchange rate volatility on

economic growth: Evidence from Ghana. *Journal of African Business*, *18*(2), 169-193.

Ali, H., Farooq, F., & Mumtaz, N. (2016). Trade Openness, External Debt and Growth Nexus in Pakistan: Empirical Evidence from ARDL Modeling Approach & Co-Integration Causality Analysis. *Review of Economics and Development Studies*, *2*(2), 93-102.

Ali, R., & Mustafa, U. (2012). External debt accumulation and its impact on economic growth in Pakistan. *The Pakistan Development Review*, 79-95.

Amin, A. A., & Audu, I. (2006). External debt, investment and economic growth: Evidence from Nigeria. *CENTRAL BANK OF NIGERIA*, *44*(1), 81.

Andrews, D. W., & Lu, B. (2001). Consistent model and moment selection procedures for GMM estimation with application to dynamic panel data models. *Journal of Econometrics*, *101*(1), 123-164.

Ansar, A., Flyvbjerg, B., Budzier, A., & Lunn, D. (2016). Does infrastructure investment lead to economic growth or economic fragility? Evidence from China. *Oxford Review of Economic Policy*, *32*(3), 360-390.

Anyanwu, J. C. (1993). *Monetary Economics: Theory, policy, and Institutions*. Hybrid Publishers.

Anyanwu, J. C., & Erhijakpor, A. E. (2004). Trends and determinants of foreign direct investment in Africa. *West African Journal of Monetary and Economic Integration*, *2*(2), 21-44.

Anyanwu, J. C., & Erhijakpor, A. E. O. (2004). Domestic debt and economic growth: The Nigerian case. *West African Financial and Economic Review*, *1*(2), 98-128.

Arellano, M., & Bond, S. (1991). Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *The review of economic studies*, *58*(2), 277-297.

Arezki, M. R. (2016). *From Global Savings Glut to Financing Infrastructure*. International Monetary Fund.

Arezki, R., Bolton, P., Peters, S., Samama, F., & Stiglitz, J. (2017). From global savings glut to financing infrastructure. *Economic Policy*, *32*(90), 221-261.

Arvin, M. B., Pradhan, R. P., & Norman, N. R. (2015). Transportation intensity, urbanization, economic growth, and CO2 emissions in the G-20 countries. *Utilities Policy*, *35*, 50-66.

Asab, N. A., & Cuestas, J. C. (2017). The Credibility of a Soft Pegged Exchange Rate in Emerging Market Economies: Evidence from a Panel Data Study. *Annals of Economics & Finance*, *18*(1).

Auerbach, A. J., & Gorodnichenko, Y. (2016). Effects of fiscal shocks in a globalized world. *IMF Economic Review*, *64*(1), 177-215.

Ahuja, H. L. (2013). Modern Economics, 10(4), 545. *New Delhi: S. Chard & Company Pvt. Ltd*

Aizenman, J., Pinto, B., & Radziwill, A. (2007). Sources for financing domestic capital–Is foreign saving a viable option for developing countries? *Journal of International Money and Finance*, *26*(5), 682-702.

Ajayi, O. E., Akinbobola, T. O., Okposin, S. B., & Ola-David, O. (2016). Interactive effects of

exchange rate volatility and foreign capital inflows on economic growth in Nigeria.

Ajibola, A. A., Enilolobo, O. S., & Theodore, N. I. (2017). Impact of Oil Revenue and Exchange Rate Fluctuation on Economic Growth in Nigeria (1981-2015). *Journal of Management & Administration*, *2017*(2), 77-104.

Akinkunmi, M. A. (2017). Empirical investigation of external debt-growth nexus in Sub-Saharan Africa. *African Research Review*, *11*(3), 142-152.

Akinlo, T., & Oyeleke, O. J. (2018). Effects of Government Expenditure on Private Investment in Nigerian Economy (1980–2016). *Emerging Economy Studies*, *4*(2), 147-156.

Alagidede, P., & Ibrahim, M. (2017). On the causes and effects of exchange rate volatility on economic growth: Evidence from Ghana. *Journal of African Business*, *18*(2), 169-193.

Ali, H., Farooq, F., & Mumtaz, N. (2016). Trade Openness, External Debt and Growth Nexus in Pakistan: Empirical Evidence from ARDL Modeling Approach & Co-Integration Causality Analysis. *Review of Economics and Development Studies*, *2*(2), 93-102.

Ali, R., & Mustafa, U. (2012). External debt accumulation and its impact on economic growth in Pakistan. *The Pakistan Development Review*, 79-95.

Amin, A. A., & Audu, I. (2006). External debt, investment and economic growth: Evidence from Nigeria. *CENTRAL BANK OF NIGERIA*, *44*(1), 81.

Andrews, D. W., & Lu, B. (2001). Consistent model and moment selection procedures for GMM

estimation with application to dynamic panel data models. *Journal of Econometrics*, *101*(1), 123-164.

Ansar, A., Flyvbjerg, B., Budzier, A., & Lunn, D. (2016). Does infrastructure investment lead to economic growth or economic fragility? Evidence from China. *Oxford Review of Economic Policy*, *32*(3), 360-390.

Anyanwu, J. C. (1993). *Monetary Economics: Theory, policy, and Institutions*. Hybrid Publishers.

Anyanwu, J. C., & Erhijakpor, A. E. (2004). Trends and determinants of foreign direct investment in Africa. *West African Journal of Monetary and Economic Integration*, *2*(2), 21-44.

Anyanwu, J. C., & Erhijakpor, A. E. O. (2004). Domestic debt and economic growth: The Nigerian case. *West African Financial and Economic Review*, *1*(2), 98-128.

Arellano, M., & Bond, S. (1991). Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *The review of economic studies*, *58*(2), 277-297.

Arezki, M. R. (2016). *From Global Savings Glut to Financing Infrastructure*. International Monetary Fund.

Arezki, R., Bolton, P., Peters, S., Samama, F., & Stiglitz, J. (2017). From global savings glut to financing infrastructure. *Economic Policy*, *32*(90), 221-261.

Arvin, M. B., Pradhan, R. P., & Norman, N. R. (2015). Transportation intensity, urbanization, economic growth, and CO2 emissions in the G-20 countries. *Utilities Policy*, *35*, 50-66.

Asab, N. A., & Cuestas, J. C. (2017). The Credibility of a Soft Pegged Exchange Rate in Emerging Market Economies: Evidence from a Panel Data Study. *Annals of Economics & Finance*, *18*(1).

Auerbach, A. J., & Gorodnichenko, Y. (2016). Effects of fiscal shocks in a globalized world. *IMF Economic Review*, *64*(1), 177-215.

AU-NEPAD. (2010). African Innovation Outlook 2010.

Babu, J. O., Kiprop, S., Kalio, A. M., & Gisore, M. (2015). Effect of domestic debt on economic growth in the east African community. *American Journal of Research Communication*, *3*(9), 73-95.

Bagahwa, M. D. S. & A. Naho (1995), 'Estimating the Second Economy in Tanzania', *World Development*, Vol. **23**, No. 8, pp. 1387– 99.

Bakar, N. A., & Hassan, S. (2008). Empirical evaluation on external debt of Malaysia. *International Business & Economics Research Journal (IBER)*, 7(2), 95-108.

Baldacci, M. E., Ding, D., Coady, D., Callegari, G., Tommasino, P., Woo, J., & Kumar, M. M. S. (2010). *Public Expenditureson Social Programs and Household Consumption in China* (No. 10-69). International Monetary Fund.

Baltagi, B. H., & Baltagi, B. H. (Eds.). (2001). *A companion to theoretical econometrics*. Oxford: Blackwell.

Barbosa, L. O. S., Jayme Jr, F. G., & Missio, F. J. (2018). Determinants of the real exchange rate

in the long-run for developing and emerging countries: a theoretical and empirical approach. *International Review of Applied Economics*, *32*(1), 62-83.

Barbosa, L. O. S., Jayme Jr, F. G., & Missio, F. J. (2018). Managing real exchange rate for economic growth: Empirical evidences from developing countries. *Journal of Post Keynesian Economics*, *41*(4), 598-619.

Barro, R. J. (1979). On the determination of the public debt. *Journal of political Economy*, *87*(5, Part 1), 940-971.

Batuo, M. E. (2015). The role of telecommunications infrastructure in the regional economic growth of Africa. *The Journal of Developing Areas*, *49*(1), 313-330.

Beaudry, P., Nam, D., & Wang, J. (2011). *Do mood swings drive business cycles and is it rational?* (No. w17651). National Bureau of Economic Research.

Beetsma, R. M. (2008). *A survey of the effects of discretionary fiscal policy*. Swedish Fiscal Policy Council (Finanspolitiska rådet).

Beetsma, R., Giuliodori, M., & Klaassen, F. (2008). The effects of public spending shocks on trade balances and budget deficits in the European Union. *Journal of the European Economic Association*, *6*(2-3), 414-423.

Behr, A. (2003). *A comparison of dynamic panel data estimators: Monte Carlo evidence and an application to the investment function* (No. 2003, 05). Discussion Paper Series 1/Volkswirtschaftliches Forschungszentrum der Deutschen Bundesbank.

Bénétrix, A. S., & Lane, P. R. (2013). Fiscal shocks and the real exchange rate. *International Journal of Central Banking*, *9*(3), 6-37.

Bénétrix, A. S., & Lane, P. R. (2013). Fiscal shocks and the real exchange rate. *International Journal of Central Banking*, *9*(3), 6-37.

Bhasin, K., & Nisa, S. (2018). An Assessment of Relationship Between Exchange Rate Volatility and Macro-Economic Variables: A VECM Approach. *ITIHAS-The Journal of Indian Management*, *8*(4).

Bhattacharya, A., & Romani, M. (2013, March). Meeting the infrastructure challenge: The case for a new development bank. In *G-24 Technical Group Meeting, Washington, DC* (Vol. 21).

Blundell, R., & Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel data models. *Journal of econometrics*, *87*(1), 115-143.

Bonadio, B., Fischer, A. M., & Sauré, P. (2016). The speed of exchange rate pass-through. *Journal of the European Economic Association*.

Boopen, S., Kesseven, P., & Ramesh, D. (2007). External debt and economic growth: A vector error correction approach. *International Journal of Business Research*, *7*(5).

Born, B., Juessen, F., & Müller, G. J. (2013). Exchange rate regimes and fiscal multipliers. *Journal of Economic Dynamics and Control*, *37*(2), 446-465.

Bouakez, H., & Eyquem, A. (2015). Government spending, monetary policy, and the real exchange

rate. *Journal of International Money and Finance*, *56*, 178-201.

Bouakez, H., & Eyquem, A. (2015). Government spending, monetary policy, and the real exchange rate. *Journal of International Money and Finance*, *56*, 178-201.

Bouakez, H., & Eyquem, A. (2015). Government spending, monetary policy, and the real exchange rate. *Journal of International Money and Finance*, *56*, 178-201.

Briceño-Garmendia, C. M., & Benitez, D. A. (2010). *Cape Verde's infrastructure: a continental perspective*. World Bank.

Buchanan, J. M. (1976). Barro on the Ricardian equivalence theorem. *Journal of political economy*, *84*(2), 337-342.

Buchanan, J. M., & Buchanan, J. M. (1958). *Public principles of public debt: a defense and restatement*. Homewood, IL: RD Irwin.

Babu, J. O., Kiprop, S., Kalio, A. M., & Gisore, M. (2015). Effect of domestic debt on economic growth in the east African community. *American Journal of Research Communication*, *3*(9), 73-95.

Bagahwa, M. D. S. & A. Naho (1995), 'Estimating the Second Economy in Tanzania', *World Development*, Vol. **23**, No. 8, pp. 1387– 99.

Bakar, N. A., & Hassan, S. (2008). Empirical evaluation on external debt of Malaysia. *International Business & Economics Research Journal (IBER)*, 7(2), 95-108.

Baldacci, M. E., Ding, D., Coady, D., Callegari, G., Tommasino, P., Woo, J., & Kumar, M. M. S.

(2010). *Public Expenditureson Social Programs and Household Consumption in China* (No. 10-69). International Monetary Fund.

Baltagi, B. H., & Baltagi, B. H. (Eds.). (2001). *A companion to theoretical econometrics*. Oxford: Blackwell.

Barbosa, L. O. S., Jayme Jr, F. G., & Missio, F. J. (2018). Determinants of the real exchange rate in the long-run for developing and emerging countries: a theoretical and empirical approach. *International Review of Applied Economics*, *32*(1), 62-83.

Barbosa, L. O. S., Jayme Jr, F. G., & Missio, F. J. (2018). Managing real exchange rate for economic growth: Empirical evidences from developing countries. *Journal of Post Keynesian Economics*, *41*(4), 598-619.

Barro, R. J. (1979). On the determination of the public debt. *Journal of political Economy*, *87*(5, Part 1), 940-971.

Batuo, M. E. (2015). The role of telecommunications infrastructure in the regional economic growth of Africa. *The Journal of Developing Areas*, *49*(1), 313-330.

Beaudry, P., Nam, D., & Wang, J. (2011). *Do mood swings drive business cycles and is it rational?* (No. w17651). National Bureau of Economic Research.

Beetsma, R. M. (2008). *A survey of the effects of discretionary fiscal policy*. Swedish Fiscal Policy Council (Finanspolitiska rådet).

Beetsma, R., Giuliodori, M., & Klaassen, F. (2008). The effects of public spending shocks on trade

balances and budget deficits in the European Union. *Journal of the European Economic Association*, *6*(2-3), 414-423.

Behr, A. (2003). *A comparison of dynamic panel data estimators: Monte Carlo evidence and an application to the investment function* (No. 2003, 05). Discussion Paper Series 1/Volkswirtschaftliches Forschungszentrum der Deutschen Bundesbank.

Bénétrix, A. S., & Lane, P. R. (2013). Fiscal shocks and the real exchange rate. *International Journal of Central Banking*, *9*(3), 6-37.

Bénétrix, A. S., & Lane, P. R. (2013). Fiscal shocks and the real exchange rate. *International Journal of Central Banking*, *9*(3), 6-37.

Bhasin, K., & Nisa, S. (2018). An Assessment of Relationship Between Exchange Rate Volatility and Macro-Economic Variables: A VECM Approach. *ITIHAS-The Journal of Indian Management*, *8*(4).

Bhattacharya, A., & Romani, M. (2013, March). Meeting the infrastructure challenge: The case for a new development bank. In *G-24 Technical Group Meeting, Washington, DC* (Vol. 21).

Blundell, R., & Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel data models. *Journal of econometrics*, *87*(1), 115-143.

Bonadio, B., Fischer, A. M., & Sauré, P. (2016). The speed of exchange rate pass-through. *Journal of the European Economic Association*.

Boopen, S., Kesseven, P., & Ramesh, D. (2007). External debt and economic growth: A vector error correction approach. *International Journal of Business Research*, *7*(5).

Born, B., Juessen, F., & Müller, G. J. (2013). Exchange rate regimes and fiscal multipliers. *Journal of Economic Dynamics and Control*, *37*(2), 446-465.

Bouakez, H., & Eyquem, A. (2015). Government spending, monetary policy, and the real exchange rate. *Journal of International Money and Finance*, *56*, 178-201.

Bouakez, H., & Eyquem, A. (2015). Government spending, monetary policy, and the real exchange rate. *Journal of International Money and Finance*, *56*, 178-201.

Bouakez, H., & Eyquem, A. (2015). Government spending, monetary policy, and the real exchange rate. *Journal of International Money and Finance*, *56*, 178-201.

Briceño-Garmendia, C. M., & Benitez, D. A. (2010). *Cape Verde's infrastructure: a continental perspective*. World Bank.

Buchanan, J. M. (1976). Barro on the Ricardian equivalence theorem. *Journal of political economy*, *84*(2), 337-342.

Buchanan, J. M., & Buchanan, J. M. (1958). *Public principles of public debt: a defense and restatement*. Homewood, IL: RD Irwin.

Calderón, C., & Servén, L. (2010). Infrastructure and economic development in Sub-Saharan Africa. *Journal of African Economies*, *19*(suppl_1), i13-i87.

Calderón, C., & Servén, L. (2010). *Infrastructure in Latin America*. The World Bank.

Calderón, C., Moral-Benito, E., & Servén, L. (2011). *Is infrastructure capital productive? A dynamic heterogeneous approach*. The World Bank.

Calvo, G. A. (1998). Capital flows and capital-market crises: the simple economics of sudden stops. *Journal of applied Economics*, *1*(1), 35-54.

Chakamera, C., & Alagidede, P. (2017). *The Nexus between Infrastructure (Quantity and Quality) and Economic Growth* (No. 673).

Chakamera, C., & Alagidede, P. (2017). *The Nexus between Infrastructure (Quantity and Quality) and Economic Growth* (No. 673).

Chakamera, C., & Alagidede, P. (2018). The nexus between infrastructure (quantity and quality) and economic growth in Sub Saharan Africa. *International Review of Applied Economics*, *32*(5), 641-672.

Chatterjee, S., & Mursagulov, A. (2016). Fiscal policy and the real exchange rate. *Macroeconomic Dynamics*, *20*(7), 1742-1770.

Checherita-Westphal, C. D., & Rother, P. (2010). The impact of high and growing government debt on economic growth: an empirical investigation for the euro area.

Checherita-Westphal, C., & Rother, P. (2012). The impact of high government debt on economic growth and its channels: An empirical investigation for the euro area. *European economic review*, *56*(7), 1392-1405.

Checherita-Westphal, C., Hughes Hallett, A., & Rother, P. (2014). Fiscal sustainability using growth-maximizing debt targets. *Applied Economics*, *46*(6), 638-647.

Chen, Y., & Liu, D. (2018). Dissecting real exchange rate fluctuations in China. *Emerging Markets Finance and Trade*, *54*(2), 288-306.

Chen, Y., & Liu, D. (2018). Government spending shocks and the real exchange rate in China: Evidence from a sign-restricted VAR model. *Economic Modelling*, *68*, 543-554.

Chen, Y., Salike, N., Luan, F., & He, M. (2016). Heterogeneous effects of inter-and intra-city transportation infrastructure on economic growth: Evidence from Chinese cities. *Cambridge Journal of Regions, Economy and Society*, *9*(3), 571-587.

Chenery & Strout, (1966). Foreign assistance and economic development. *American Economic Review,* 56 (no. 4), pp. 679-733.

Chenery, H. B. (1967). Foreign assistance and economic development. In *Capital Movements and Economic Development* (pp. 268-292). Palgrave Macmillan, London.

Chipeta, C., Meyer, D. F., & Muzindutsi, P. F. (2017). The effect of exchange rate movements and economic growth on job creation. *Studia Universitatis Babes-Bolyai Oeconomica*, *62*(2), 20-41.

Cholifihani, M. (2008). A cointegration analysis of public debt service and GDP in Indonesia. *Journal of Management and social sciences*, 4(2), 68-81.

Chotia, V., & Rao, N. M. (2015). Examining the Interlinkages Between Regional Infrastructure

Disparities, Economic Growth, And Poverty: A Case of Indian States. *Ekonomski Anali/Economic Annals*, *60*(205).

Chotia, V., & Rao, N. M. (2017). Examining the impact of public investment and private investment on economic growth: empirical evidence from BRICS nations. *International Journal of Economics and Business Research*, *14*(2), 128-137.

Chotia, V., & Rao, N. V. M. (2015). Investigating the Landscape of India's Balance of Payments: Cointegration and Causality Analysis. *International Journal of Statistics and Economics*.

Clements, B., Bhattacharya, R., & Nguyen, T., (2003). External debt, public investment, and growth in low income countries. *IMF working paper WP/03/249*, Washington, DC.

Cohen, D. (1993). *Two notes on economic growth and the Solow model* (No. 780). CEPR Discussion Papers.

Cohen, D. (1997). *Growth and external debt: A new perspective on the African and Latin American tragedies* (No. 1753). London: Centre for Economic Policy Research.

Collins, A., Paago, J. K., Igbara, F. N., & Domale, E. (2016). Exchange Rate and Foreign Direct Investment (FDI): Implications for Economic Growth in Nigeria. *Equatorial Journal of Finance and Management Sciences*, *1*(1).

Corral, L., Schling, M., Rogers, C., Cumberbatch, J., Hinds, F., Zhou, N., & Lemay, M. H. (2016). *The Impact of Coastal Infrastructure Improvements on Economic Growth: Evidence from Barbados*. Inter-American Development Bank.

Corsetti, G., Dedola, L., & Leduc, S. (2014). The international dimension of productivity and demand shocks in the US economy. *Journal of the European Economic Association*, *12*(1), 153-176.

Corsetti, G., Meier, A., & Müller, G. J. (2012). Fiscal stimulus with spending reversals. *Review of Economics and Statistics*, *94*(4), 878-895.

Corsetti, G., Meier, A., & Müller, G. J. (2012). What determines government spending multipliers? *Economic Policy*, *27*(72), 521-565.

Cunningham, R. T. (1993). The effects of debt burden on economic growth in heavily indebted developing nations. *Journal of economic development*, *18*(1), 115-126.

Calderón, C., & Servén, L. (2010). Infrastructure and economic development in Sub-Saharan Africa. *Journal of African Economies*, *19*(suppl_1), i13-i87.

Calderón, C., & Servén, L. (2010). *Infrastructure in Latin America*. The World Bank.

Calderón, C., Moral-Benito, E., & Servén, L. (2011). *Is infrastructure capital productive? A dynamic heterogeneous approach*. The World Bank.

Calvo, G. A. (1998). Capital flows and capital-market crises: the simple economics of sudden stops. *Journal of applied Economics*, *1*(1), 35-54.

Chakamera, C., & Alagidede, P. (2017). *The Nexus between Infrastructure (Quantity and Quality) and Economic Growth* (No. 673).

Chakamera, C., & Alagidede, P. (2017). *The Nexus between Infrastructure (Quantity and Quality)*

and Economic Growth (No. 673).

Chakamera, C., & Alagidede, P. (2018). The nexus between infrastructure (quantity and quality) and economic growth in Sub Saharan Africa. *International Review of Applied Economics*, *32*(5), 641-672.

Chatterjee, S., & Mursagulov, A. (2016). Fiscal policy and the real exchange rate. *Macroeconomic Dynamics*, *20*(7), 1742-1770.

Checherita-Westphal, C. D., & Rother, P. (2010). The impact of high and growing government debt on economic growth: an empirical investigation for the euro area.

Checherita-Westphal, C., & Rother, P. (2012). The impact of high government debt on economic growth and its channels: An empirical investigation for the euro area. *European economic review*, *56*(7), 1392-1405.

Checherita-Westphal, C., Hughes Hallett, A., & Rother, P. (2014). Fiscal sustainability using growth-maximizing debt targets. *Applied Economics*, *46*(6), 638-647.

Chen, Y., & Liu, D. (2018). Dissecting real exchange rate fluctuations in China. *Emerging Markets Finance and Trade*, *54*(2), 288-306.

Chen, Y., & Liu, D. (2018). Government spending shocks and the real exchange rate in China: Evidence from a sign-restricted VAR model. *Economic Modelling*, *68*, 543-554.

Chen, Y., Salike, N., Luan, F., & He, M. (2016). Heterogeneous effects of inter-and intra-city

transportation infrastructure on economic growth: Evidence from Chinese cities. *Cambridge Journal of Regions, Economy and Society*, *9*(3), 571-587.

Chenery & Strout, (1966). Foreign assistance and economic development. *American Economic Review,* 56 (no. 4), pp. 679-733.

Chenery, H. B. (1967). Foreign assistance and economic development. In *Capital Movements and Economic Development* (pp. 268-292). Palgrave Macmillan, London.

Chipeta, C., Meyer, D. F., & Muzindutsi, P. F. (2017). The effect of exchange rate movements and economic growth on job creation. *Studia Universitatis Babes-Bolyai Oeconomica*, *62*(2), 20-41.

Cholifihani, M. (2008). A cointegration analysis of public debt service and GDP in Indonesia. *Journal of Management and social sciences*, 4(2), 68-81.

Chotia, V., & Rao, N. M. (2015). Examining the Interlinkages Between Regional Infrastructure Disparities, Economic Growth, And Poverty: A Case of Indian States. *Ekonomski Anali/Economic Annals*, *60*(205).

Chotia, V., & Rao, N. M. (2017). Examining the impact of public investment and private investment on economic growth: empirical evidence from BRICS nations. *International Journal of Economics and Business Research*, *14*(2), 128-137.

Chotia, V., & Rao, N. V. M. (2015). Investigating the Landscape of India's Balance of Payments: Cointegration and Causality Analysis. *International Journal of Statistics and Economics*.

Clements, B., Bhattacharya, R., & Nguyen, T., (2003). External debt, public investment, and growth in low income countries. *IMF working paper WP/03/249*, Washington, DC.

Cohen, D. (1993). *Two notes on economic growth and the Solow model* (No. 780). CEPR Discussion Papers.

Cohen, D. (1997). *Growth and external debt: A new perspective on the African and Latin American tragedies* (No. 1753). London: Centre for Economic Policy Research.

Collins, A., Paago, J. K., Igbara, F. N., & Domale, E. (2016). Exchange Rate and Foreign Direct Investment (FDI): Implications for Economic Growth in Nigeria. *Equatorial Journal of Finance and Management Sciences*, *1*(1).

Corral, L., Schling, M., Rogers, C., Cumberbatch, J., Hinds, F., Zhou, N., & Lemay, M. H. (2016). *The Impact of Coastal Infrastructure Improvements on Economic Growth: Evidence from Barbados*. Inter-American Development Bank.

Corsetti, G., Dedola, L., & Leduc, S. (2014). The international dimension of productivity and demand shocks in the US economy. *Journal of the European Economic Association*, *12*(1), 153-176.

Corsetti, G., Meier, A., & Müller, G. J. (2012). Fiscal stimulus with spending reversals. *Review of Economics and Statistics*, *94*(4), 878-895.

Corsetti, G., Meier, A., & Müller, G. J. (2012). What determines government spending multipliers? *Economic Policy*, *27*(72), 521-565.

Cunningham, R. T. (1993). The effects of debt burden on economic growth in heavily indebted developing nations. *Journal of economic development*, *18*(1), 115-126.

De Castro, F., & Fernández, L. (2013). The effects of fiscal shocks on the exchange rate in Spain. *The Economic and Social Review*, *44*(2, Summer), 151-180.

De Castro, F., & Garrote, D. (2015). The effects of fiscal shocks on the exchange rate in the EMU and differences with the USA. *Empirical Economics*, *49*(4), 1341-1365.

Deshpande, A. (1997). The debt overhang and the disincentive to invest. *Journal of Development Economics*, 52(1), 169-187.

Devereux, M. B., & Yu, C. (2017). Exchange rate adjustment in financial crises. *IMF Economic Review*, *65*(3), 528-562.

Diamond, P. A. (1965). National debt in a neoclassical growth model. *The American Economic Review*, *55*(5), 1126-1150.

Dickey, D. A., & Fuller, W. A. (1979). Distribution of the estimators for autoregressive time series with a unit root. *Journal of the American statistical association*, *74*(366a), 427-431.

Dickey, D. A., & Fuller, W. A. (1981). Likelihood ratio statistics for autoregressive time series with a unit root. *Econometrica: journal of the Econometric Society*, 1057-1072.

Domínguez-Torres, C., & Briceño-Garmendia, C. (2011). *Mozambique's Infrastructue: A Continental Perspective*. World Bank.

Dotsey, M. (1994). Some unpleasant supply side arithmetic. *Journal of Monetary Economics*, *33*(3), 507-524.

Dritsakis, N., & Stamatiou, P. (2016). Trade openness and economic growth: A panel cointegration and causality analysis for the Newest EU countries. *Romanian Economic Journal*, *18*(59), 45-60.

De Castro, F., & Fernández, L. (2013). The effects of fiscal shocks on the exchange rate in Spain. *The Economic and Social Review*, *44*(2, Summer), 151-180.

De Castro, F., & Garrote, D. (2015). The effects of fiscal shocks on the exchange rate in the EMU and differences with the USA. *Empirical Economics*, *49*(4), 1341-1365.

Deshpande, A. (1997). The debt overhang and the disincentive to invest. *Journal of Development Economics*, 52(1), 169-187.

Devereux, M. B., & Yu, C. (2017). Exchange rate adjustment in financial crises. *IMF Economic Review*, *65*(3), 528-562.

Diamond, P. A. (1965). National debt in a neoclassical growth model. *The American Economic Review*, *55*(5), 1126-1150.

Dickey, D. A., & Fuller, W. A. (1979). Distribution of the estimators for autoregressive time series with a unit root. *Journal of the American statistical association*, *74*(366a), 427-431.

Dickey, D. A., & Fuller, W. A. (1981). Likelihood ratio statistics for autoregressive time series with a unit root. *Econometrica: journal of the Econometric Society*, 1057-1072.

Domínguez-Torres, C., & Briceño-Garmendia, C. (2011). *Mozambique's Infrastructue: A Continental Perspective*. World Bank.

Dotsey, M. (1994). Some unpleasant supply side arithmetic. *Journal of Monetary Economics*, *33*(3), 507-524.

Dritsakis, N., & Stamatiou, P. (2016). Trade openness and economic growth: A panel cointegration and causality analysis for the Newest EU countries. *Romanian Economic Journal*, *18*(59), 45-60.

Eberts, R. W., & Fogarty, M. S. (1987). *Estimating the relationship between local public and private investment* (Vol. 8703). USA: Federal Reserve Bank of Cleveland.

Eberts, R., & Fogarty, M. (1987). *The role of public investment in regional economic development*. Working Paper 8703, Federal Reserve Bank of Cleveland.

Edoun, E. I., & Mbohwa, C. (2016). External debt in Africa and its implication on development: a review of past and current experience.

Egbetunde, T. (2012). Public debt and economic growth in Nigeria: Evidence from granger causality. *American Journal of Economics*, *2*(6), 101-106.

Elbadawi, I. A., & Soto, R. (1997). Real exchange rates and macroeconomic adjustments in sub-Saharan Africa and other developing countries. *Journal of African Economies*, 74-120.

Elbadawi, I., Ndulu, B. J., & Ndung'u, N. (1997). Debt overhang and economic growth in Sub-Saharan Africa. *External finance for low-income countries*, 49-76.

El-Mahdy, A. M., & Torayeh, N. M. (2009). Debt sustainability and economic growth in Egypt. *International journal of Applied Econometrics and quantitative studies*, *6*(1), 21-55.

Enders, Z., & Müller, G. J. (2009). On the international transmission of technology shocks. *Journal of International Economics*, *78*(1), 45-59.

Enders, Z., Kleemann, M., & Müller, G. J. (2017). Growth expectations, undue optimism, and short-run fluctuations.

Engel, C. (2014). Exchange rates and interest parity. In *Handbook of international economics* (Vol. 4, pp. 453-522). Elsevier.

Engel, C., & Wang, J. (2011). International trade in durable goods: Understanding volatility, cyclicality, and elasticities. *Journal of International Economics*, *83*(1), 37-52.

Esfahani, H. S., & Ramírez, M. T. (2003). Institutions, infrastructure, and economic growth. *Journal of development Economics*, *70*(2), 443-477.

Estache, A. (2010). Infrastructure finance in developing countries: An overview. *EIB Papers*, *15*(2), 60-88.

Fedderke, J., & Bogeti, Z. (2006). *Infrastructure and Growth in South Africa: Direct and Indirect Productivity Impacts of 19 Infrastructure Measures', World Bank Policy*. August, Working Paper 3989.

Fincke, B., & Greiner, A. (2015). Public debt and economic growth in emerging market

economies. *South African Journal of Economics*, *83*(3), 357-370.

Forni, M., & Gambetti, L. (2016). Government spending shocks in open economy VARs. *Journal of International Economics*, *99*, 68-84.

Foster, V., & Briceño-Garmendia, C. (2010). Africa ‘s Infrastructure: A Time for Transformation. Agence Française de Développement and the World Bank.

Foster, V., & Briceño-Garmendia, C. M. (Eds.). (2009). *Africa's infrastructure: a time for transformation*. The World Bank.

Foster, V., & Pushak, N. (2010). *Liberia's Infrastructure: A Continental Perspective*. World Bank.

Fosu, A. K. (1999). The external debt burden and economic growth in the 1980s: evidence from sub-Saharan Africa. *Canadian Journal of Development Studies/Revue canadienne d'études du développement*, *20*(2), 307-318.

Fratzscher, M., Juvenal, L., & Sarno, L. (2010). Asset prices, exchange rates and the current account. *European Economic Review*, *54*(5), 643-658.

Gale, W. G., & Orszag, P. R. (2003). Economic effects of sustained budget deficits. *National Tax Journal*, 463-485.

Gbatu, A. P., Wang, Z., Wesseh Jr, P. K., & Tutdel, I. Y. R. (2017). The impacts of oil price shocks on small oil-importing economies: Time series evidence for Liberia. *Energy*, *139*, 975-990.

Geiger, L. T. (1990). Debt and economic development in Latin America. *The Journal of Developing Areas*, *24*(2), 181-194.

Granger, C. W. (1988). Some recent development in a concept of causality. *Journal of econometrics*, *39*(1-2), 199-211.

Greene WH (2003). Econometric Analysis. Prentice Hall, Upper Saddle River, NJ, 5th edition.

Gujarati, D. (2004). Basic Econometrics Fourth (4th) Edition. *Magraw Hill Inc, New York*.

Gujarati, D. N. (2009). *Basic econometrics*. Tata McGraw-Hill Education.

Gurara, D., Klyuev, M. V., Mwase, M., Presbitero, A., Xu, X. C., & Bannister, M. G. J. (2017). *Trends and Challenges in Infrastructure Investment in Low-Income Developing Countries*. International Monetary Fund.

Gurara, D., Klyuev, M. V., Mwase, M., Presbitero, A., Xu, X. C., & Bannister, M. G. J. (2017). *Trends and Challenges in Infrastructure Investment in Low-Income Developing Countries*. International Monetary Fund.

Gale, W. G., & Orszag, P. R. (2003). Economic effects of sustained budget deficits. *National Tax Journal*, 463-485.

Gbatu, A. P., Wang, Z., Wesseh Jr, P. K., & Tutdel, I. Y. R. (2017). The impacts of oil price shocks on small oil-importing economies: Time series evidence for Liberia. *Energy*, *139*, 975-990.

Geiger, L. T. (1990). Debt and economic development in Latin America. *The Journal of Developing Areas*, *24*(2), 181-194.

Granger, C. W. (1988). Some recent development in a concept of causality. *Journal of econometrics*, *39*(1-2), 199-211.

Greene WH (2003). Econometric Analysis. Prentice Hall, Upper Saddle River, NJ, 5th edition.

Gujarati, D. (2004). Basic Econometrics Fourth (4th) Edition. *Magraw Hill Inc, New York*.

Gujarati, D. N. (2009). *Basic econometrics*. Tata McGraw-Hill Education.

Gurara, D., Klyuev, M. V., Mwase, M., Presbitero, A., Xu, X. C., & Bannister, M. G. J. (2017). *Trends and Challenges in Infrastructure Investment in Low-Income Developing Countries*. International Monetary Fund.

Gurara, D., Klyuev, M. V., Mwase, M., Presbitero, A., Xu, X. C., & Bannister, M. G. J. (2017). *Trends and Challenges in Infrastructure Investment in Low-Income Developing Countries*. International Monetary Fund.

Hafeez, M., Shahab, S., & Mahmood, M. T. (2017). Exchange Rate-Economic Growth Nexus under Different Political Regimes and Structural Shocks: Evidence from Pakistan. *Journal of Contemporary Management Sciences*, 1(2), 93-106.

Hailemariam A. (2011). The impact of external debt on economic growth and private investment in Ethiopia: A vector Auto Regressive Approach" A Paper Submitted to the Ninth International Conference on Ethiopian Economy.

Hameed, A., Ashraf, H., & Chaudhary, M. A. (2008). External debt and its impact on economic and business growth in Pakistan. *International Research Journal of Finance and Economics*, 20, 132-140.

Hotelling, H. (1933). Analysis of a complex of statistical variables into principal

components. *Journal of educational psychology*, *24*(6), 417.

Hussain, I., Khan, Z., Khan, M. I., Khalid, S., Kiran, A., & Hussain, T. (2017). Long run and short run relationship among gross domestic saving, net bilateral foreign aid, external debt and economic growth in Pakistan. *Dynamics of Economics*, *1*(1), 1-7.

Hussain, M. E., Haque, M., & Igwike, R. S. (2015). Relationship between economic growth and debt: An empirical analysis for Sub-Saharan Africa. *Journal of Economics and Political Economy*, *2*(2), 262-275.

Ibi, E. E., & Aganyi, A. (2015). Impacts of external debt on economic growth in Nigeria: a VAR approach. *Journal of Business Management and Administration*, *3*(1), 1-5.

IEA, O. (2010). OECD, & World Bank. 2010. *Analysis of the Scope of Energy Subsidies and Suggestions for the G-20 Initiative*, 26-27.

Igwe, S. C., Abdullah, M. A. I. L., & Sherko, K. (2016). Impact of External Debt-Induced Structural Adjustment Policies on Salient Aspects of the Nigerian Economy. *Canadian Social Science*, *12*(12), 42-47.

Iqbal, Z., & Zahid, G. M. (1998). Macroeconomic determinants of economic growth in Pakistan. *The Pakistan Development Review*, 125-148.

Ishida, H. (2015). The effect of ICT development on economic growth and energy consumption in Japan. *Telematics and Informatics*, *32*(1), 79-88.

Isse, M., & Ibrahim, A. (2017). Determinants of Exchange Rates in Somalia. *Asian Journal of*

Economic Modelling, *5*(3), 233-244.

Isyaku, S. (2014). Islamic Mode of Financing: A Panacea to the Nigeria's External Debt Burden. *International Journal of Advanced Studies in Business Strategies and Management*, 2(1). 109-125.

Jakob, B. (2016). Impact of exchange rate regimes on economic growth. *Undergraduate Economic Review*, *12*(1), 11.

Jarju, I., Nyarko, E., Adams, K., Haffner, O., & Odeniran, O. S. (2016). *The Relationship Between External Debt and Economic Growth in The West African Monetary Zone: A Panel Data Analysis* (No. 12).

Jha, R. (2007). Fiscal policy in developing countries: a synoptic view. *Available at SSRN 978101*.

Jhingan, M. L. (2004). *Principles of Economics*. Vrinda Pubs.

Jolliffe, I. T. (2002). Principal Component Analysis (2nd edition.). *SpringerVerlag, New York*

Judge, G. G., Hill, R. C., Griffiths, W., Lutkepohl, H., & Lee, T. C. (1982). Introduction to the Theory and Practice of Econometrics.

Judge, George G., R. Carter Hill, William E. Griffiths, Helmut Lütkepohl, & Tsoung-Chao Lee (1982). Introduction to the Theory and Practice of Econometrics, *John Wiley & Sons, New York.*

Juvenal, L. (2011). Sources of exchange rate fluctuations: Are they real or nominal? *Journal of International Money and Finance*, *30*(5), 849-876.

Kaplan, F. (2015). Oil Price, Exchange Rate and Economic Growth in Russia: A Multiple Structural Break Approach. *Advances in Management and Applied Economics*, *5*(4), 91-104.

Kharusi, S. A., & Ada, M. S. (2018). External debt and economic growth: The case of emerging economy. *Journal of economic integration*, *33*(1), 1141-1157.

Kibiy, J., & Tabitha, N. (2016). Determinants of Exchange Rate Volatility on the Kenyan Shilling against world major currencies. *International Journal of Social Sciences and Information Tehcnology, II*, 1181-1202.

Kim, S. (2015). Country characteristics and the effects of government consumption shocks on the current account and real exchange rate. *Journal of International Economics*, *97*(2), 436-447.

Kim, S., & Roubini, N. (2008). Twin deficit or twin divergence? Fiscal policy, current account, and real exchange rate in the US. *Journal of international Economics*, *74*(2), 362-383.

Klobodu, E. K. M., & Adams, S. (2016). Capital flows and economic growth in Ghana. *Journal of African Business*, *17*(3), 291-307.

Kodongo, O., & Ojah, K. (2014). Conditional pricing of currency risk in Africa's equity markets. *Emerging Markets Review*, *21*, 133-155.

Kollmann, R. (2010). Government purchases and the real exchange rate. *Open Economies Review*, *21*(1), 49-64.

Korseh, H. M. (2005). *Effects of external debt on economic growth in Sub-Saharan Africa: cointegration and causality evidence for Sierra Leone* (Doctoral dissertation, Lincoln University).

Kriwoluzky, A. (2012). Pre-announcement and timing: The effects of a government expenditure shock. *European Economic Review*, *56*(3), 373-388.

Krugman, P. R. (1998). What happened to Asia?

Kularatne, C. (2006). Social and economic infrastructure impacts on economic growth in South Africa. In *UCT School of Economics Sta¤ Seminar Series*.

Kumar, M. M. S., & Baldacci, M. E. (2010). *Fiscal deficits, public debt, and sovereign bond yields* (No. 10-184). International Monetary Fund.

Kumar, M., & Woo, J. (2010). Public debt and growth. *IMF working papers*, 1-47.

Charles, O., & Abimbola, O. (2018). The impact of external debt on the Nigerian economy. *Journal of Economics and International Business Management*, *6*(2), 30-39.

Eko, S. (2017). *The Impact of Domestic Investment, Foreign Direct Investment, and External Debt on Economic Growth in Indonesia* (Doctoral dissertation, Universitas Andalas).

Eyide, M. U., & Nzewi, U. (2018). Debt Management and Economic Development in Nigeria (1981.

Grace, O. O., Oluwayemisi, A. M., & Femi, O. O. (2019). Effect of External Debt on Economic Growth in Nigeria. *African Journal of Economics and Sustainable Development*, *2*(1), 39-50.

Iqbal, S., & Malik, I. R. (2018). FDI, external debt and their impact on economic growth of Pakistan: Empirical evidence using larger sample size. *Available at SSRN 3121113*.

Kapindula, M. G., & Kaliba, C. (2019). The effects of external debt servicing on infrastructure

spending: a case of Zambia. *International Journal of Construction Management*, 1-10.

Masron, T. A., Naseem, N. A. M., & Wahab, E. A. A. (2018). Institutional quality in Attracting foreign direct investment to small countries. *Malaysian Journal of Economic Studies*, *55*(2), 267-284.

Charles, O., & Abimbola, O. (2018). The impact of external debt on the Nigerian economy. *Journal of Economics and International Business Management*, *6*(2), 30-39.

Eko, S. (2017). *The Impact of Domestic Investment, Foreign Direct Investment, and External Debt on Economic Growth in Indonesia* (Doctoral dissertation, Universitas Andalas).

Eyide, M. U., & Nzewi, U. (2018). Debt Management and Economic Development in Nigeria (1981.

Grace, O. O., Oluwayemisi, A. M., & Femi, O. O. (2019). Effect of External Debt on Economic Growth in Nigeria. *African Journal of Economics and Sustainable Development*, *2*(1), 39-50.

Iqbal, S., & Malik, I. R. (2018). FDI, external debt and their impact on economic growth of Pakistan: Empirical evidence using larger sample size. *Available at SSRN 3121113*.

Kapindula, M. G., & Kaliba, C. (2019). The effects of external debt servicing on infrastructure spending: a case of Zambia. *International Journal of Construction Management*, 1-10.

Masron, T. A., Naseem, N. A. M., & Wahab, E. A. A. (2018). Institutional quality in Attracting foreign direct investment to small countries. *Malaysian Journal of Economic Studies*, *55*(2), 267-284.

Kuncoro, H. (2015). Credible fiscal policy and exchange rates stabilization. *Journal of Economics and Development Studies*, *3*(2), 7-18.

Kweka, J. P., & Morrissey, O. (2000). *Government spending and economic growth in Tanzania, 1965-1996* (No. 00/6). CREDIT Research Paper.

Lee, S. P., & Ng, Y. L. (2015). Public debt and economic growth in Malaysia. *Asian Economic and Financial Review*, *5*(1), 119-126.

Liu, D., Burston, B., Stewart, S. C., & Mulligan, H. H. (2018). *The Challenges of Health Disparities*. Jones & Bartlett Learning.

Loayza, N. V., & Odawara, R. (2010). Infrastructure and economic growth in Egypt policy research working paper 5177.

Maghyereh, A. (2006). Oil price shocks and emerging stock markets: A generalized VAR approach. In *Global stock markets and portfolio management* (pp. 55-68). Palgrave Macmillan, London.

Malinić, D. (2019). Challenges of creating sustainable growth in infrastructure sectors: The gap between ambitions and capabilities. *Ekonomika preduzeća*, *67*(1-2), 51-72.

Mason, E. S., & Asher, R. E. (2010). *The world bank since Bretton Woods*. Brookings Institution Press.

Mbeteh, A., Pellegrini, M. M., & Mehtap, S. (2019). Unemployment in Africa and entrepreneurial education: a critical assessment of entrepreneurship education programs in Sierra Leone. *International Journal of Business and Globalisation*, *23*(3), 420-451.

Meade, J. E. (1958). Is the national debt a burden? *Oxford Economic Papers*, *10*(2), 163-183.

Mertens, K., & Ravn, M. O. (2012). Empirical evidence on the aggregate effects of anticipated and unanticipated US tax policy shocks. *American Economic Journal: Economic Policy*, *4*(2), 145-81.

Miller, M., & Modigliani, F. (1961). Dividend policy, growth, and the valuation of shares.

Miyamoto, W., Nguyen, T. L., & Sheremirov, V. (2019). The effects of government spending on real exchange rates: Evidence from military spending panel data. *Journal of International Economics*, *116*, 144-157.

Modigliani, F. (1961). Long-run implications of alternative fiscal policies and the burden of the national debt. *The Economic Journal*, *71*(284), 730-755.

Mohanty, A., Patra, S. K., Kumar, S., & Mohanty, A. (2016). An empirical analysis of effect of public debt on economic growth in india in the post-reform era. *Asian Economic and Financial Review*, *6*(11), 692.

Mohanty, B., Bhanumurthy, N. R., & Dastidar, A. G. (2018). What explains regional imbalances in public infrastructure expenditure? Evidence from Indian states. *Asia-Pacific Development Journal*, *24*(2), 113-139.

Mohanty, R. K., & Bhanumurthy, N. R. (2018). Assessing public expenditure efficiency at Indian states. *National Institute of Public Finance and Policy, New Delhi, NIPFP Working Paper*, *225*.

Charles, O., & Abimbola, O. (2018). The impact of external debt on the Nigerian economy. *Journal of Economics and International Business Management*, *6*(2), 30-39.

Eko, S. (2017). *The Impact of Domestic Investment, Foreign Direct Investment, and External Debt on Economic Growth in Indonesia* (Doctoral dissertation, Universitas Andalas).

Eyide, M. U., & Nzewi, U. (2018). Debt Management and Economic Development in Nigeria (1981.

Grace, O. O., Oluwayemisi, A. M., & Femi, O. O. (2019). Effect of External Debt on Economic

Growth in Nigeria. *African Journal of Economics and Sustainable Development*, *2*(1), 39-50.

Iqbal, S., & Malik, I. R. (2018). FDI, external debt and their impact on economic growth of Pakistan: Empirical evidence using larger sample size. *Available at SSRN 3121113*.

Kapindula, M. G., & Kaliba, C. (2019). The effects of external debt servicing on infrastructure spending: a case of Zambia. *International Journal of Construction Management*, 1-10.

Masron, T. A., Naseem, N. A. M., & Wahab, E. A. A. (2018). Institutional quality in Attracting foreign direct investment to small countries. *Malaysian Journal of Economic Studies*, *55*(2), 267-284.

Mohanty, R. K., & Bhanumurthy, N. R. (2018). *Analyzing the Dynamic Relationship between Physical Infrastructure, Financial Development and Economic Growth in India* (No. 18/245).

Mohmand, Y. T., Wang, A., & Saeed, A. (2017). The impact of transportation infrastructure on economic growth: empirical evidence from Pakistan. *Transportation Letters*, *9*(2), 63-69.

Mojekwu, J. N., & Ogege, S. (2012). Nigeria public debt and economic growth: a critical appraiser. *The Business & Management Review*, *3*(1), 253.

Monacelli, T., & Perotti, R. (2010). Fiscal policy, the real exchange rate and traded goods. *The Economic Journal*, *120*(544), 437-461.

Monacelli, T., Perotti, R., & Trigari, A. (2010). Unemployment fiscal multipliers. *Journal of Monetary Economics*, *57*(5), 531-553.

Mumtaz, H., & Sunder-Plassmann, L. (2013). Time-Varying Dynamics of the Real Exchange Rate: An Empirical Analysis. *Journal of Applied Econometrics*, *28*(3), 498-525.

Munnell, A. H. (1992). Policy watch: infrastructure investment and economic growth. *Journal of economic perspectives*, *6*(4), 189-198.

Musibau, H. O., Mahmood, S., Ismail, S., Shamsuddin, Z., & Rashid, N. (2018). Does External Debt Cause Economic Growth? An Experience from ECOWAS Member Countries. *International Journal of Academic Research in Business and Social Sciences*, 8(11), 1256–1264.

Newbold, P., & Granger, C. W. (1974). Experience with forecasting univariate time series and the combination of forecasts. *Journal of the Royal Statistical Society: Series A (General)*, *137*(2), 131-146.

Nhial, K. S. S. (2018). *Determinants of foreign exchange rate in South Sudan* (Doctoral dissertation, Moi Univesity).

Nickel, C., & Tudyka, A. (2014). Fiscal stimulus in times of high debt: Reconsidering multipliers and twin deficits. *Journal of Money, Credit and Banking*, *46*(7), 1313-1344.

Nwanne, T. F. I., & Eze, O. R. (2015). Assessing the effect of external debt servicing and receipt on exchange rate in Nigeria. *International Journal of Economics and Finance*, *7*(9), 278-286.

Nwannebuike, U.S., Ike, U.J. & Onuka, O. I. (2016). External debt and economic growth: The Nigeria experience. *European Journal of Accounting Auditing and Finance Research*, 4(2):33-48.

Ndubuisi, P. (2017). Analysis of the impact of external debt on economic growth in an Emerging Economy: Evidence from Nigeria. *African Research Review*, *11*(4), 156-173.

Nguea, S. M. (2020). The Impact of Infrastructure development on Foreign Direct Investment in Cameroon.

Nkoa, B. E. O. (2018). Determinants of foreign direct investment in Africa: An analysis of the impact of financial development. *Economics Bulletin*, *38*(1), 221-233.

Nwanne, T. F. I., & Eze, O. R. (2015). Assessing the effect of external debt servicing and receipt on exchange rate in Nigeria. *International Journal of Economics and Finance*, *7*(9), 278-286.

Nwannebuike, U.S., Ike, U.J. & Onuka, O. I. (2016). External debt and economic growth: The Nigeria experience. *European Journal of Accounting Auditing and Finance Research*, 4(2):33-48.

Ndubuisi, P. (2017). Analysis of the impact of external debt on economic growth in an Emerging Economy: Evidence from Nigeria. *African Research Review*, *11*(4), 156-173.

Nguea, S. M. (2020). The Impact of Infrastructure development on Foreign Direct Investment in Cameroon.

Nkoa, B. E. O. (2018). Determinants of foreign direct investment in Africa: An analysis of the impact of financial development. *Economics Bulletin*, *38*(1), 221-233.

Okoye, G. O. (2019). Effect of External Debt on Economic Growth of Developing Countries (Nigeria Perspective, 2001-2016). *Online Journal of Arts, Management & Social Sciences*, *4*(1).

Onafowora, O., & Owoye, O. (2019). Impact of external debt shocks on economic growth in Nigeria: a SVAR analysis. *Economic Change and Restructuring*, *52*(2), 157-179.

Odawara, R., & Loayza, N. V. (2010). *Infrastructure and economic growth in Egypt*. The World Bank.

Odili, O. (2015). Effects of exchange rate trends and volatility on imports in Nigeria: implications for macroeconomic policy. *International Journal of Economics, Commerce and Management United Kingdom*, *3*(7).

Ogunmuyiwa, M. S. (2011). Does external debt promote economic growth in Nigeria? *Current Research Journal of Economic Theory*, *3*(1), 29-35.

Okech, T. C., Mweni, F. T., & Njuguna, A. G. (2016). The Effect of External Debt on Inflation Rate in Kenya, 1972-2012.

Okoh, S. E. N. (2008). Public sector economics. *Benin City: Mindex Publishing Co*.

Okon, E. O., & Monday, O. I. (2017). Empirical and evidence-based investigation: External debt, poverty and economic growth nexus. *International Journal of Applied Economics, Finance and Accounting*, *1*(1), 37-47.

Okoye, L. U., Evbuomwan, G. O., Ezeji, F. N., & ERIN, O. (2018). Exchange Rate Management and Economic Development in Nigeria.

Oleksandr, D. (2003). Nonlinear impact of external debt on economic growth: The Case of Post-Soviet Countries. *Unpublished MA Thesis, National University of Kyiv-Mohyla Academy*.

Owusu-Nantwi, V., & Erickson, C. (2016). Public debt and economic growth in Ghana. *African Development Review*, *28*(1), 116-126.

Palei, T. (2015). Assessing the impact of infrastructure on economic growth and global competitiveness. *Procedia Economics and Finance*, *23*, 168-175.

Paun, D. (2019). Tax competition and factors influencing the gross domestic product and foreign direct investments of CEE countries. *Economic research-Ekonomska istraživanja*, *32*(1), 876-893.

Pinto, B. (2019). Ethiopia's Downgrade to High Risk of Debt Distress: A Policy Framework for the Government.

Panizza, U., & Presbitero, A. F. (2012). Is high public debt harmful for economic growth. *VoxEU. org*, *22*.

Pattillo, C. A., Poirson, H., & Ricci, L. A. (2002). *External debt and growth* (No. 2002-2069). International Monetary Fund.

Pattilo, C., Helen, P. & Luca, R. (2004). What are the channels through which external debt affects growth. International monetary fund (IMF) working paper, *Africa.Asia and Pacific Department*. W.P/04/15.

Pavlic, I., Svilokos, T., & Tolic, M. S. (2015). Tourism, real effective exchange rate and economic growth: Empirical evidence for Croatia. *International Journal of Tourism Research*, *17*(3), 282-291.

Pearson, K. (1901). On lines and planes of closest fit to systems of points in space London, Edinburgh, Dublin Philos. *Mag. J. Sci.*, 2 (11), pp. 559-572

Perkins, P., Fedderke, J., & Luiz, J. (2005). An analysis of economic infrastructure investment in South Africa. *South African Journal of Economics*, *73*(2), 211-228.

Pradhan, R. P., Arvin, M. B., & Norman, N. R. (2015). The dynamics of information and

communications technologies infrastructure, economic growth, and financial development: Evidence from Asian countries. *Technology in Society*, *42*, 135-149.

Ramakrishna, G. (2015). Service Sector Growth, Public External debt and Economic growth: A relook in to the Experience of Ethiopia. *America Journal of Business and Management*, *3*(2), 64-74.

Ramzan, M., & Ahmad, E. (2014). External debt growth nexus: Role of macroeconomic policies. *Economic Modelling*, *38*, 204-210.

Ravn, M. O., Schmitt-Grohé, S., & Uribe, M. (2012). Consumption, government spending, and the real exchange rates. *Journal of Monetary Economics*, *59*(3), 215-234.

Reinhart, C. M., & Rogoff, K. S. (2010). Growth in a Time of Debt. *American economic review*, *100*(2), 573-78.

Reinhart, C. M., Reinhart, V. R., & Rogoff, K. S. (2012). Public debt overhangs: advanced-economy episodes since 1800. *Journal of Economic Perspectives*, *26*(3), 69-86.

Reinhart, C. & K. Rogoff (2010), 'Growth in a Time of Debt', *American Economic Review*, Vol. **100**, No. 2, pp. 573– 78.

Reinhart, C., & Rogoff, K. (2010). Debt and growth revisited.

Ribeiro, R. S. M., McCombie, J. S., & Tadeu Lima, G. (2017). A reconciliation proposal of demand-driven growth models in open economies. *Journal of Economic Studies*, *44*(2), 226-244.

Richardson, R. B. (2010). *The contribution of tourism to economic growth and food security* (No. 1093-2016-88021).

Riffat, N., & Munir, K. (2015). Exploring the channels and impact of debt on economic growth in South Asia.

Rockerbie, D. W. (1994). Did the debt crisis cause the investment crisis? Further evidence. *Applied Economics*, *26*(7), 731-738.

Rosen, H. S. (2004). Public finance. In *The encyclopedia of public choice* (pp. 252-262). Springer, Boston, MA.

Rosen, S. G. & T. Gayer (2008), *Public Finance*, 8th edn, McGraw-Hill/Irwin, New York.

Rudra P., Tapan P. (2013). Effect of transportation infrastructure on economic growth in India: The VECM approach. J. Research in Transportation Economics, 38: 139-148.

Sá, F., & Wieladek, T. (2015). Capital inflows and the US housing boom. *Journal of Money, Credit and Banking*, *47*(S1), 221-256.

Saad, W. (2012). Causality between economic growth, export, and external debt servicing: the case of Lebanon. *International Journal of Economics and Finance*, *4*(11), 134-143.

Saheed, Z. S., Sani, I. E., & Idakwoji, B. O. (2015). Impact of public external debt on exchange rate in Nigeria. *International Finance and Banking*, *2*(1), 15-26.

Saheed, Z. S., Sani, I. E., & Idakwoji, B. O. (2015). Impact of public external debt on exchange

rate in Nigeria. *International Finance and Banking*, *2*(1), 15-26.

Sahoo, P., & Dash, R. K. (2012). Economic growth in South Asia: Role of infrastructure. *The Journal of International Trade & Economic Development*, *21*(2), 217-252.

Saidi, S., Shahbaz, M., & Akhtar, P. (2018). The long-run relationships between transport energy consumption, transport infrastructure, and economic growth in MENA countries. *Transportation Research Part A: Policy and Practice*, *111*, 78-95.

Saint-Paul, G. (1992). Fiscal policy in an endogenous growth model. *The Quarterly Journal of Economics*, *107*(4), 1243-1259.

Sargent, T. J., & Wallace, N. (1981). Rational expectations and the theory of economic policy. *Rational expectations and econometric practice*, *1*, 199-214.

Saungweme, T., & Odhiambo, N. M. (2019). Government debt, government debt service and economic growth nexus in Zambia: a multivariate analysis. *Cogent Economics & Finance*, *7*(1), 1622998.

Sawada, Y. (1994). Are the heavily indebted countries solvent? Tests of intertemporal borrowing constraints. *Journal of Development Economics*, *45*(2), 325-337.

Schclarek, A. (2004). Consumption and Keynesian fiscal policy.

Schclarek, A. (2004). Debt and economic growth in developing and industrial countries. *Lund University Department of Economics Working Paper*, *2005*, 34.

Schiffbauer, M. (2007). *Calling for innovations-infrastructure and sources of growth* (No.

DYNREG18).

Schiffbauer, M. (2008). Catching up or falling behind? The effect of infrastructure capital on technology adoption in transition economies. *DYNREG Working Paper.*, (29).

Shah, M. M. H. & P. Shahida (2012), 'External Public Debt and Economic Growth: Empirical Evidence from Bangladesh', *Academic Research International*, Vol. 3, No. 2, pp. 508– 15.

Shi, Y., Guo, S., & Sun, P. (2017). The role of infrastructure in China's regional economic growth. *Journal of Asian Economics*, *49*, 26-41.

Shinjo, K., & Zhang, X. (2004). ICT capital investment and productivity growth: Granger causality in Japanese and the USA industries. In *15th European Regional International Telecommunications Society Conference*.

Shittu, W. O., Hassan, S., & Nawaz, M. A. (2018). The nexus between external debt, corruption and economic growth: evidence from five SSA countries. *African Journal of Economic and Management Studies*, *9*(3), 319-334.

Siddiqui, R., & Malik, A. (2001). Debt and economic growth in South Asia. *The Pakistan Development Review*, 677-688.

Spilioti, S., & Vamvoukas, G. (2015). The impact of government debt on economic growth: An empirical investigation of the Greek market. *The Journal of Economic Asymmetries*, *12*(1), 34-40.

Stanley, T. D., Doucouliagos, H., & Steel, P. (2018). Does ICT Generate Economic Growth? A

Meta-Regression Analysis. *Journal of Economic Surveys*, *32*(3), 705-726.

Swada, Y., & Yoshino, N. (2018). Asian Development Review: Volume 35 No. 1.

Tchereni, B. H. M., Sekhampu, T. J., & Ndovi, R. F. (2013). The impact of foreign debt on economic growth in Malawi. *African Development Review*, *25*(1), 85-90.

Todaro, M. P., & Smith, S. C. (2012). Economic Development, (Addison Wesley).

Udoka, C. O., & Ogege, S. (2012). Public debt and the crisis of development in Nigeria econometric investigation. *Asian Journal of Finance and Accounting*, *4*(2), 231-243.

Uribe, M., & Schmitt-Grohé, S. (2017). *Open economy macroeconomics*. Princeton University Press.

Udeh, S. N., Ugwu, J. I., & Onwuka, I. O. (2016). External debt and economic growth: The Nigeria experience. *European Journal of Accounting Auditing and Finance Research*, *4*(2), 33-48.

Wekesa, C. T., Wawire, N. H., & Kosimbei, G. (2016). Effects of infrastructure development on foreign direct investment in Kenya. *Journal of Infrastructure Development*, *8*(2), 93-110.

Vivien, F., & Briceño-Garmendia, C. (2010, March). Africa's Infrastructure: A Time for Transformation. In *Foster, V. and C. Briceno-Garmendia (2010), Africa's Infrastructure: A Time for Transformation, Africa Development Forum, World Bank, Washington DC*.

Wang, S., Ye, S., & Li, X. (2017, July). The impact of real effective exchange rate volatility on economic growth in the process of renminbi internationalization an empirical study based on VAR model. In *2017 4th International Conference on Industrial Economics System and Industrial Security Engineering (IEIS)* (pp. 1-7). IEEE.

Were, M. (2001). The impact of external debt on economic growth and private investments in Kenya: An empirical assessment. *Kenya Institute for Public Policy Research and Analysis*.

Were, M. (2001). *The impact of external debt on economic growth in Kenya: An empirical assessment* (No. 2001/116). WIDER Discussion Papers//World Institute for Development Economics (UNU-WIDER).

Wooldridge, J. M. (2015). *Introductory econometrics: A modern approach*. Nelson Education.

Wooldridge, M. (2009). *An introduction to multiagent systems*. John Wiley & Sons.

World Bank Group. (2013). *Global financial development report 2014: Financial inclusion* (Vol. 2). World Bank Publications.

World Bank Staff. (2004). *Education in Rwanda: Rebalancing resources to accelerate post-conflict development and poverty reduction*. World Bank Publications.

World Bank. (2013). World Bank development indicators.

World Bank. Development Research Center of the State Council. (2013). *China 2030: Building a modern, harmonious, and creative society*. World Bank.

Yildiz, H., Ide, G., & Malik, S. (2016). The Relationship between Exchange Rate Volatility and Economic Growth: An Example of Turkey. *International Journal of Arts and Commerce*, 47-61.

Yılmaz, D., & Çetin, I. (2017). The impact of infrastructure on growth in developing countries:

Dynamic panel data analysis. In *Handbook of research on economic, financial, and industrial impacts on infrastructure development* (pp. 40-68). IGI Global.

Yusuf, S., & Said, A. O. (2018). Public Debt and Economic Growth: Evidence from Tanzania. *Journal of Economics, Management and Trade*, 1-12.

Zeno, E., Müller, G. J., & Scholl, A. (2008). How do Fiscal and Technology Shocks affect Real Exchange Rates? New Evidence for the United States. *Center for Financial Studies, Working Paper, 22*.

Zouhaier, H., & Fatma, M. (2014). Debt and economic growth. *International Journal of Economics and Financial Issues*, *4*(2), 440-448.