

**AN INVESTIGATION INTO THE IMPACT OF FISCAL POLICY ON
INVESTMENT IN NAMIBIA FROM 1990 TO 2017**

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ABSTRACT

Evidence from the credit rating agencies that resulted in the sovereign credit downgrade for Namibia, informed of the need to investigate fiscal policy's ability to influence investment. Hence, this study investigated the impact of fiscal policy on investment by considering the following variables: taxes, government spending and investment. It employed the bounds testing (ARDL) approach to cointegration to examine the long-run and short-run relationships between fiscal policy and investment in Namibia for the period 1990 to 2017. The ARDL model revealed a positively significant relationship between independent variables government expenditure, total revenue, gross domestic product, real interest and the dependent variable: investment. Error correction term (ECT) from the study was negative and statistically significant. The results of the ECT revealed an average speed of 79.11% for variables to adjust from any disequilibrium back to the long-run equilibrium annually. Furthermore, unit root tests (Augmented Dickey Fuller (ADF) and the Phillips-Perrons (PP), were employed to investigate for stationary / non-stationary of the series the test was applied), diagnostic tests (Normality test, Serial correlation LM test and Heteroscedasticity test are applied) and stability tests (the CUSUM test was used to test for existence of any instability of the coefficients and whether or not the model exhibited some structural changes over the study period) were used to ascertain the fitness of the model. The study recommends policy-makers to thoroughly review monetary and fiscal policy, applying the relevant policy mix at the most effective and efficient timeframe. Balancing the two policies is very critical to investment and economic growth as investors and other agents of growth are heavily dependent on prudent monetary and fiscal policy stance.

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LIST OF ACRONYMS

ADF	Augmented Dickey-Fuller
ARDL	Autoregressive Distributed Lag
BON	Bank of Namibia
ECT	Error Correction Term
FIM	Financial Institution Management Bill
GDP	Gross Domestic Product
GE	Government Expenditure
I	Investment
PP	Phillips-Perron
MOF	Ministry of Finance
MTEF	Medium Term expenditure Framework
NFSS	Namibia Financial Sector Strategy
NSX	Namibia Stock Exchange
NPC	National Planning Commission
TR	Total Revenue
RI	Real Interest

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DEDICATION

The project is highly dedicated to my beloved wife, Ms. Oscarline Vizakuje Karipata Kandingua, for her unceasing financial, moral support and encouragement throughout my studies. Without her dedicated support, this project could not have been realised. Her patience and perseverance played a very critical role in me persevering with this research project.

I also dedicate this work to my darling Sons Uatuna and Uzuva Kandingua, they are my inspiration and my pillar of strength. I did it for them.

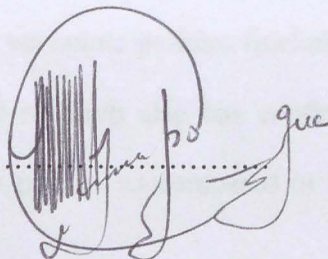
DECLARATIONS

I, Godfried Kandingua, hereby declares that this study is my own work and is a true reflection of my research, and that this work, or any part thereof has not been submitted for a degree at any other institution.

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Godfried Kandingua

A handwritten signature in black ink, enclosed within a hand-drawn circle. The signature is stylized and appears to read 'Godfried Kandingua'.

Date

APRIL 2020

CHAPTER ONE

INTRODUCTION

1.1 Background of the study

Governments use fiscal policy to influence the level of aggregate demand in the economy, in an effort to achieve the economic objectives of price stability, full employment, and economic growth. According to Keynesian economics, when the government changes the levels of taxation and government spending, they influence aggregate demand and the level of economic activity (Keynes, 2017). Fiscal policy is often used to stabilize the economy over the course of the business cycle (Keynes, 2017).

The importance of private investment for growth and development in the developing countries is a well-established fact. Equally important is the response of private investment to changes in economic policies (including fiscal policy) of the government (Malik, 2013). Empirical research also has confirmed a much larger role of private investment in the growth process as compared to the public investment (Reinhart and Khan, 1989).

Government investment seems to be perfect for stabilising recessions. In the short term, government investment can be an equaliser for falling private demand by increasing purchase of goods and services; while in the long term, government investment may become productive public capital, promoting economic growth (Alesina, Ardagna, Perotti, and Schiantarelli, 1999).

There is an inverse relationship between government expenditure and investment whereby an increase (reduction) of public spending reduce (increase) profits and, therefore, investment (Alesina, Ardagna, Perotti, and Schiantarelli, 1999). Similarly, an increase (reduction) in taxes reduces (increase) profits and investment, but the magnitude of these tax effects is smaller than those on the expenditure side (Alesina *et al.*, 1999).

Fiscal policy is the most effective policy instrument that the Namibian government has employed over the past 29 years to influence and balance the economy, using taxes and spending (First Capital, 2019). According to this report the Namibian economy grew above 7 percent both in 1991 and 1992, before it registered negative growth of 1.6 percent in 1993. The new government inherited a huge infrastructure backlog especially in the areas of education, health, housing, water and electricity supply, roads and telecommunications infrastructure. The report further indicated that GDP growth increased from an average of 1.1 percent during the period 1981 to 1989 to an average growth of 4.1 percent from 1990 to 2005. Despite high growth in government expenditure, government deficit as a percentage of GDP remained relatively low at an average of 3 percent of GDP (First Capital, 2019).

In addition, a higher average GDP growth of 5.6 percent compared to 4.1 from 2006 to 2015 was achieved through high government spending. However, during the same period, the debt to GDP percentage increased after reaching a low of 15 percent in 2009/10 to 24 percent in 2014/15 (First Capital, 2019).

The dual listing of shares at the NSX has complicated the saving-investment process whereby funds invested through the companies find it way out of the economy to South Africa. To address this concern the study recommends that the Namibia Stock Exchanges must play an active role in identifying and grooming potential domestic companies and eventually list them. This process will help to facilitate the process of keeping funds invested through the NSX to remain in the economy and trickle down to productive investment, i.e. employment creation (Uanguta, Haiyambo, Kadhikwa and Chimani, 2004).

Private Investment: It is the accumulation of physical and liquid stock for productive purposes. This is done by private persons who could be nationals or foreigners in the country. It is the capital accumulation by the private agents for productive purposes. Private investment refers to investment by private business for the purpose of profit generation (Kumo, 2006). In this study it was obtained by deducting government investment from gross fixed capital formation.

Public Investment: According to the IMF (2014) Public investment is measured as general government gross fixed capital formation (GFCF) and comprises the total net value of general government acquisitions of fixed assets during the accounting period, plus variations in the valuation of non-produced assets. In this study, public investment comprised of all other investments that were not private investments.

In Namibia the private sector has remained the primary basis of growth and job creation (Motlaleng, Ntsosa, and Nanjunga, 2011). For instance, from 1990 to 2008 gross capital formation by the private sector on average was 16.6% per annum as a percentage of real GDP (Motlaleng *et al.*, 2011). This 16.6% of gross capital formation by the private sector per annum includes private investments from abroad. According to Motlaleng *et al.*, (2011) at the same time the government internal debt had been increasing and by 1990 the total outstanding internal debt was N\$29 Million.

Fiscal Policy is complicated because it is not just a matter of increasing government spending, we have to take into account how Central Banks, Investors (Businesses) and Consumers respond to Fiscal policy. Therefore, an investigation into the impact of fiscal policy on investment became imperative.

1.2 Statement of the problem

Namibia's international credit rating position has been downgraded in terms of the Moody rating criteria to a rating position of Baa3-. This is the minimum floor below which the rating becomes sub-investment or considered risky (Schlettwein, 2017). This essentially put Namibia's international debt issuances into a junk status and subsequently affects the country's investment. According to Hamoudi (2016) the fiscal policy is considered as policy tool for fostering sustainable economic development and eliminate the problems hindering economic stability especially in the developing countries.

Malik (2013), found that the fiscal policy has both a direct and indirect impact on investment while Hassan and Friday (2015) discovered a negative impact of government expenditure and a positive impact of corporate tax on investment. Generally, countries have different approaches in executing fiscal policy, which cannot be generalised to Namibia. At present, there are limited studies done on the impact of fiscal policy on investment in Namibia. Based on the literature gap, the recent downgrading and the fiscal policy's ability to influence investment, it became important to study the relationship between fiscal policy variables (taxes, government spending) and investment.

1.3 Objectives of the study

The purpose of this study was to investigate the impact of fiscal policy on investment in Namibia from 1990 to 2017. To achieve this aim, the following specific research objectives were formulated:

- To examine the effects of various taxes on investment in Namibia
- To analyze the impact of various government spending on investment in Namibia.

The following direct and indirect taxes are levied in Namibia:

- Corporation tax (applicable to Companies, Close Corporations and External Companies)
- Personal income tax
- Withholding tax
- General sales tax
- Additional sales levy
- Other taxes include: transfer tax, stampduty, customs duty and municipal rates.

In regard to this study the total revenues emanating from the aforesaid tax types will be used in research objectives.

1.4 Hypotheses of the study

The following hypotheses will be tested;

H₀: Taxes do not affect investment in Namibia.

H₁: Taxed do affect investment in Namibia.

H₀: government spending does not affect investment in Namibia.

H₁: government spending affects investment in Namibia

1.5 Significance of the study

The study will set a clear understanding of the relationship between fiscal policy variables particularly government spending and taxes on investment, when the government applies expansionary or contractionary fiscal policy. Currently, Namibia has a budget deficit, implying that the government spends more than it earns (Ministry of Finance, 2017). The deficit is funded via loans from large international bodies through issuances of Euro Bonds and Treasury Bills. Downgrading also has a negative impact on the equity market as investors deem the sovereign's assets to be more-risky. It is therefore, imperative that the government strives towards credit worthiness in order to maintain positive credit ratings and enhance investment.

In addition, the findings from the study will provide guidance to government in terms of the fiscal policy stance to apply during economic downturn in order to improve economic growth. Hence, these will be well executed when the relationship between fiscal policy and investment is established.

1.6 Limitation of the study

The main limitation of the study was the limited scope, that is, Namibia alone being the subject of study which limits the generalisation of the results. Moreover, the study only examined the relationship between fiscal policy and investment between 1990 and 2017. The study only collected data for 26 years since Namibia gained independence in 1990

and time series data for all variables was only available during this period. The availability of empirical literature on the specific subject also served as a minor challenge as only limited sources were available for review.

1.1 Introduction

1.7 Delimitation of the study

The purpose of this study was to investigate the impact of fiscal policy on investment in Namibia from 1990 to 2017. The choice of the study period was informed by availability of data and the magnitude of the problem on the study periods.

1.2 Theoretical literature

Turkey (1995) stated that theories are formulated to explain, predict, and understand phenomena and, in many cases, to challenge and extend existing knowledge within the limits of the critical thinking discipline. In this study, the theoretical framework introduces and describes the theory which explains why the research problem under study exists. The theories below were found relevant to the study, in investigating the impact of fiscal policy on investment in Namibia.

1.1.1 Keynesian Theory

Keynesian economics is an economic theory of total spending in the economy and its effects on output and inflation. Keynesian economics was developed by the British economist John Maynard Keynes during the 1930s in an attempt to understand

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter reviewed the theoretical and empirical literature relevant to the impact of fiscal policy on investment. Theoretical review highlights three theories namely; the Keynesian Theory, Classical Theory, and Neoclassical Theory of Investments. The chapter also reviewed literature on fiscal policy, economic growth, public and private investment. Finally, this chapter gives a summary and highlights on the gaps and issues reviewed as well as the conceptual framework.

2.2 Theoretical literature

Torraco (1997) stated that theories are formulated to explain, predict, and understand phenomena and, in many cases, to challenge and extend existing knowledge, within the limits of the critical bounding assumptions. In this study, the theoretical framework introduces and describes the theory which explain why the research problem under study exists. The theories below were found relevant to the study, in investigating the impact of fiscal policy on investment in Namibia.

2.2.1 Keynesian Theory

Keynesian economics is an economic theory of total spending in the economy and its effects on output and inflation. Keynesian economics was developed by the British economist John Maynard Keynes during the 1930s in an attempt to understand

the Great Depression. Keynes advocated for increased government expenditures and lower taxes to stimulate demand and pull the global economy out of the depression.

Subsequently, Keynesian economics was used to refer to the concept that optimal economic performance could be achieved and economic slumps prevented by influencing aggregate demand through activist stabilisation and economic intervention policies by the government. Keynesian economics is considered a "demand-side" theory that focuses on changes in the economy over the short-run.

According to Keynes, the aggregate demand has a short-run effect on output, income and employment. During business cycle, active stabilization policy is the best way to cure the economy. During recession, government should run a deficit budget by increasing spending or cutting taxes. In addition, when the government changes the levels of taxation and government spending, it influences aggregate demand and the level of economic activity (Keynes, 2017). Fiscal policy is often used to stabilize the economy over the course of the business cycle.

Macroeconomic theory and particularly Keynesian models provide several practical insights to policy makers on how to implement fiscal policy to alleviate the adversary effects of business cycle fluctuations (Halkos, 2015). It is cited in Soli (2008), that government activity may increase total output through its interaction with the private sector. It is argued that changes in government spending and taxation affect corporate profits and thus private investments. According to Hassan & Friday (2015), fiscal policy has a significant impact on investment expenditure in Nigeria.

2.2.2 Classical Theory

In the classical economy theory, it is assumed that output and prices will eventually return to a state of equilibrium, but the Great Depression seemed to counter this assumption. Output was low and unemployment remained high during this time. The Great Depression inspired Keynes to think differently about the nature of the economy. From these theories, he established real-world applications that could have implications for a society in economic crisis. Keynes rejected the idea that the economy would return to a natural state of equilibrium. Instead, he envisaged economies as being constantly in flux, both contracting and expanding. This natural cycle is referred to as boom and bust. In response to this, Keynes advocated a countercyclical fiscal policy in which, during the boom periods, the government ought to increase taxes or cut spending, and during periods of economic woe, the government should undertake deficit spending.

2.2.3 Neoclassical Theory

Tobin (1969) developed a neo-classical model in an attempt to explain investment behaviour. According to neo-classical theory of investment, private investment is influenced by the growth rate of real GDP and the user cost of capital. Neoclassical economists do not believe in "fine-tuning" the economy. They believe that economic growth is fostered by a stable economic environment with a low rate of inflation. Similarly, tax rates should be low and unchanging. In this environment, private economic agents can make the best possible investment decisions, which will lead to optimal investment in physical and human capital as well as research and development to promote improvements in technology.

Neoclassical economists tend to put relatively more emphasis on long-term growth than on fighting recession, because they believe that recessions will fade in a few years and long-term growth will ultimately determine the standard of living. They tend to focus more on reducing the natural rate of unemployment caused by economic institutions and government policies than the cyclical unemployment caused by recession.

In theory, when monetary policy is at the effective lower bound, fiscal policy may even be more effective than previously realized. This is because monetary policy will not partially offset fiscal policy through either an interest-rate channel or an exchange-rate channel. In fact, fiscal policy could even crowd in additional private investment to the degree that expanded aggregate demand raises growth rates and thus increases investment growth, as predicted by the standard accelerator model for investment that has done a reasonably good job explaining recent trends in investment (IMF 2015; OECD 2015).

2.3 Empirical literature

According to Zikmund, Babin, & Griffin (2010), empirical literature review is a directed search of published work which includes books and periodicals. Among the authors who carried out empirical studies, some of their findings are presented below.

According to the study done by Isaac & Samwel (2012), on the effects of fiscal policy on private investment in Kenya. The results indicated that fiscal policy impacts on investment and investment plays a major role in the determination of the economic growth in Kenya, the study uses a time series data from 1973 to 2009.

The study adopted two stage instrumental variable estimation method to perform our regression analysis because of its adaptability. However, Njuru (2012) states that fiscal policy design and implementation matters to private investment levels in Kenya and the study found that taxes, government expenditure, government debt servicing and fiscal reforms could either promote or deter private investment both in the short-run and in the long-run.

Akpo, Hassan & Friday (2015) conducted a study with a view to examine the impact of fiscal policy on investment expenditure in Nigeria. It covers the period of 1970 to 2010. A multiple regression model was used in study to assess the impact of fiscal policy on investment, using government expenditure, gross domestic product and corporate income tax. The estimation technique used in the study was the ordinary least squares (OLS) method. The study revealed that fiscal policy has a significant impact on investment expenditure in Nigeria.

Government expenditure and gross domestic product have significant impact on investment, but corporate income tax has a positive, instead of a negative, impact on investment expenditure in Nigeria. Based on the findings, it is therefore recommended that the government should use an expansionary fiscal policy to encourage increase in investment in Nigeria and government spending should be channelled to capital projects and social overhead capital that will encourage investment, such as constant electricity supply and good road networks.

Similarly, Hamoudi (2016) examined the impact of fiscal on investment in Libya. The study covers the period of 2000 to 2015 and it selected the multiple model to evaluate the effect of the fiscal policy on the investment spending by using the gross domestic product, the government spending.

The study revealed that the gross domestic product has a positive effect on the investment spending in Libya and growth in gross domestic product (GDP) will lead to the expansion of investment spending in during the study period (2000-2015).

Moreover, Egbetunde, & Fasanya (2013) analysed the impact of public expenditure on economic growth in Nigeria during the period 1970 to 2010 making use of annual time series data. The study employs the bounds testing (ARDL) approach to examine the long-run and short-run relationships between public expenditure and economic growth in Nigeria. The bounds test suggested that the variables of interest put in the framework are bound together in the long-run. The associated equilibrium correction was also significant confirming the existence of long-run relationships. The findings indicated that the impact of total public spending on growth to be negative which is consistent with other past studies. Recurrent expenditure however was found to have little significant positive impact on growth.

Hussain, & Zafar (2017) examined the relationship between health expenditure, expenditure on education, Gross Fixed Capital Formation, Military Expenditure, Fiscal Balance (Deficit) and economic growth in Pakistan. The period of study is from 1972 to 2015. ARDL Bounds Testing approach for cointegration and ECM Technique were applied to study the long-run and short-run relationship among the above-mentioned variables. "Granger Causality Test" was applied to find out the direction of causality. The results reveal long-run relationship between Military Expenditure, Gross Fixed Capital Formation, Fiscal Balance and Economic Growth. The results of "ECM" show the short-run relationship among these variables. However, there is no long-run relationship between Health Expenditure, Expenditure on Education and Economic Growth. It was concluded that fiscal policy has an important role in boosting economic growth.

In a recent study Omitogun (2018) investigated the crowding out effect of government expenditure on private investment in Nigeria using annual data spanning from 1981 to 2015. The estimation techniques of the study included pre-and post-estimation, including descriptive statistics, correlation matrix, a unit root test and econometric estimation using the Auto Regressive Distributed Lag (ARDL) method. Government capital expenditures were estimated marginally, while recurrent expenditures are estimated in terms of elasticity, as the variables (recurrent expenditures) show a strict long tail to the right. It was observed in general that the effect of government expenditure on private investment depends on the components of the expenditure. Some were found to crowd out private investment while some crowd in private investment.

Furthermore, Hermes, & Lensink (2001) analysed the impact of fiscal policy on private investment for a sample of thirty-three Less Developed Countries (LDCs). The study found that an increase in both the tax burden and the deficit/GOP ratios during the eighties and beginning of the nineties, have impacted negatively on FDI and, therefore, on economic growth in the country. In addition, the empirical results from the study showed that a lot will have to be done to transform the South African economy into an investor friendly environment. Apart from pure economic reasons based on market principles, government policy (especially also fiscal policy), plays a major role in this regard. Of special importance are the deficit before borrowing and the relative tax burden on prospective investors in South Africa.

In addition, Alesina, Ardagna, Perotti, & Schiantarelli (1999) evaluated the effects of fiscal policy on investment using a panel of **OECD** countries. In particular, the study focused on how different types of fiscal policy affect profits and, as result, investment. The study found a sizable negative effect of public spending and in particular of its public wage component on business investment. Further, the study indicated that results were consistent with models in which government employment creates wage pressure for the private sector and various types of taxes also have negative effects on profits, but, interestingly, the effects of government spending on investment are larger than the effect of taxes. Also, the study states that the results have important implications for the so called "non-Keynesian" (i.e. expansionary) effects of fiscal adjustments.

Schoeman, Robison, & de Wet (2000) did an investigation on the impact of fiscal policy on foreign direct investment (FDI) in South Africa during the past 30 years. Casual empirical analysis reveals a definite linkage between FDI flows and variables such as the deficit/GDP ratio, representing fiscal discipline, and the tax burden on foreign investors. The relationship was substantiated by econometric analysis. Given the economy's large degree of dependence on foreign capital, the government may contribute to an investor-friendly environment by adjusting fiscal policy. Some inroads have been made in this regard with the government's Medium-term Expenditure Framework (MTEF), which projects a policy of strict fiscal discipline in years to come. However, the tax burden is still relatively high and, due to its impact on foreign direct capital flows, requires urgent attention.

Another study by Banga (2003) examined the impact of government policies and investment agreements on Foreign Direct Investment inflows. The study used aggregate FDI inflows to fifteen developing countries of South, East and South East Asia for the period 1980-81 to 1999-2000 and separate analyses for FDI from developed and developing countries. The study based on random effects model showed that fiscal incentives do not have any significant impact on aggregate FDI, but removal of restrictions attracts aggregate FDI. However, FDI from developed and developing countries are attracted to different selective policies.

While lowering of restrictions attracts FDI from developed countries, fiscal incentives and lower tariffs attract FDI from developing countries. The study further indicated that BITs, which emphasize non-discriminatory treatment of FDI, are found to have a significant impact on aggregate FDI. But it is BITs with developed countries rather than developing countries that are found to have a significant impact on FDI inflows to developing countries.

Moreover, Afonso & Jalles (2011) in their study to assess linking Investment and Fiscal Policies. The study assesses the relevance of budgetary components for private and public investment using data for a panel of 95 countries for the period 1970-2008, and accounting for the usually encountered econometric pitfalls. The study revealed a positive effect attributed to total government expenditures and to public investment in fostering private investment, and negative effects of government expenditure on wages and government consumption spending on private investment. Finding from the study showed that interest payments and subsidies have a negative effect on both types of investment (particularly in the emerging economies sub-group). Social security spending has a negative effect on private investment for the full and OECD samples, whereas government health spending has a positive and significant impact on private investment

In a study of the relationship between government investment and fiscal stimulus in the United States, Leeper, Walker, & Yang (2010) used an estimated neoclassical growth model to study the effects of government investment. The analysis focused on two dimensions that are critical for understanding government investment as a fiscal stimulus: implementation delays for building public capital and expected fiscal adjustments to deficit-financed spending. The study revealed that implementation delays can produce small or even negative labour and output responses to increases in government investment in the short-run. Anticipated fiscal adjustments matter both quantitatively and qualitatively for long-run growth effects. The study also, found that when public capital is insufficiently productive, distorting financing can make government investment contractionary at longer horizons.

Muyaba (2016) analysed the effects of government expenditure on economic growth in Zambia. The study used secondary data which was sourced from the Zambian Ministry of Finance and World Bank websites for the period from 1991 to 2015. The data was analysed using E-Views 9.5 student version. The econometric tools used to analyse the data are the Autoregressive Distribution Lag (ARDL) and the Pairwise Granger Causality Test. The variables included in the research are public expenditure and economic growth. Both variables were stationary at first difference. Empirical finding from the study indicates that there is a positive and significant relationship between public expenditure and economic growth in Zambia both in the short-run and the long-run.

Further, Granger causality test demonstrated a unidirectional causality from public expenditure to economic growth. This finding validated the fact that the Zambian fiscal environment is aligned to the Keynesian theory as opposed to Wagner's Law.

Osinowo (2015) broadly examined the effect of fiscal policy on sectorial output growth in Nigeria for the period of 1970-2013. The study employed an Autoregressive Distributed lag (ARDL) and Error Correction Model (ECM). The results showed that total fiscal expenditure (TEXP) have positively contributed to all the sectors output with an exception of agriculture sector. The findings established that manufacturing sector has a positive relationship with all the determinant variables, while inflation rate has negatively impacted output growth of the various sectors with an exception of manufacturing sector. The study concluded that the existence of disparity in the sectorial response to fiscal policy variables underscored the difficulty of conducting uniform and economic wide fiscal policy in Nigeria. Therefore, the best policy approach is to adopt sector specific policy based on their relative strength and significance in each sector of the economy within the overall fiscal policy mechanism framework.

Jeong (2014) analysed the effects of fiscal policy and assessing its sustainability. Using a sequence of econometric models, three key issues concerning fiscal policy are examined.

The first issue is related to the transmission mechanism for fiscal policy shocks in Korea. VAR models are employed to evaluate the macroeconomic effects of fiscal policy shocks on GDP and the labour markets. The second issue is the sustainability of government debt in three selected countries (Korea, the United Kingdom, and the United States). Several different approaches, such as Johansen's cointegration tests, ARDL bounds tests, and Bohn's fiscal reaction function tests, are employed to check the existence of long-run equilibrium between the variables. The third issue is concerned with the effects of fiscal consolidation on macroeconomic activity. A dynamic panel GMM model is used to examine whether fiscal consolidation has positive effects on GDP and a panel probit model is used to investigate the main determinants of the successful fiscal consolidation that reduce the debt-to-GDP ratios.

The main findings from the study were as follows. Firstly, government spending has a positive effect on output and its components. In particular, current government spending has a negative effect on private consumption, while capital government spending has a positive effect. When it comes to the labour market, each type of government spending has a positive effect. However, capital government spending is likely to boost the labour market more effectively than current government spending. Meanwhile, a net tax rise causes a significant fall in output but shows ambiguous effects on the labour market. Secondly, according to the results of Johansen's cointegration tests and ARDL bounds tests, there is a cointegrating relationship between the variables in Korea and the US, but not in the UK.

That means fiscal policy in Korea and the US is sustainable, while fiscal policy in the UK is not. A modified Bohn's tests, which estimate the response of primary surplus to government debt, also support the above conclusion. Thirdly, the estimation results show that fiscal consolidation is not likely to be expansionary in terms of GDP growth. The results also show that fiscal consolidation in time of high debt-to-GDP ratios, the spending-base, or high sovereign risk has fewer negative effects on economic growth than fiscal consolidation in time of low debt-to-GDP ratios, the tax-base, or low sovereign risk. The economic growth rate, government spending-based fiscal consolidation, low long-term interest rates, and higher sovereign risk have significant effects on reducing debt-to-GDP ratio. By contrast, the results suggest that the size of fiscal consolidation, exchange rates, and unemployment rate have positive but statistically insignificant effects on reducing debt-to-GDP ratio.

Hashikutuva (2016) analysed the impact of financial development (measured by depth, stability, efficiency and access) on private investment in South Africa over the period 1977 (Q1) to 2015 (Q4). Autoregressive distributive lag model was used in addition to conducting further tests to establish the efficiency of the model using standard diagnostics which confirmed the overall significance of the model. The results find the relationship between financial development and private investment in South Africa to be long-run in nature.

The statistically significant variables found to explain the variance of private investment for South Africa in both the short- and long-run are market capitalization, domestic credit, growth in output as well as trade openness. Interest rate spread was found significant only in the short-run.

Kingori (2015) analysed the determinants of private investment in Kenya. The problem of ambiguous results of existing studies, mainly stemming from inappropriate econometric methods, called for further study of methodology and empirical model building. Results from numerous studies that have employed autoregressive distributed lag (ARDL) approaches are more likely to be persuasive than their predecessors. Primary objectives of the study were investigation of determinants of private sector investment and determination of the causal relationship between private sector investment and real gross domestic product. Various specific economic indicators were the data type of interest since the study was purely of economic nature. The study used secondary data, sourced from World Bank and International Monetary Fund. An advanced econometric technique, the ARDL model, was employed in data analysis to help in addressing the objectives that the study sought to address. The study found that real Gross Domestic Product (GDP) and trade openness were the main determinants of private investment in the long run. However, in the short run, real GDP remained an important variable in explaining variations in private investment while openness was no longer important switching with inflation which was found to be important.

There is a unidirectional causality effect where private investment granger causes real GDP and not vice versa recommending deeper understanding of factors that influence GDP in the long run and short run. Gross domestic product being a major determinant of private sector investment informs and guides policy makers in quest to providing stable macroeconomic conditions in the economy. Moreover, to ensure sustainable economic development it's upon policy makers to ensure that local industries are protected since the results indicate an inverse relationship between private investment and trade openness which is a proxy to liberalization.

Ocran (2009) carried out a study seeking to examine the effect of fiscal policy variables on economic growth in South Africa. The fiscal policy variables considered in the study include government gross fixed capital formation, tax expenditure and government consumption expenditure as well as budget deficit. The study covered the period 1990 to 2004. Quarterly data was used in the estimation with the aid of vector regressive modelling technique and impulse response functions. The outcome supports four key conclusions. First, government consumption expenditure has a significant positive effect on economic growth. Gross fixed capital formation from government also has a positive impact on output growth but the size of the impact is less than that attained by consumption expenditure. Tax receipts also have a positive effect on output growth. However, the size of the deficit seems to have no significant impact on growth outcomes

2.4 Summary

From the above theoretical and empirical discussion, it is evident that there is little discussion on the effect of fiscal policy on investment in Namibia. There is scarce information available in regard to the effect of fiscal policy on investment in Namibia. This study therefore contributes to the literature by studying the effects of fiscal policy on investment in Namibia. The next chapter dwells on the research methods applied in the research.

2.5 Research Design

The study employed a causal comparative design of time series analysis. This design was appropriate as it enabled the researcher to quantify the impact of fiscal policy and investment through an Autoregressive Distributed Lag model.

2.6 Data sources and description

The study used annual time series data for the period 1995 to 2017 obtained from Ministry of Finance (MFP) Annual Reports, National Statistical Agency (NSA), National Association of Bank of Namibia (NAB) and World Bank Government

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter is made up of eleven sections. The first section describes the research design, the second section discusses data sources and description, the third section presents model specification, the fourth section consists of data procedure and analysis, the fifth section presents stationary test, the sixth section presents the diagnostics tests, the seventh determines the optimal lag structure, the eighth section discusses the estimation of the ARDL model, the ninth section presents the stability test, the tenth section discusses the ARDL bound test and the last section presents the definition and measurement.

3.2 Research Design

The study employed a causal comparative design of time series analysis. This design was appropriate as it enabled the researcher to quantify the impact of fiscal Policy and investment through an Autoregressive Distributive Lag model.

3.3 Data sources and description

The study used annual time series data for the period 1990 to 2017 obtained from Ministry of Finance (MOF) Annual Reports, Namibia statistics Agency (NSA) - National Accounts, and Bank of Namibia (BON). Collected data are Government

expenditure (GE), Tax revenues (TR), Gross Domestic Product (GDP), Investment (I) and Real Interest (RI).

In this study the dependent variable was investment and the independent variables were Government expenditure, Tax revenues, Gross Domestic Product and Real Interest. The real interest values rate has a negative value which needed to be transformed to positive value using the following formula, because it produces a blank result in Eviews and the investor would not invest where negative interest rates prevails.

$$\ln ri = @recode(ri > 0, \log(1 + ri), -\log(1 - ri))$$

3.4 Model specification

The Autoregressive Distributed Lag (ARDL) model adapted by Egbetunde, & Fasanya (2013), Hussain, & Zafar (2017), and Omitogun (2018) shall be applied in this study to investigate the impact of fiscal policy on investment in Namibia. The adopted model was modified to suit the availability of data used in the study. The technique applied (ARDL model) is appropriate, in the context that the sample size is small, which is the general problem in Namibia.

The standard form of the model was specified as follows:

$$I = f(GE, TR, GDP, RI) \quad (1)$$

Where:

I = Investment

GE = Government expenditure

TR = Tax revenue

GDP = Gross Domestic Product

RI = Real Interest

The dependent variable was Investment and the independent variables were Government expenditure, Tax revenue, Gross Domestic Product and Real interest in this study.

The error correction version of ARDL model can be written as follow;

$$\Delta \ln I_t = \beta_0 + \sum_{i=1}^n \beta_1 \ln I_{t-i} + \sum_{i=1}^n \beta_2 \ln GE_{t-i} + \sum_{i=1}^n \beta_3 \ln TR_{t-i} + \sum_{i=1}^n \beta_4 \ln GDP_{t-i} + \sum_{i=1}^n \beta_5 \ln RI_{t-i} + \delta_1 \ln I_{t-1} + \delta_2 \ln GE_{t-1} + \delta_3 \ln TR_{t-1} + \delta_4 \ln GDP_{t-1} + \delta_5 \ln RI_{t-1} + \varepsilon_t \quad (2)$$

Where:

$\ln I$ = log of Investment

$\ln GE$ = log of Government expenditure

$\ln TR$ = log of Tax revenue

$\ln GDP$ = log of Gross Domestic Product

$\ln RI$ = log of Real Interest

ε = Error term (white noise disturbance error term)

$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5$ Refer to short-run and $\delta_1, \delta_2, \delta_3, \delta_4, \delta_5$, to long-run parameters.

The bound test output will be deduced from on equation (3) to test for the long-run relationship between the fiscal policy and investment based on the Wald test (F statistic).

The hypothesis is shown below:

$$H_0 : \delta_1 = \delta_2 = \delta_3 = \delta_4 = \delta_5 = 0$$

$$H_1 : \delta_1 \neq \delta_2 \neq \delta_3 \neq \delta_4 \neq \delta_5 \neq 0$$

The rejection of the null hypothesis based on the F-Statistic, which suggest there is cointegration relationship. The procedure was adopted for the following three reasons: Firstly, the bounds test procedure is simple. As opposed to other multivariate cointegration techniques such as Johansen and Juselius (1990), it allows the cointegration relationship to be estimated by OLS once the lag order of the model is identified. Secondly, the bounds testing procedure does not require the pre-testing of the variables included in the model for unit roots unlike other techniques such as the Johansen approach. It is applicable irrespective of whether the regressors in the model are purely I (0), purely I (1) or mutually cointegrated. Thirdly, the test is relatively more efficient in small or finite sample data sizes as is the case in this study. The procedure will however crash in the presence of I (2) series. . If the cointegration property is

supported an error correction model will the following error correction version will be estimated.

Error Correction Model (ECM) representation is specified as follows:

$$\Delta \ln I_t = a_0 + \sum_{i=1}^n a_{1i} \Delta \ln I_{t-i} + \sum_{i=1}^n a_{2i} \Delta \ln GE_{t-i} + \sum_{i=1}^n a_{3i} \Delta \ln TR_{t-i} + \sum_{i=1}^n a_{4i} \Delta \ln GDP_{t-i} + \sum_{i=1}^n a_{5i} \Delta \ln RI_{t-i} + \lambda ECT_{t-i} + \ell_t$$

$\lambda = (1 - \sum_{i=1}^p \delta_i)$, speed of adjustment parameter with a negative sign

ECT , the error correction term is the extracted residuals from the regression of the long-run equation.

a_{1i}, a_{5i} , are the short-run dynamic coefficients of the model's adjustment long-run equilibrium.

$d(\ln i) \quad d(\ln i(-1)) \quad d(\ln ge(-1)) \quad d(\ln tr(-1)) \quad d(\ln gdp(-1)) \quad d(\ln ri(-1)) \quad ecm(-1)$

The limitation of the ARDL approach is that it restricts only one level-relationship among the variables under consideration and does not allow for a greater number of long-run relationships (Pesaran *et al.*, 2001). However, the strength of ARDL model is more suitable for a sample size that is less than thirty (30).

ARDL bound Test Interpretation

investigate for stationary / non-stationary of the series the Augmented Dickey Fuller (ADF) test and the Phillips-Perrons (PP) test was applied.

Under this test the ADF / PP value under t-Statistics is compared to the critical value at 1%, 5% and 10%. The ADF/ PP value should be more negative than the critical value in order to reject the null hypothesis. The ADF and PP statistic tests for the null hypothesis of the presence of Unit root against the alternative hypothesis on non-presence of unit root. Stationarity of time series data is important as this prevents problems during the empirical analysis, if data that is not stationary is used the results will be nonsensical. When variables are to be non-stationary at a level, the test is repeated at first difference to check if they are not stationary and it continues.

3.7 Diagnostic Test

Diagnostic test requires an examination of the residuals. The implication is that if the residuals exhibits the problems of heteroscedasticity, serial correlation, and non-normality will eventually leads to bias conclusion. To detect and correct these problems, the Normality test, Serial correlation LM test and Heteroscedasticity test are applied.

3.7.1 Normality Test

Normality tests were used to determine if the data set was well-modelled by a normal distribution and to compute how likely it is for a random variable underlying the data set to be normally distributed. It measures goodness of fit a normal model to the data – if the fit is poor then the data is not well modelled in that respect by a normal distribution,

without making a judgment on any underlying variable. The null hypothesis stated that the data/ model follows a normal distribution, while the alternative denotes that a model does not follow a normal distribution.

3.7 Estimation of the ARDL model

3.7.2 Serial Correlation LM Test

The correlation LM test is a test for autocorrelation in the errors in a regression model. It makes use of the residuals from the model being considered in a regression analysis, and a test statistic is derived from these. The null hypothesis of this test indicates that the model does not suffer from autocorrelation, while the alternative indicates that the model suffers from autocorrelation. The decision rule is that if the p -value > 0.05 level of significance then the model does not suffer from autocorrelation.

3.7.3 Heteroscedasticity Test

Heteroscedasticity is a collection of random variables and it tests whether there are sub-populations that have different variabilities from others. Thus, heteroscedasticity is the absence of homoscedasticity. The null hypothesis of this test indicates that the model is homoscedasticity, while the alternative indicates that the model is heteroscedasticity.

3.8 Determine optimal lag structure

The optimal lag length for an ARDL, tells how far in the past one can go to deduce the predictive influences of one variable over the other. An appropriate lag length entails a well specified ARDL. There are various information criteria to be used in estimating the optimal lag length. This study will use the Akaike (AIC) and Schwarz-baysian (SC)

information criterions. The optimal length then lies where the two information criterions are at their lowest values. (*) indicates lag order selected by the criterion.

3.9 Estimation of the ARDL model

The ARDL test is conducted to investigate the short-run and long-run dynamics.

$$d(\ln i) + c d(\ln i(-1)) + d(\ln ge(-1)) + d(\ln tr(-1)) + d(\ln gdp(-1)) + d(\ln ri(-1)) + \ln i(-1) + \ln ge(-1) + \ln tr(-1) + \ln gdp(-1) + \ln ri(-1) \dots \dots \dots (3)$$

3.10 Stability testing

The CUSUM test serves as the basis to test for existence of any instability of the coefficients and whether or not the model exhibited some structural changes over the study period and that it can be used for reliable predictions. The desired outcome is such that the CUSUM statistics falls within the critical bands.

3.11 Definition and measurement of variables

The variables of the model are government expenditure (GE), GDP growth (GDP), Tax revenue (TR), Investment (I), Real interest (RI) and Error term (ε). The table below shows the variables used in the model, their symbols and how measurement was done.

Table 3.1: Variables definition and Measurement

Variables	Definitions and measurement
Government expenditure (GE)	This refers to the purchase of good and services, which includes public consumption and public investment and transfers. The measurement is in Namibia Dollar.

GDP growth (GDP)	This is the value of goods and services produced in a country over the period of one year and it is measure in Namibian dollar
Tax revenue (TR)	This is the total revenue of all individual tax heads and it is measured in Namibia dollars
Investment (I)	This is a monetary asset purchased with the idea that the asset will provide income in the future or will later be sold at higher price for a profit. The measurement is in the Namibia Dollar.
Real interest (RI)	This is the nominal interest rate minus the inflation rate and it is measured in percentage.
Error term (ε)	It captures other information not presented in the model.

Source: Author's compilation

3.12 Research ethics

The study used secondary data, the researcher adhered to the research ethics by firstly, acquiring a letter granting permission to conduct the research from the Namibia Business School (NBS).

Secondly, the letter was taken to the data sources of this study, namely: the Namibia Statistics Agency, Bank of Namibia and the Ministry of Finance to obtain all the variables data. The data acquired was handled with all due diligence. In conclusion, confidentiality and anonymity was adhered to throughout the research.

3.13 Summary ANALYSIS AND DISCUSSION OF EMPIRICAL RESULTS

This chapter covered the methodology employed in this research. The research design was described as a quantitative research design of time series data. This chapter also described the data source and procedure used in collecting and analysing the data. Lastly, the chapter highlighted the methods used to analyse the data and the need for ethical consideration.

4.2. Testing for stationarity: unit root test

The study applied the Augmented Dickey-Fuller (ADF) and Phillips - Perron (PP) tests, to test for Stationarity of the stochastic variables, namely, LNI, LNOR, LNTR, LNCDP AND LNRI and G, as presented in the table below:

Table 4.2: Unit root test result

Variable	ADF	PP	ADF	PP	DF-GLS
LNOR	-3.579	-3.751**	-3.549	-3.705**	(1)
LNOR and trend	-3.579	-3.751**	-3.549	-3.705**	(1)
LNTR	-3.411	-3.583**	-3.705	-3.828**	(1)
LNTR and trend	-3.411	-3.583**	-3.705	-3.828**	(1)
LNCDP	-3.348	-3.520**	-3.354	-3.523**	(1)
LNCDP and trend	-3.348	-3.520**	-3.354	-3.523**	(1)
LNRI	-3.300	-3.468**	-3.300	-3.468**	(1)
LNRI and trend	-3.300	-3.468**	-3.300	-3.468**	(1)
G	-3.340**	-3.520**	-3.340**	-3.520**	(1)
G and trend	-3.340**	-3.520**	-3.340**	-3.520**	(1)

CHAPTER FOUR

ANALYSIS AND DISCUSSION OF EMPIRICAL RESULTS

4.1 Introduction

This chapter deliberates on the empirical analysis of the study. Firstly, the Stationary tests are discussed using the Augmented Dickey Fuller (ADF) and the Phillips Peron (PP) tests. Secondly, the variables were tested using Diagnostic tests such as Normality test, Serial correlation LM Test and Heteroscedasticity test and interpreted. Thirdly, the chapter discusses the central tendency and dispersion to judge whether the data had a strong or a weak central tendency based on its dispersion. Fourthly, the optimal lag structure was determined. Lastly, the chapter discussed the stability and ARDL bound test.

4.2 Testing for stationarity: unit root test

The study applied the Augmented Dickey-Fuller (ADF) and Phillips –Perron (PP) tests, to test for Stationarity of the stochastic variables, namely: LNI, LNGE, LNTR, LNGDP AND LNRI and G, as presented in the table below:

Table 4.2: Unit root test result

Variable	Model Specification	ADF		PP		Order of (I)
		Levels	1ST D	Levels	1ST D	
LNI	Intercept	-1.579	-5.759**	-1.649	-5.938**	I (1)
	Intercept and trend	-2.833	-5.758**	-3.183	-5.908**	I (1)
LNGE	Intercept	-1.827		-1.703		I (0)
	Intercept and trend	-4.425**		-4.203**		I (0)
LNTR	Intercept	-1.348		-1.364	-4.223**	I (1)
	Intercept and trend	-3.951**		-3.344	-4.273**	I (0)
LNGDP	Intercept	-1.602	-4.668**	-1.68	-4.707**	I (1)
	Intercept and trend	-2.889	-3.509**	-3.258	-4.737**	I (1)
LNRI	Intercept	-3.440**		-3.398**		I (0)
	Intercept and trend	-3.884**		-3.857**		I (0)

Source: author's compilation and values obtained from EViews ()** implies **Stationarity**

The ADF and PP test results revealed that the tested variables were found to be integrated at different of orders. LNI, GDP and TR are stationary at first difference I (1), while LNGE and LNI are integrated at zero I (0). The differences in the order of integration leads to the adaption of the ARDL approach.

4.3 ARDL bound testing for cointegration

The interpretation focuses much on the long-run coefficients hence, there is need for coefficient diagnostic test to test for the significance of the coefficients in model. Using Wald-Test – Coefficient Retractions.

Table 4.3: Bound test result

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I (0)	I (1)
Asymptotic: n=1000				
F-statistic	3.345317	10%	2.2	3.09
k	4	5%	2.56	3.49
		2.5%	2.88	3.87
		1%	3.29	4.37

Source: values obtained from EViews

The F-statistic was compared with Pesaran critical value at %5 significance level corresponding to restricted constant and no trend. The K is four meaning that there were four explanatory variables which were Government Expenditure, Total Revenues, Gross Domestic Product and Real Interest.

At 5 per cent level of significance, the lower bound is 2.56 and upper bound is 3.49 the calculated F-statistic is 3.35 which is lower than the critical value of upper bound of 3.49 hence, accepting the null hypothesis of no cointegration at this level. However, the calculated F-statistics, at 10% level of significance is greater than the upper bound of 3.09 which indicates that there is a weak long-run cointegration. The decision rule is that the null hypothesis is rejected implying that there is cointegration though it is weak. In other words, LNI (-1), LNGE (-1), LNTR (-1), LNGDP (-1) and LNRI (-1) have long-run association which means all these variables do move together in the long-run.

Based on the existence of long-run cointegration, this implies that even if there are shocks in the short-run, which may affect movement in the individual series, they would converge with time in the (long-run). The Error Correlation Model (ECM) is estimated to correct for short-run deviation. The error correction model is specified as follows:

Table 4.4: Speed of adjustment

ECM Regression				
Case 2: Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNGDP)	1.640452	0.263052	6.236233	0.0000
D(LNRI)	-0.023389	0.028145	-0.831015	0.4163
CointEq (-1)*	-0.791086	0.157109	-5.035274	0.0001

Based on the results, the table above reveals that the cointegration equation is negative meaning that the coefficient the adjustment term is negative which is a good sign and significant at one percent (1%) as the *p-value* is less than 1% level. By interpretation, this means that about 79.11% of departure from the long-run equilibrium is corrected each period.

4.4 Diagnostic Test

In order to ensure that the empirical model is correctly specified, various tests were conducted, which are discussed below:

Based on the existence of long-run cointegration, this implies that even if there are shocks in the short-run, which may affect movement in the individual series, they would converge with time in the (long-run). The Error Correction Model (ECM) is estimated to correct for short-run deviation. The error correction model is specified as follows:

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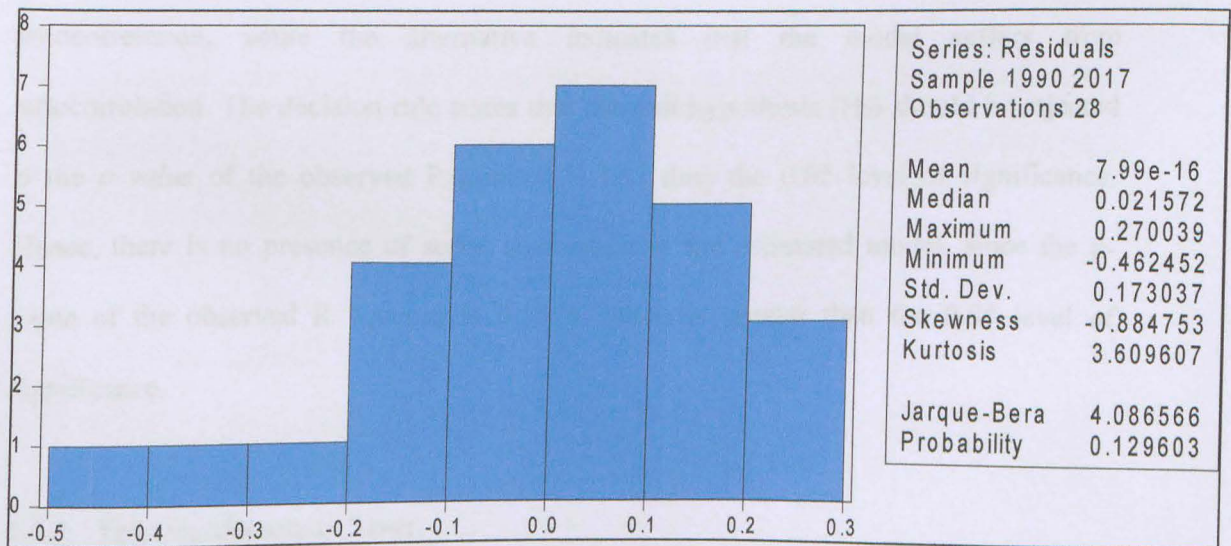
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4.4 Diagnostic Test

In order to ensure that the empirical model is correctly specified, various tests were conducted, which are discussed below:

4.4.1 Normality Test:

Figure 4.1: Histogram Normality result



Source: values obtained from EViews

In these results, the null hypothesis states that the data / model follows a normal distribution, while the alternative denotes that a model does not follow a normal distribution. The results for the Jarque-Bera statistics was 4.087 which is greater than the significant level of 0.05 with the probability value of 0.130 and this means accepting the null hypothesis and conclusion that the residuals of the model follows the normal distribution.

4.4.2 Serial correlation LM Test:

Table 4.5: Serial correlation LM Test Result

Breusch-Godfrey Serial Correlation LM Test			
F-statistic	0.487064	Prob. F (2,21)	0.6212
Obs*R-squared	1.241260	Prob. Chi-Square (2)	0.5376

Source: values obtained from EViews

The null hypothesis (H_0) of this test indicate that the model does not suffer from autocorrelation, while the alternative indicates that the model suffers from autocorrelation. The decision rule states that the null hypothesis (H_0) should be rejected if the *p value* of the observed R-squared is less than the 0.05 level of significance. Hence, there is no presence of serial correlation in the estimated model, since the p-value of the observed R squared is 0.5376 which is greater than the 0.05 level of significance.

4.4.3 Heteroscedasticity Test:

Table 4.6: Heteroscedasticity white test result

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F-statistic	0.745840	Prob. F (13,14)	0.6984
Obs*R-squared	11.45706	Prob. Chi-Square (13)	0.5726
Scaled explained SS	10.08691	Prob. Chi-Square (13)	0.6868

Source: values obtained from EViews

The null hypothesis (Ho) claims that residuals are homoscedasticity and the alternative hypothesis claims that the residuals are heteroscedastic and thus the variance is not constant. The rejection rule states that the null hypothesis should be rejected if the probability value of observation R-squared is less than the 0.05 level of significance. Since the probability of Chi-Square of 0.5726 is greater than 0.05, the test fails to reject the null hypothesis of constancy of variance among the residuals in the model, and thus are deemed to be homoscedastic.

4.4.4 Descriptive Data

The descriptive statistics is used to measure data variability and the spread of the distribution of the set of data. The variables of fiscal policy and investment are presented in Table 2 below and all variables are as previously defined.

Table 4.7: Descriptive statistics

	LNI	LNRI	LNTR	LNGE	LNGDP
Mean	9.072	1.004	9.269	9.343	10.497
Median	9.154	1.141	9.226	9.377	10.525
Maximum	10.820	2.586	10.866	11.097	12.079

Minimum	7.128	-1.112	7.410	7.203	8.728
Std. Dev.	1.074	0.987	1.046	1.075	1.003
Skewness	-0.009	-0.56	-0.038	-0.04	-0.06
Kurtosis	1.786	2.674	1.860	2.122	1.900
Jarque-Bera	1.721	1.588	1.523	0.907	1.429
Probability	0.423	0.452	0.467	0.635	0.489
Sum	254.013	28.116	259.528	261.605	293.924
Sum Sq. Dev.	31.158	26.312	29.546	31.209	27.202
Observations	28	28	28	28	28

Source: values obtained from EViews

Investment (LNI) has a mean of 9.072 and lower standard deviation of 1.074. A lower standard deviation value indicates less spread in the data of Investment (LNI). The kurtosis is 1.786, which is a positive kurtosis value indicating that the Investment (LNI) distribution has heavier tails and a sharper peak than normal distribution and a negative skewness of -0.009, which indicates a distribution with an asymmetric tail leaning towards more negative values. Negative skewness implies that the data is not normally distributed, as data becomes more symmetrical, its skewness value approaches zero.

The mean for the independent variables, Real Interest (LNRI), Total Revenue (LNTR), Government Expenditure (LNGE) and Gross Domestic Product (LNGDP) are 1.004, 9.269, 9.343, and 10.497 respectively. Their respective standard deviations are 0.987,

1.046, 1.075 and 1.003 which is far lower than their mean indicating that there is less spread in their data.

The kurtosis of Government expenditure (LNGE) and Real Interest (LNRI) are 2.674 and 2.122 which indicates that data distribution is relatively peak with a negative skewness of -0.56 and -0.04, which is indicating a distribution with an asymmetric tail extending towards more negative values. The Total revenue (LNTR) shows a negative skewness of -0.038 indicating that the tail of the distribution is pointing to the left and is not normally distributed. The kurtosis is 1.860 indicating that Total revenue (LNTR) has a peak distribution. Gross domestic product is negatively skewed with kurtosis of 1.900 indicating the distribution is not normally distributed and high-pitched peak.

4.5 Determination of the optimal lag structure

Table 4.8: Optimal lag length selection

Lag	LogL	LR	FPE	AIC	SC	HQ
0	6.627759	NA	6.07e-07	-0.125212	0.116729	-0.055542
1	112.1489	162.3401*	1.29e-09*	-6.319143*	-4.867493*	-5.901120*
2	133.5809	24.72926	2.17e-09	-6.044683	-3.383325	-5.278308

Source: values obtained from EViews

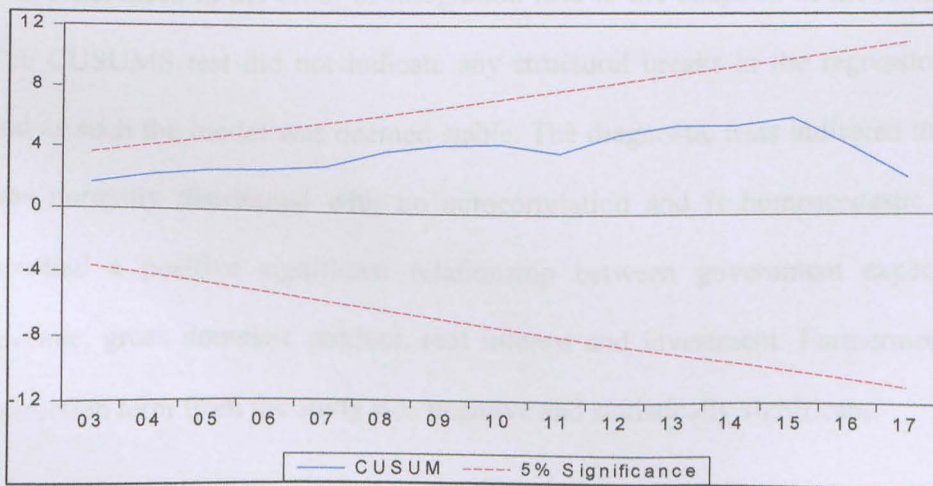
In estimating ARDL, special attention was given to ensuring an appropriate specification of the lag length in ascertaining that there is no serial correlation from the residuals.

Table 3 provides the lag length selection criteria. Based on the sequential modified Likelihood Ratio (LR) test statistic (each test at 5% level), Final Prediction Error (FPE), Schwartz information criterion (SC), Akaike Information Criterion (AIC) and Hannan-Quinn (HQ) criterion.

To minimise the problems of over-identification, the information criteria used are AIC and SC. The optimal length then lies where the two information criteria are at their lowest values. In this case, AIC is -6.319143 and SC is -4.867439, which suggests that an appropriate lag length of 1.

4.6 Stability testing

Figure 4.2: CUSUM Stability Test



Source: values obtained from Eviews

The use of the stability test is to test whether or not the model exhibited some structural changes over the study period and that it can be used for reliable predictions. In this regard, the study employs CUSUMS of squares to test for stability on the long-run ARDL error correct model. The CUSUMS of squares does not indicate any structural breaks in the regression coefficients. The trend line lies within the boundary which means that the model is largely stable.

4.7 Summary

The study employed annual datasets stretching from 1990 to 2017 to investigate the impact of fiscal policy on investment. The PP and ADF test found the variables were integrated at different of orders. LNI, GDP and TR were stationary at first difference I (1), while LNGE and LNI are integrated at zero I (0).

The differences in the order of integration lead to the adaption of the ARDL approach. The CUSUMS test did not indicate any structural breaks in the regression coefficient and as such the model was deemed stable. The diagnostic tests indicated that the model was normally distributed with no autocorrelation and is homoscedastic. The results revealed a positive significant relationship between government expenditure, total revenue, gross domestic product, real interest and investment. Furthermore, the Error correction term from the study was negative and statistically significant.

study was negative and statistically significant. The results of the ECT revealed an average speed of 79.11% for variables to adjust from any disequilibrium back to the long-run equilibrium annually. Therefore, the study concluded that there exists positive long-run relationships between government expenditure, total revenue, gross domestic product, real interest and investment.

5.3 Policy Recommendations

Based on the conclusion of this study that a positive long-run relationship exist between the following variables; government expenditure, total revenue, gross domestic product, real interest and investment. This indicates that these variables are significant factors in the application of corrective monetary and fiscal policy in Namibia.

Over the last decade the government has undertaken several policy reform and more so, in the financial sector space. This includes the Namibia Financial Sector Strategy (NFSS), Banking Act, Bank of Namibia Act, Financial Institution Management Bill (FIM), change in the Domestic Asset Requirement from contractual saving institutions and change in NSX dual listing requirements. This has led to deepening of the financial sector in Namibia and improved financial market liquidity, in line with existing empirical evidence.

The study recommends a thorough analysis on the identified factors in this study to inform prudent monetary and fiscal policy. Although there have been developments in the financial sector space more alignment and cohesion is needed to accelerate the implementation of the reforms in the financial sector. Applying the relevant policy mix

at most effective and efficient timeframe will propel the right channelling of resources that have a higher multiplier effect on investment and economic growth. Balancing the two policies is very critical to investment and economic growth as investors and other agents of growth are heavily depended on prudent monetary and fiscal policy stance.

In addition, empirical finding from the study done by Muyaba (2016) on analysis of the effects of government expenditure on economic growth in Zambia, indicates that there is a positive and significant relationship between public expenditure and economic growth in Zambia both in the short-run and the long-run. The econometric tools used to analyse the data are the Autoregressive Distribution Lag (ARDL) and the Pairwise Granger Causality Test was used.

5.4 Further Research

An extension on the variables is recommended for further research. to investigate the relationship between government expenditure, economic growth and investment. Similarly, future research could also focus on the relationship between public expenditure and domestic and foreign debt, as well as individual government revenues as split variables to further increase policy recommendations. lastly, further research is suggested on the refining the data once they become available.

REFERENCES

- Akpo, E.S., Friday, C., & Hassan, S. (2015). Analysis of the impact of fiscal policy on investment in Nigeria. *International Journal of Economics, Commerce and Management*, 3(5), 450-469. doi:10.1108/17538370910991106
- Afonso, A., & Jalles, J.T. (2011). Linking investment and fiscal policies. School of Economic and Management. Wp /16/2011. Retrieved from <http://ir.kabarak.ac.ke/bitstream/handle/123456789/1157> [Accessed on 12 May 2019]
- Alesina, A., Ardagna, S., Schiantarelli, F., & Perotti, R. (1999). Fiscal policy, profits, and investment. National Bureau of Economic Research, 7207, 27-28. Retrieved from <https://www.nber.org/papers/w7207.pdf> [Accessed on 06 July 2019]
- Banga, R. (2003). Impact of government policies and investment agreements on fdi inflows. Indian Council for Research on International Economic Relation, wp116. Retrieved from <https://www.econstor.eu/bitstream/10419/189636/1/icrier-wp116.pdf> [Accessed on 02 June 2019]
- Babin, B.J., Carr, C.J., Griffin, M., & Zikmund, G.W. (2010). *Business Research Methods* 8th ed. South-Western, Cengage Learning
- De Wet, T.J., Robinson, Z.C., & Schoeman, N.J. (2000). Foreign direct investment flows and fiscal discipline in South Africa. *Department of Economics*. 3(2), 2235.

- Retrieved from <https://journals.co.za/docserver/fulltext/ecoman/3/2/334.pdf?>
[Accessed on 02 June 2019]
- Egbetunde, T., & Fasanya, I.O. (2013). Public expenditure and economic growth in Nigeria. *Zagreb International Review of Economics & Business*. 16(1)79-92.
Retrieved from [ZIREB_Vol_16_No_1_05.pdf](#) [Accessed on 07 August 2019]
- Gaur, A.S., & Gaur, S.S. (2009). *Statistical methods for practice and research*. (2nd ed). New Delhi: Response Books.
- Hamoudi, M.K.T.E., (2016). The impact of fiscal policy on investment in Libya. *Open Access Library Journal*, 3(e3184), 1-14. doi:10.4236/oalib.1103184
- Halkos, G.E., & Paizanos, E.A (2015). Fiscal policy and economic performance: A review of the theoretical and empirical literature, doi://mpra.ub.uni-muenchen.de/67737/
- Hermes, N., & Lensink, R. (2001). Fiscal policy and private investment in less developed countries. United Nations University World Institute for Development, wp/2001/32. Retrieved from <https://www.econstor.eu/bitstream/10419/53076/1/333439244.pdf> [Accessed on 05 August 2019]
- Huck, S.W. (2012). *Reading statistics and research*. (6th ed). Boston: Pearson Publishing.
- Hussain, M.J., & Zafar, T. (2017). The impact of public expenditure components on economic growth in Pakistan. *Civil Services Academy*. 6(3) 378-405.
Retrieved from doi: [5107-11870-1-PB.pdf](#) [Accessed on 02 July 2019]
- Hashikutuva, L.N. (2016) Analysed the impact of financial development (measured by depth, stability, efficiency and access) on private investment in South Africa.

- (Thesis). University of Cape Town, South Africa. Retrieved from <https://open.uct.ac.za/bitstream/handle/11427/25092/thesis> [Accessed on 12 June 2019]
- Joeng, K.J. (2014) Analysing the effects of fiscal policy and assessing its sustainability: Department of Economics Business School. (Doctor Thesis). University of Birmingham, United Kingdom. Retrieved from <http://repository.uibk.ac.at/bitstream/handle/20.500.12709/10000/economies-06-00027.pdf> [Accessed on 06 July 2019]
- Isaac, M.K., & Samwel, C.K. (2012). Effects of fiscal policy on private investment and economics growth in Kenya. *Journal of Economics and Sustainable Development*, 3(7), 8-20. doi:10.1108/IJMPB-10-2013-0049
- Keynes, J. M. (1936). *The general theory of employment, interest and money*. New York: Cambridge University Press.
- Kingori, B.M. (2015) Analysed the determinants of private investment in Kenya. (Thesis). University of Namibia, Namibia. Retrieved from <http://repository.unam.edu.na/bitstream/handle/11070/1449/Kingori2015.pdf> [Accessed on 22 July 2019]
- Leeper, E.M., Yang, S.S., & Walker, T.B. (2010). Government investment and fiscal stimulus. International Monetary Fund Research Department, wp/10/229. doi: wp102229.pdf [Accessed on 22 July 2019]
- Malik, A. (2013). Private investment and fiscal policy in Pakistan. *Journal of Economics Development*, 38(1), 83- 85. doi:10.1108/IJMPB-08-2013-0040
- Muyaba, A.M. (2016). Public spending and economic growth in Zambia- An Econometric Analysis. Retrieved from

https://open.uct.ac.za/bitstream/handle/11427/27477/thesis_com_2017_muyaba_andrew_munsaka.pdf [Accessed on 18 June 2019]

Ocran, M.K. (2011). Fiscal policy and economic growth in South Africa. Department of Economics. doi: 004635242cee04649c000000

Omitogun, O. (2018). Investigating the crowding out effect of government expenditure on private investment. Research Department. Retrieved from <https://www.cjournal.cz/files/310.pdf> [Accessed on 18 June 2019]

Osinowo, O.H. (2015). Effect of fiscal policy on sectoral output growth in Nigeria. *Advances in Economics and Business* 3(6): 195-203. Retrieved from <http://www.hrpub.org> DOI: 10.13189/aeb.2015.030601

Schlettwein, C. (2017, August 14). On Moody's investor service downgrading of Namibia's credit rating. Retrieved from http://www.mof.gov.na/documents/27827/373088/14_08_2017

Torraco, R. J. (1997). Theory building research methods. In R. A. Swanson & E.F. Hutton (Eds)

Tobin, J. (1958). Liquidity preference as behaviour towards Risk. *The Review of Economic Studies* (2), pp. 65-86.

Uanguta, E, Haiyambo, E, Kadhikwa, G., & Chimana, S. (2004). The structure and nature of savings in Namibia. Bank of Namibia Research Department. Retrieved from <https://www.bon.com.na/CMSTemplates/Bon/Files/bon.com.na/c5/c54525f3-6d19-482c-a11f-e5921a133060.pdf>[Accessed on 09 August-2019]

APPENDICES

1. Raw Data used (Measured in NS000 000')

Year	Expenditure	Revenues	GDP Growth	Real Interest	Investment
1990	1,343	1,652	6,176	1.02	1,247
1991	2,103	2,032	7,522	1.25	2,047
1992	2,863	2,674	8,698	-1.98	2,206
1993	3,380	2,945	10,005	6.92	2,506
1994	3,439	3,106	11,116	6.13	2,956
1995	3,857	3,661	13,260	6.82	3,106
1996	4,557	4,081	14,965	9.54	3,535
1997	5,567	4,676	17,448	8.41	2,288
1998	6,129	5,690	19,467	12.28	4,321
1999	6,936	6,186	21,699	9.48	4,760
2000	7,953	7,272	24,280	2.07	4,460
2001	8,708	8,200	27,978	1.16	6,073
2002	10,302	9,098	31,759	-0.03	6,964
2003	11,399	10,562	35,898	3.67	9,857
2004	12,245	9,768	38,648	3.53	9,190
2005	12,771	11,425	43,553	6.83	9,727
2006	13,193	13,108	48,137	2.67	12,235
2007	15,279	17,593	55,908	3.03	13,554
2008	17,382	20,688	63,715	2.19	17,751
2009	21,946	23,447	71,388	-2.04	21,025
2010	24,914	24,047	77,062	1.89	20,884
2011	27,253	23,377	83,780	1	20,433
2012	36,611	29,922	95,313	-0.95	27,514

2013	38,112	37,997	110,791	-0.1	32,565
2014	46,751	41,910	126,345	0.39	46,370
2015	58,769	49,960	164,115	3.02	50,032
2016	62,540	52,363	171,034	0.26	37,199
2017	65,966	50,852	176,119	0.68	28,296

Source: Ministry of Finance, Bank of Namibia and Namibia Statistic Agency (1990-2017)

2. Results

a. Unit root test results (ADF and PP)

Null Hypothesis: LNI has a unit root			
Exogenous: Constant			
Lag Length: 0 (Automatic - based on SIC, maxlag=6)			
		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.579057	0.4792
Test critical values:	1% level	-3.699871	
	5% level	-2.976263	
	10% level	-2.627420	
*MacKinnon (1996) one-sided p-values.			
Augmented Dickey-Fuller Test Equation			
Dependent Variable: D(LNI)			

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Source: Ministry of Finance, Bank of Namibia and Namibia Statistic Agency (1990-2017)

2. Results

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Lag Length: 0 (Automatic - based on SIC, maxlag=6)			
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Test critical values:	1% level	-3.699871	
	5% level	-2.976263	
	10% level	-2.627420	
*MacKinnon (1996) one-sided p-values.			
Augmented Dickey-Fuller Test Equation			

Dependent Variable: D(LNI)

Method: Least Squares

Date: 05/26/19 Time: 18:06

Sample (adjusted): 1991 2017

Included observations: 27 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNI (-1)	-0.064842	0.041064	-1.579057	0.1269
C	0.701037	0.373227	1.878311	0.0720
R-squared	0.090692	Mean dependent var		0.115629
Adjusted R-squared	0.054319	S.D. dependent var		0.230191
S.E. of regression	0.223852	Akaike info criterion		-0.084474
Sum squared resid	1.252746	Schwarz criterion		0.011514
Log likelihood	3.140396	Hannan-Quinn criter.		-0.055932
F-statistic	2.493422	Durbin-Watson stat		2.138960
Prob(F-statistic)	0.126894			

Null Hypothesis: LNI has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 7 (Automatic - based on SIC, maxlag=6)

		t-Statistic	Prob.*	
Augmented Dickey-Fuller test statistic		-2.833144	0.1994	
Test critical values:	1% level	-4.374307		
	5% level	-3.603202		
	10% level	-3.238054		
*MacKinnon (1996) one-sided p-values.				
Augmented Dickey-Fuller Test Equation				
Dependent Variable: D(LNI)				
Method: Least Squares				
Date: 05/26/19 Time: 18:07				
Sample (adjusted): 1993 2017				
Included observations: 25 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNI (-1)	-1.218663	0.430145	-2.833144	0.0103
D(LNI (-1))	0.534382	0.343028	1.557838	0.1350
D(LNI (-2))	0.264015	0.265074	0.996005	0.3311
C	8.793435	3.024963	2.906956	0.0087
TREND (1990)	0.158072	0.057712	2.738964	0.0126
R-squared	0.341114	Mean dependent var		0.102062
Adjusted R-squared	0.209337	S.D. dependent var		0.226110
S.E. of regression	0.201055	Akaike info criterion		-0.193617
Sum squared resid	0.808465	Schwarz criterion		0.050158
Log likelihood	7.420209	Hannan-Quinn criter.		-0.126004
F-statistic	2.588567	Durbin-Watson stat		1.897535

Prob(F-statistic)	0.068023
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Null Hypothesis: D(LNI) has a unit root				
Exogenous: Constant				
Lag Length: 0 (Automatic - based on SIC, maxlag=6)				
			t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic			-5.759412	0.0001
Test critical values:	1% level		-3.711457	
	5% level		-2.981038	
	10% level		-2.629906	
*MacKinnon (1996) one-sided p-values.				
Augmented Dickey-Fuller Test Equation				
Dependent Variable: D(LNI,2)				
Method: Least Squares				
Date: 05/26/19 Time: 18:00				
Sample (adjusted): 1992-2017				
Included observations: 26 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNI (-1))	-1.163409	0.202001	-5.759412	0.0000
C	0.122354	0.051100	2.394388	0.0248
R-squared	0.580206	Mean dependent var		-0.029584
Adjusted R-squared	0.562714	S.D. dependent var		0.337460
S.E. of regression	0.223154	Akaike info criterion		-0.088106
Sum squared resid	1.195145	Schwarz criterion		0.008671

Log likelihood	3.145377	Hannan-Quinn criter.	-0.060238
F-statistic	33.17083	Durbin-Watson stat	1.901923
Prob(F-statistic)	0.000006		

Null Hypothesis: D(LNI) has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 0 (Automatic - based on SIC, maxlag=6)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.758078	0.0004
Test critical values:	1% level	-4.356068	
	5% level	-3.595026	
	10% level	-3.233456	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(LNI,2)

Method: Least Squares

Date: 05/26/19 Time: 18:11

Sample (adjusted): 1992 2017

Included observations: 26 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNI(-1))	-1.183507	0.205538	-5.758078	0.0000
C	0.190196	0.103339	1.840506	0.0786
TREND(1990)	-0.004498	0.005937	-0.757524	0.4564
R-squared	0.590424	Mean dependent var		-0.029584
Adjusted R-squared	0.554809	S.D. dependent var		0.337460

S.E. of regression	0.225162	Akaike info criterion	-0.035826
Sum squared resid	1.166052	Schwarz criterion	0.109339
Log likelihood	3.465743	Hannan-Quinn criter.	0.005976
F-statistic	16.57784	Durbin-Watson stat	1.910822
Prob(F-statistic)	0.000035		

Null Hypothesis: LNGE has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=6)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.827223	0.3599
Test critical values:	1% level	-3.699871	
	5% level	-2.976263	
	10% level	-2.627420	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(LNGE)

Method: Least Squares

Date: 05/26/19 Time: 18:13

Sample (adjusted): 1991 2017

Included observations: 27 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
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LNGE (-1)	-0.032272	0.017662	-1.827223	0.0796
C (1990)	0.443654	0.164853	2.691215	0.0125
R-squared	0.117816	Mean dependent var		0.144231
Adjusted R-squared	0.082528	S.D. dependent var		0.097604
S.E. of regression	0.093490	Akaike info criterion		-1.830740
Sum squared resid	0.218509	Schwarz criterion		-1.734752
Log likelihood	26.71499	Hannan-Quinn criter.		-1.802198
F-statistic	3.338746	Durbin-Watson stat		1.307718
Prob(F-statistic)	0.079628			

Null hypothesis: LNGE has a unit root				
Exercises: Constant, Linear Trend				
Lag Length: 0 (Automatic - based on SIC, maxlag=6)				
			t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic			-4.424655	0.0082
Test critical values:		1% level	-4.339330	
		5% level	-3.587527	
		10% level	-3.229230	
*MacKinnon (1996) one-sided p-values.				
Date: 05/26/19 Time: 18:15				
Sample (adjusted): 1991 2017				
Included observations: 27 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNGE (-1)	-0.512232	0.115768	-4.424655	0.0002

Constant	4.011689	0.864097	4.642640	0.0001
TREND (1990)	0.063219	0.015141	4.175310	0.0003
R-squared	0.488999	Mean dependent var		0.144231
Adjusted R-squared	0.446415	S.D. dependent var		0.097604
S.E. of regression	0.072621	Akaike info criterion		-2.302695
Sum squared resid	0.126570	Schwarz criterion		-2.158713
Log likelihood	34.08638	Hannan-Quinn criter.		-2.259882
F-statistic	11.48331	Durbin-Watson stat		1.279889
Prob(F-statistic)	0.000317			
Exogenous: Constant				
Lag Length: 0 (Automatic - based on SIC, maxlag=6)				
			t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic			-1.347729	0.5923
Test critical values:		1% level	-3.699871	
		5% level	-2.976263	
		10% level	-2.627420	
*MacKinnon (1996) one-sided p-values.				
Dependent Variable: D(LNTR)				
Method: Least Squares				
Date: 05/26/19 Time: 18:22				
Sample (adjusted): 1991 2017				
Included observations: 27 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNTR (-1))	-0.023117	0.017153	-1.347729	0.1898
Constant	0.339853	0.158920	2.138521	0.0424
R-squared	0.067734	Mean dependent var		0.126923

Adjusted R-squared	0.030443	S.D. dependent var	0.090512
S.E. of regression	0.089124	Akaike info criterion	-1.926397
Sum of squared resid	0.198576	Schwarz criterion	-1.830409
Log Likelihood	28.00636	Hannan-Quinn criter.	-1.897855
F-statistic	1.816375	Durbin-Watson stat	1.808951
Prob(F-statistic)	0.189833		

Null hypothesis: LNTR has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 3 (Automatic - based on SIC, maxlag=6)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-3.951436	0.0253
Test statistics for:		
1% level	-4.394309	
5% level	-3.612199	
10% level	-3.243079	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(LNTR)

Method: Least Squares

Date: 05/16/19 Time: 18:26

Sample (adjusted): 1994 2017

Included observations: 24 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNTR (-1)	-1.556624	0.393939	-3.951436	0.0009
D(LNTR (-1))	0.887459	0.291205	3.047546	0.0069
D(LNTR (-2))	0.524258	0.246482	2.126962	0.0475
D(LNTR (-3))	0.265492	0.221339	1.199484	0.2459

C	11.51594	2.860083	4.026437	0.0008
@TREND (1990)	0.195520	0.049895	3.918650	0.0010
R-squared	0.542874	Mean dependent var		0.118700
Adjusted R-squared	0.415895	S.D. dependent var		0.089015
S.E. of regression	0.068031	Akaike info criterion		-2.325383
Sum squared resid	0.083308	Schwarz criterion		-2.030869
Log Likelihood	33.90459	Hannan-Quinn criter.		-2.247248
F-statistic	4.275296	Durbin-Watson stat		1.945373
Prob(F-statistic)	0.009726			
Null Hypothesis: LNGDP has a unit root				
Exogenous: Constant				
Lag Length: 0 (Automatic - based on SIC, maxlag=6)				
			t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic				
Augmented Dickey-Fuller test statistic			-1.601593	0.4681
Test statistics values:				
1% level			-3.699871	
5% level			-2.976263	
10% level			-2.627420	
*MacKinnon (1996) one-sided p-values.				
Augmented Dickey-Fuller Test Equation				
Dependent Variable: D(LNGDP)				
Method: Least Squares				
Date: 05/26/19 Time: 18:32				
Sample (adjusted): 1991 2017				
Included observations: 27 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNGDP (-1)	-0.014325	0.008944	-1.601593	0.1218

	0.273623	0.093753	2.918539	0.0073
R-squared	0.093056	Mean dependent var		0.124092
Adjusted R-squared	0.056778	S.D. dependent var		0.045684
S.E. of regression	0.044368	Akaike info criterion		-3.321394
Sum squared resid	0.049214	Schwarz criterion		-3.225407
Log Likelihood	46.83883	Hannan-Quinn criter.		-3.292852
F-statistic	2.565100	Durbin-Watson stat		1.874201
Prob(F-statistic)	0.121808			

Null Hypothesis: LNGDP has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 24 (Automatic - based on SIC, maxlag=6)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-2.888892	0.1824
Test statistics at:		
1% level	-4.374307	
5% level	-3.603202	
10% level	-3.238054	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(LNGDP)

Method: Least Squares

Date: 05/26/19 Time: 18:33

Sample (adjusted): 1993-2017

Included observations: 25 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
L(LNGDP(-1))	-0.659073	0.228140	-2.888892	0.0091
D(LNGDP(-1))	0.253535	0.236339	1.072761	0.2962

D (LNGDP (-2))	-0.000645	0.224846	-0.002868	0.9977
C	5.874449	1.972644	2.977957	0.0074
@TREND (1990)	0.078610	0.027609	2.847210	0.0100
R-squared	0.341393	Mean dependent var		0.120323
Adjusted R-squared	0.209671	S.D. dependent var		0.044778
S.E. of regression	0.039807	Akaike info criterion		-3.432667
Sum squared resid	0.031693	Schwarz criterion		-3.188892
Log likelihood	47.90834	Hannan-Quinn criter.		-3.365054
F-statistic	2.591778	Durbin-Watson stat		2.029765
Prob(F-statistic)	0.067778			

Null Hypothesis: D(LNGDP) has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=6)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.668063	0.0010
Test critical values:	1% level	-3.711457	
	5% level	-2.981038	
	10% level	-2.629906	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(LNGDP,2)

Method: Least Squares

Date: 05/26/19 Time: 18:34

Sample (adjusted): 1992 2017

Included observations: 26 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D (LNGDP (-1))	-0.992182	0.212547	-4.668063	0.0001
C	0.120283	0.028552	4.212790	0.0003
R-squared	0.475877	Mean dependent var		-0.006456
Adjusted R-squared	0.454039	S.D. dependent var		0.060975
S.E. of regression	0.045054	Akaike info criterion		-3.288120
Sum squared resid	0.048716	Schwarz criterion		-3.191343
Log likelihood	44.74556	Hannan-Quinn criter.		-3.260252
F-statistic	21.79081	Durbin-Watson stat		1.888232
Prob(F-statistic)	0.000097			

Null Hypothesis: D(LNGDP) has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 3 (Automatic - based on SIC, maxlag=6)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-3.508998	0.0620
Test critical values:		
1% level	-4.416345	
5% level	-3.622033	
10% level	-3.248592	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(LNGDP,2)

Method: Least Squares

Date: 05/26/19 Time: 18:36

Sample (adjusted): 1995 2017

Included observations: 23 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNGDP (-1))	-2.248527	0.640789	-3.508998	0.0027
D(LNGDP (-1),2)	1.153878	0.546506	2.111374	0.0498
D(LNGDP (-2),2)	1.039463	0.559087	1.859215	0.0804
D(LNGDP (-3),2)	0.402562	0.405293	0.993261	0.3345
C	0.315509	0.093188	3.385745	0.0035
@TREND(1990)	-0.002528	0.001724	-1.465779	0.1610
R-squared	0.596908	Mean dependent var		-0.003304
Adjusted R-squared	0.478352	S.D. dependent var		0.063909
S.E. of regression	0.046158	Akaike info criterion		-3.094021
Sum of squared resid	0.036220	Schwarz criterion		-2.797805
Log likelihood	41.58124	Hannan-Quinn criter.		-3.019524
F-statistic	5.034809	Durbin-Watson stat		1.960675
Prob(F-statistic)	0.005183			
Null Hypothesis: LNRI has a unit root				
Exclusions: Constant				
Lag Length: 0 (Automatic - based on SIC, maxlag=6)				
			t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic			-3.439609	0.0182
Test critical values:		1% level	-3.699871	
		5% level	-2.976263	

10% level

-2.627420

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(LNRI)

Method: Least Squares

Date: 05/06/19 Time: 18:39

Sample (adjusted): 1991 2017

Included observations: 27 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNRI (-1)	-0.645315	0.187613	-3.439609	0.0021
C	0.652768	0.266001	2.454009	0.0214
R-squared	0.321222	Mean dependent var		-0.006826
Adjusted R-squared	0.294071	S.D. dependent var		1.140069
S.E. of regression	0.957881	Akaike info criterion		2.823000
Sum squared resid	22.93839	Schwarz criterion		2.918988
Log likelihood	-36.11050	Hannan-Quinn criter.		2.851543
F-statistic	11.83091	Durbin-Watson stat		2.113526
Prob(F-statistic)	0.002054			
Null Hypothesis: LNRI has a unit root				
Exogeneous: Constant, Linear Trend				
Lag Length: 0 (Automatic - based on SIC, maxlag=6)				
			t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic			-3.884087	0.0271

Test critical values:	1% level	-4.339330
	5% level	-3.587527
	10% level	-3.229230

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(LNRI)

Method: Least Squares

Date: 05/26/19 Time: 18:41

Sample (adjusted): 1991 2017

Included observations: 27 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNRI (-1)	-0.752359	0.193703	-3.884087	0.0007
C	1.312637	0.484469	2.709432	0.0122
@TREND (1990)	-0.039318	0.024436	-1.609041	0.1207

R-squared	0.387316	Mean dependent var	-0.006826
Adjusted R-squared	0.336259	S.D. dependent var	1.140069
S.E. of regression	0.928817	Akaike info criterion	2.794630
Sum squared resid	20.70484	Schwarz criterion	2.938612
Log Likelihood	-34.72751	Hannan-Quinn criter.	2.837443
F-statistic	7.585954	Durbin-Watson stat	2.085401
Prob(F-statistic)	0.002798		
Null hypothesis: LNI has a unit root			
Exogenous: Constant			
Bandwidth: 2 (Newey-West automatic) using Bartlett kernel			

		Adj. t-Stat	Prob.*	
Phillips-Perron test statistic		-1.649027	0.4447	
Test critical values:	1% level	-3.699871		
	5% level	-2.976263		
	10% level	-2.627420		
*MacKinnon (1996) one-sided p-values.				
Residual variance (no correction)			0.046398	
HAC corrected variance (Bartlett kernel)			0.036814	
Phillips-Perron Test Equation				
Dependent Variable: D(LNI)				
Method: Least Squares				
Date: 05/17/19 Time: 07:19				
Sample (adjusted): 1991-2017				
Included observations: 27 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNI(-1)	-0.064842	0.041064	-1.579057	0.1269
C	0.701037	0.373227	1.878311	0.0720
R-squared	0.090692	Mean dependent var		0.115629
Adjusted R-squared	0.054319	S.D. dependent var		0.230191
S.E. of regression	0.223852	Akaike info criterion		-0.084474
Sum squared resid	1.252746	Schwarz criterion		0.011514
Log likelihood	3.140396	Hannan-Quinn criter.		-0.055932

F-statistic	2.493422	Durbin-Watson stat	2.138960
Prob(F-statistic)	0.126894		

Null Hypothesis: LNI has a unit root			
Exogenous: Constant, Linear Trend			
Bandwidth: 1 (Newey-West automatic) using Bartlett kernel			
		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-3.183136	0.1088
Test critical values:	1% level	-4.339330	
	5% level	-3.587527	
	10% level	-3.229230	
*MacKinnon (1996) one-sided p-values.			
Residual variance (no correction)			0.034992
HAC corrected variance (Bartlett kernel)			0.038468
Phillips-Perron Test Equation			
Dependent Variable: D(LNI)			
Method: Least Squares			
Date: 05/17/19 Time: 07:25			
Sample (adjusted): 1991-2017			
Included observations: 27 after adjustments			

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNI (-1)	-0.723446	0.238270	-3.036249	0.0057
C	5.390391	1.708928	3.154253	0.0043
@TREND (1990)	0.089763	0.032093	2.796936	0.0100
R-squared	0.314222	Mean dependent var		0.115629
Adjusted R-squared	0.257074	S.D. dependent var		0.230191
S.E. of regression	0.198409	Akaike info criterion		-0.292530
Sum squared resid	0.944790	Schwarz criterion		-0.148549
Log likelihood	6.949161	Hannan-Quinn criter.		-0.249717
F-statistic (LNI (-1))	5.498381	Durbin-Watson stat		1.532035
Prob (F-statistic)	0.010819			
Null Hypothesis: D(LNI) has a unit root				
Exogeneity: Constant				
Bandwidth: 3 (Newey-West automatic) using Bartlett kernel				
			Adj. t-Stat	Prob.*
Phillips-Perron test statistic			-5.938009	0.0000
Test critical values:				
	1% level		-3.711457	
	5% level		-2.981038	
	10% level		-2.629906	
*MacKinnon (1996) one-sided p-values.				
Residual variance (no correction)				0.045967
HAC corrected variance (Bartlett kernel)				0.033788

Phillips-Perron Test Equation				
Dependent Variable: D(LNI,2)				
Method: Least Squares				
Date: 05/27/19	Time: 07:26			
Sample (adjusted): 1992 2017				
Included observations: 26 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNI (-1))	-1.163409	0.202001	-5.759412	0.0000
C	0.122354	0.051100	2.394388	0.0248
R-squared	0.580206	Mean dependent var		-0.029584
Adjusted R-squared	0.562714	S.D. dependent var		0.337460
S.E. of regression	0.223154	Akaike info criterion		-0.088106
Sum squared resid	1.195145	Schwarz criterion		0.008671
Log likelihood	3.145377	Hannan-Quinn criter.		-0.060238
F-statistic	33.17083	Durbin-Watson stat		1.901923
Prob(F-statistic)	0.000006			
Null Hypothesis: D(LNI) has a unit root				
Exogeneity: Constant, Linear Trend				
Bandwidth 3 (Newey-West automatic) using Bartlett kernel				
			Adj. t-Stat	Prob.*
Phillips-Perron test statistic			-5.908561	0.0003
Test critical values:	1% level		-4.356068	

5% level	-3.595026
10% level	-3.233456

*MacKinnon (1996) one-sided p-values.

Residual variance (no correction)	0.044848
HAC corrected variance (Bartlett kernel)	0.034289

Phillips-Perron Test Equation

Dependent Variable: D(LNI,2)

Method: Least Squares

Date: 05/27/19 Time: 07:33

Sample (adjusted): 1992-2017

Included observations: 26 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNI(-1))	-1.183507	0.205538	-5.758078	0.0000
C	0.190196	0.103339	1.840506	0.0786
@TREND(1990)	-0.004498	0.005937	-0.757524	0.4564

R-squared	0.590424	Mean dependent var	-0.029584
Adjusted R-squared	0.554809	S.D. dependent var	0.337460
S.E. of regression	0.225162	Akaike info criterion	-0.035826
Sum squared resid	1.166052	Schwarz criterion	0.109339
Log likelihood	3.465743	Hannan-Quinn criter.	0.005976
F-statistic	16.57784	Durbin-Watson stat	1.910822

Prob(F-statistic) 0.000035

Null Hypothesis: LNGE has a unit root

Exogenous: Constant

Bandwidth: 1 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-1.702586	0.4187
Test critical values:	1% level	-3.699871	
	5% level	-2.976263	
	10% level	-2.627420	

*MacKinnon (1996) one-sided p-values.

Residual variance (no correction) 0.008093

HAC corrected variance (Bartlett kernel) 0.009831

Phillips-Perron Test Equation

Dependent Variable: D(LNGE)

Method: Least Squares

Date: 05/27/19 Time: 07:35

Sample (adjusted): 1991 2017

Included observations: 27 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNGE (-1)	-0.032272	0.017662	-1.827223	0.0796
C	0.443654	0.164853	2.691215	0.0125
R-squared	0.117816	Mean dependent var		0.144231
Adjusted R-squared	0.082528	S.D. dependent var		0.097604
S.E. of regression	0.093490	Akaike info criterion		-1.830740
Sum squared resid	0.218509	Schwarz criterion		-1.734752
Log likelihood	26.71499	Hannan-Quinn criter.		-1.802198
F-statistic	3.338746	Durbin-Watson stat		1.307718
Prob(F-statistic)	0.079628			
Null Hypothesis: LNGE has a unit root				
Exogenous: Constant, Linear Trend				
Bandwidth: 2 (Newey-West automatic) using Bartlett kernel				
			Adj. t-Stat	Prob.*
Phillips-Perron test statistic			-4.203024	0.0136
Test critical values:		1% level	-4.339330	
		5% level	-3.587527	
		10% level	-3.229230	
*MacKinnon (1996) one-sided p-values.				

Residual variance (no correction)	0.004688
HAC corrected variance (Bartlett kernel)	0.007318

Phillips-Perron Test Equation

Dependent Variable: D(LNGE)

Method: Least Squares

Date: 05/27/19 Time: 07:35

Sample (adjusted): 1991 2017

Included observations: 27 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNGE (-1)	-0.512232	0.115768	-4.424655	0.0002
C	4.011689	0.864097	4.642640	0.0001
@TREND (1990)	0.063219	0.015141	4.175310	0.0003
R-squared	0.488999	Mean dependent var		0.144231
Adjusted R-squared	0.446415	S.D. dependent var		0.097604
S.E. of regression	0.072621	Akaike info criterion		-2.302695
Sum squared resid	0.126570	Schwarz criterion		-2.158713
Log likelihood	34.08638	Hannan-Quinn criter.		-2.259882
F-statistic	11.48331	Durbin-Watson stat		1.279889
Prob(F-statistic)	0.000317			

Null Hypothesis: LNTR has a unit root

Exogenous: Constant

Bandwidth: 2 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-1.363977	0.5846
Test critical values:		
1% level	-3.699871	
5% level	-2.976263	
10% level	-2.627420	

*MacKinnon (1996) one-sided p-values.

Residual variance (no correction) 0.007355

HAC corrected variance (Bartlett kernel) 0.007098

Phillips-Perron Test Equation

Dependent Variable: D(LNTR)

Method: Least Squares

Date: 05/27/19 Time: 07:38

Sample (adjusted): 1991 2017

Included observations: 27 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNTR (-1)	-0.023117	0.017153	-1.347729	0.1898
C	0.339853	0.158920	2.138521	0.0424
R-squared	0.067734	Mean dependent var		0.126923
Adjusted R-squared	0.030443	S.D. dependent var		0.090512
S.E. of regression	0.089124	Akaike info criterion		-1.926397
Sum squared resid	0.198576	Schwarz criterion		-1.830409
Log likelihood	28.00636	Hannan-Quinn criter.		-1.897855
F-statistic	1.816375	Durbin-Watson stat		1.808951
Prob(F-statistic)	0.189833			
Null Hypothesis: LNTR has a unit root				
Exogenous: Constant, Linear Trend				
Bandwidth: 2 (Newey-West automatic) using Bartlett kernel				
			Adj. t-Stat	Prob.*
Phillips-Perron test statistic			-3.343925	0.0806
Test critical values:	1% level		-4.339330	
	5% level		-3.587527	
	10% level		-3.229230	
*MacKinnon (1996) one-sided p-values.				

Residual variance (no correction)	0.005153
HAC corrected variance (Bartlett kernel)	0.005354

Phillips-Perron Test Equation

Dependent Variable: D(LNTR)

Method: Least Squares

Date: 05/27/19 Time: 07:40

Sample (adjusted): 1991 2017

Included observations: 27 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNTR (-1)	-0.623720	0.188145	-3.315102	0.0029
C	4.789107	1.396158	3.430203	0.0022
@TREND (1990)	0.077341	0.024154	3.201959	0.0038
R-squared	0.346782	Mean dependent var		0.126923
Adjusted R-squared	0.292347	S.D. dependent var		0.090512
S.E. of regression	0.076141	Akaike info criterion		-2.208030
Sum squared resid	0.139138	Schwarz criterion		-2.064048
Log likelihood	32.80841	Hannan-Quinn criter.		-2.165217
F-statistic	6.370580	Durbin-Watson stat		1.601089
Prob(F-statistic)	0.006035			

Null Hypothesis: D(LNTR) has a unit root		
Exogenous: Constant		
Bandwidth: 3 (Newey-West automatic) using Bartlett kernel		
		Adj. t-Stat
		Prob.*
Phillips-Perron test statistic		-4.222995
		0.0030
Test critical values:	1% level	-3.711457
	5% level	-2.981038
	10% level	-2.629906
*MacKinnon (1996) one-sided p-values.		
Residual variance (no correction)		0.007897
HAC corrected variance (Bartlett kernel)		0.005273
Phillips-Perron Test Equation		
Dependent Variable: D(LNTR,2)		
Method: Least Squares		
Date: 05/27/19 Time: 07:42		
Sample (adjusted): 1992 2017		
Included observations: 26 after adjustments		

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D (LNTR (-1))	-0.925940	0.213505	-4.336861	0.0002
C	0.113997	0.033683	3.384443	0.0024
R-squared	0.439362	Mean dependent var		-0.009089
Adjusted R-squared	0.416002	S.D. dependent var		0.121030
S.E. of regression	0.092491	Akaike info criterion		-1.849611
Sum squared resid	0.205309	Schwarz criterion		-1.752835
Log likelihood	26.04495	Hannan-Quinn criter.		-1.821743
F-statistic	18.80836	Durbin-Watson stat		1.881978
Prob(F-statistic)	0.000224			
Null Hypothesis: D(LNTR) has a unit root				
Exogeneous: Constant, Linear Trend				
Bandwidth: 3 (Newey-West automatic) using Bartlett kernel				
			Adj. t-Stat	Prob.*
Phillips-Perron test statistic			-4.272951	0.0120
Test critical values:	1% level		-4.356068	
	5% level		-3.595026	
	10% level		-3.233456	
*MacKinnon (1996) one-sided p-values.				

Residual variance (no correction)	0.007680
HAC corrected variance (Bartlett kernel)	0.005313

Phillips-Perron Test Equation

Dependent Variable: D(LNTR,2)

Method: Least Squares

Date: 05/27/19 Time: 07:43

Sample (adjusted): 1992 2017

Included observations: 26 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNTR (-1))	-0.946686	0.216618	-4.370304	0.0002
C	0.145423	0.051697	2.812997	0.0099
@TREND (1990)	-0.001977	0.002454	-0.805739	0.4286
R-squared	0.454752	Mean dependent var		-0.009089
Adjusted R-squared	0.407340	S.D. dependent var		0.121030
S.E. of regression	0.093174	Akaike info criterion		-1.800524
Sum squared resid	0.199673	Schwarz criterion		-1.655359
Log likelihood	26.40681	Hannan-Quinn criter.		-1.758722
F-statistic	9.591336	Durbin-Watson stat		1.896037
Prob(F-statistic)	0.000935			

Null Hypothesis: LNGDP has a unit root

Exogenous: Constant

Bandwidth: 2 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-1.680150	0.4295
Test critical values: 1% level	-3.699871	
5% level	-2.976263	
10% level	-2.627420	

*MacKinnon (1996) one-sided p-values.

Residual variance (no correction) 0.001823

HAC corrected variance (Bartlett kernel) 0.001631

Phillips-Perron Test Equation

Dependent Variable: D(LNGDP)

Method: Least Squares

Date: 01/17/19 Time: 07:49

Sample (adjusted): 1991 2017

Included observations: 27 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNGDP (-1)	-0.014325	0.008944	-1.601593	0.1218
	0.273623	0.093753	2.918539	0.0073
R-squared	0.093056	Mean dependent var		0.124092
Adjusted R-squared	0.056778	S.D. dependent var		0.045684
S.E. of regression	0.044368	Akaike info criterion		-3.321394
Sum squared resid	0.049214	Schwarz criterion		-3.225407
Log likelihood	46.83883	Hannan-Quinn criter.		-3.292852
F-statistic	2.565100	Durbin-Watson stat		1.874201
Prob(F > 0.1)	0.121808			

Null hypothesis: LNGDP has a unit root

Exponential Constant, Linear Trend

Hannan-Quinn (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-3.258068	0.0948
Test critical values: 1% level	-4.339330	
5% level	-3.587527	
10% level	-3.229230	

*MacKinnon (1996) one-sided p-values.

Residual variance (no correction)	0.001276
HAC corrected variance (Bartlett kernel)	0.001020

Phillips-Perron Test Equation

Dependent Variable: D(LNGDP)

Method: Least Squares

Date: 05/07/19 Time: 07:50

Sample (adjusted): 1991-2017

Included observations: 27 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNGDP(-1))	-0.494714	0.150084	-3.296253	0.0030
Constant	4.462871	1.309563	3.407908	0.0023
@TPTSD(1990)	0.058958	0.018396	3.204963	0.0038
R-squared	0.364881	Mean dependent var		0.124092
Adjusted R-squared	0.311955	S.D. dependent var		0.045684
S.E. of regression	0.037894	Akaike info criterion		-3.603589
Sum of squares resid	0.034464	Schwarz criterion		-3.459607
Log likelihood	51.64845	Hannan-Quinn criter.		-3.560776
F-statistic	6.894105	Durbin-Watson stat		1.739913
Prob. (F-statistic)	0.004308			

Null Hypothesis: D(LNGDP) has a unit root

Exogenous: Constant

Bandwidth: 4 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-4.707159	0.0009
Test critical values: 1% level	-3.711457	
5% level	-2.981038	
10% level	-2.629906	

*MacKinnon (1996) one-sided p-values.

Residual variance (no correction)	0.001874
HAC corrected variance (Bartlett kernel)	0.000973

Phillips-Perron Test Equation

Dependent Variable: D(LNGDP,2)

Method: Least Squares

Date: 05/27/19 Time: 07:52

Sample (adjusted): 1992 2017

Included observations: 26 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNGDP (-1))	-0.992182	0.212547	-4.668063	0.0001
LNGDP constant	0.120283	0.028552	4.212790	0.0003
R-squared	0.475877	Mean dependent var		-0.006456
Adjusted R-squared	0.454039	S.D. dependent var		0.060975
S.E. of regression	0.015054	Akaike info criterion		-3.288120
Sum of squared resid	0.048716	Schwarz criterion		-3.191343
Log likelihood	41.71556	Hannan-Quinn criter.		-3.260252
F-statistic	21.79081	Durbin-Watson stat		1.888232
Prob(F >= 21.79081)	0.000097			

Null Hypothesis: D(LNGDP) has a unit root

Exponential smoothing: Constant, Linear Trend

Bandwidth: 3 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-4.736707	0.0043
Adjusted p-values:	1% level	-4.356068	
	5% level	-3.595026	
	10% level	-3.233456	

*MacKinnon (1996) one-sided p-values.

Residual variance (no correction)					0.001802
HAC corrected variance (Bartlett kernel)					0.001245
Phillips-Perron Test Equation					
Dependent Variable: D(LNGDP,2)					
Method: Least Squares					
Date: 05/27/19 Time: 07:54					
Sample (adjusted): 1992 2017					
Included observations: 26 after adjustments					
Variable	Coefficient	Std. Error	t-Statistic	Prob.	
D (LNGDP (-1))	-1.026314	0.215921	-4.753187	0.0001	
C	0.141210	0.036038	3.918327	0.0007	
@TREND (1990)	-0.001143	0.001197	-0.954643	0.3497	
R-squared	0.495854	Mean dependent var			-0.006456
Adjusted R-squared	0.452015	S.D. dependent var			0.060975
S.E. of regression	0.045137	Akaike info criterion			-3.250055
Sum squared resid	0.046859	Schwarz criterion			-3.104890
Log likelihood	45.25072	Hannan-Quinn criter.			-3.208253

F-statistic	11.31083	Durbin-Watson stat	1.899204
Prob(F-statistic)	0.000380		
Null Hypothesis: LNRI has a unit root			
Exogenous: Constant			
Bandwidth: 1 (Newey-West automatic) using Bartlett kernel			
		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-3.398304	0.0200
Test critical values:	1% level	-3.699871	
	5% level	-2.976263	
	10% level	-2.627420	
*MacKinnon (1996) one-sided p-values.			
Residual variance (no correction)			0.849570
HAC corrected variance (Bartlett kernel)			0.800328
Phillips-Perron Test Equation			
Dependent Variable: D(LNRI)			
Method: Least Squares			
Date: 05/27/19 Time: 07:56			

Sample (adjusted): 1991 2017

Included observations: 27 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNRI (-1)	-0.645315	0.187613	-3.439609	0.0021
C	0.652768	0.266001	2.454009	0.0214
R-squared	0.321222	Mean dependent var		-0.006826
Adjusted R-squared	0.294071	S.D. dependent var		1.140069
S.E. of regression	0.957881	Akaike info criterion		2.823000
Sum squared resid	22.93839	Schwarz criterion		2.918988
Log likelihood	-36.11050	Hannan-Quinn criter.		2.851543
F-statistic	11.83091	Durbin-Watson stat		2.113526
Prob(F-statistic)	0.002054			
Null Hypothesis: LNRI has a unit root				
Exogenous: Constant, Linear Trend				
Bandwidth: 1 (Newey-West automatic) using Bartlett kernel				
			Adj. t-Stat	Prob.*
Phillips-Perron test statistic			-3.856745	0.0287
Test critical values:	1% level		-4.339330	
	5% level		-3.587527	
	10% level		-3.229230	

*MacKinnon (1996) one-sided p-values.

Residual variance (no correction)	0.766846
HAC corrected variance (Bartlett kernel)	0.725778

Phillips-Perron Test Equation

Dependent Variable: D(LNRI)

Method: Least Squares

Date: 05/27/19 Time: 07:57

Sample (adjusted): 1991 2017

Included observations: 27 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNRI (-1)	-0.752359	0.193703	-3.884087	0.0007
C	1.312637	0.484469	2.709432	0.0122
@TREND (1990)	-0.039318	0.024436	-1.609041	0.1207

R-squared	0.387316	Mean dependent var	-0.006826
Adjusted R-squared	0.336259	S.D. dependent var	1.140069
S.E. of regression	0.928817	Akaike info criterion	2.794630
Sum squared resid	20.70484	Schwarz criterion	2.938612

Log likelihood	-34.72751	Hannan-Quinn criter.	2.837443
F-statistic	7.585954	Durbin-Watson stat	2.085401
Prob(F-statistic)	0.002798		

3. Descriptive Data

	LNI	LNRI	LNTR	LNGE	LNGDP
Mean	9.072	1.004	9.269	9.343	10.497
Median	9.154	1.141	9.226	9.377	10.525
Maximum	10.820	2.586	10.866	11.097	12.079
Minimum	7.128	-1.112	7.410	7.203	8.728
Std. Dev.	1.074	0.987	1.046	1.075	1.003
Skewness	-0.009	-0.56	-0.038	-0.04	-0.06
Kurtosis	1.786	2.674	1.860	2.122	1.900
Jarque-Bera	1.721	1.588	1.523	0.907	1.429
Probability	0.423	0.452	0.467	0.635	0.489
Sum	254.013	28.116	259.528	261.605	293.924
Sum Sq. Dev.	31.158	26.312	29.546	31.209	27.202
Observations	28	28	28	28	28

Source: values obtained from EViews

4. Normality Test

Residual variance (no correction)				0.001802
HAC corrected variance (Bartlett kernel)				0.001245
Phillips-Perron Test Equation				
Dependent Variable: D(LNGDP,2)				
Method: Least Squares				
Date: 05/27/19 Time: 07:54				
Sample (adjusted): 1992 2017				
Included observations: 26 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D (LNGDP (-1))	-1.026314	0.215921	-4.753187	0.0001
C	0.141210	0.036038	3.918327	0.0007
@TREND (1990)	-0.001143	0.001197	-0.954643	0.3497
R-squared	0.495854	Mean dependent var		-0.006456
Adjusted R-squared	0.452015	S.D. dependent var		0.060975
S.E. of regression	0.045137	Akaike info criterion		-3.250055
Sum squared resid	0.046859	Schwarz criterion		-3.104890
Log likelihood	45.25072	Hannan-Quinn criter.		-3.208253

F-statistic	11.31083	Durbin-Watson stat	1.899204
Prob(F-statistic)	0.000380		

Null Hypothesis: LNRI has a unit root

Exogenous: Constant

Bandwidth: 1 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-3.398304	0.0200
Test critical values:		
1% level	-3.699871	
5% level	-2.976263	
10% level	-2.627420	

*MacKinnon (1996) one-sided p-values.

Residual variance (no correction)	0.849570
HAC corrected variance (Bartlett kernel)	0.800328

Phillips-Perron Test Equation

Dependent Variable: D(LNRI)

Method: Least Squares

Date: 05/27/19 Time: 07:56

Sample (adjusted): 1991 2017

Included observations: 27 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNRI (-1)	-0.645315	0.187613	-3.439609	0.0021
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R-squared	0.321222	Mean dependent var		-0.006826
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S.E. of regression	0.957881	Akaike info criterion		2.823000
Sum squared resid	22.93839	Schwarz criterion		2.918988
Log likelihood	-36.11050	Hannan-Quinn criter.		2.851543
F-statistic	11.83091	Durbin-Watson stat		2.113526
Prob(F-statistic)	0.002054			
Null Hypothesis: LNRI has a unit root				
Exogenous: Constant, Linear Trend				
Bandwidth: 1 (Newey-West automatic) using Bartlett kernel				
			Adj. t-Stat	Prob.*
Phillips-Perron test statistic			-3.856745	0.0287
Test critical values:	1% level		-4.339330	
	5% level		-3.587527	
	10% level		-3.229230	

*MacKinnon (1996) one-sided p-values.

Residual variance (no correction)	0.766846
HAC corrected variance (Bartlett kernel)	0.725778

Phillips-Perron Test Equation

Dependent Variable: D(LNRI)

Method: Least Squares

Date: 05/27/19 Time: 07:57

Sample (adjusted): 1991 2017

Included observations: 27 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNRI (-1)	-0.752359	0.193703	-3.884087	0.0007
C	1.312637	0.484469	2.709432	0.0122
@TREND (1990)	-0.039318	0.024436	-1.609041	0.1207

R-squared	0.387316	Mean dependent var	-0.006826
Adjusted R-squared	0.336259	S.D. dependent var	1.140069
S.E. of regression	0.928817	Akaike info criterion	2.794630
Sum squared resid	20.70484	Schwarz criterion	2.938612

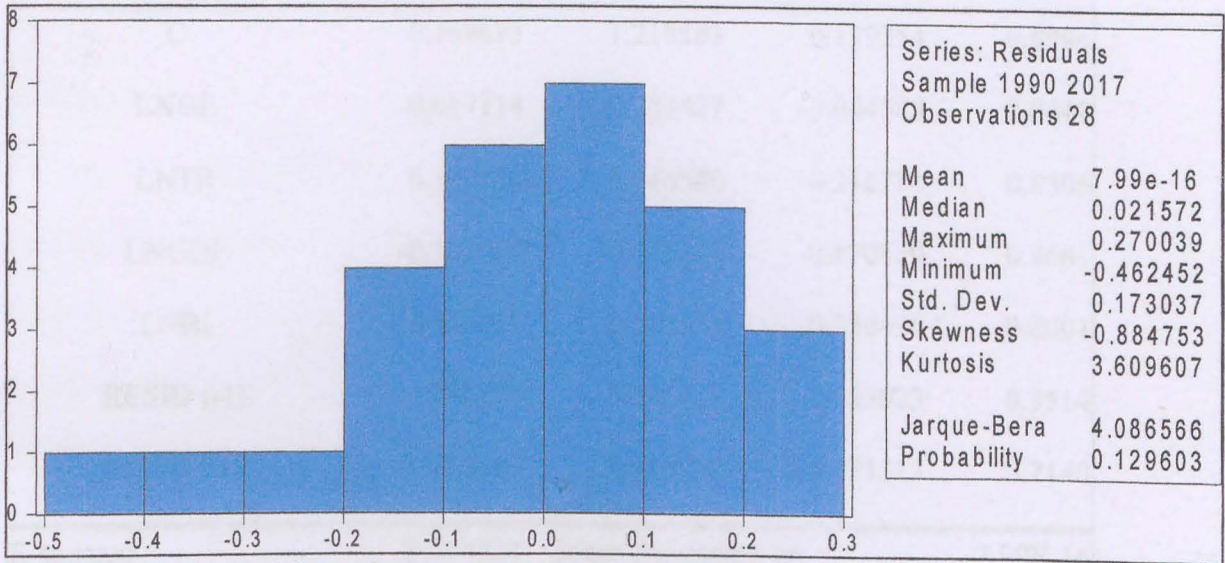
Log likelihood	-34.72751	Hannan-Quinn criter.	2.837443
F-statistic	7.585954	Durbin-Watson stat	2.085401
Prob(F-statistic)	0.002798		

3. Descriptive Data

	LNI	LNRI	LNTR	LNGE	LNGDP
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Minimum	7.128	-1.112	7.410	7.203	8.728
Std. Dev.	1.074	0.987	1.046	1.075	1.003
Skewness	-0.009	-0.56	-0.038	-0.04	-0.06
Kurtosis	1.786	2.674	1.860	2.122	1.900
Jarque-Bera	1.721	1.588	1.523	0.907	1.429
Probability	0.423	0.452	0.467	0.635	0.489
Sum	254.013	28.116	259.528	261.605	293.924
Sum Sq. Dev.	31.158	26.312	29.546	31.209	27.202
Observations	28	28	28	28	28

Source: values obtained from EViews

4. Normality Test



Source: values obtained from EViews

5. Serial correlation LM Test

Breusch-Godfrey Serial Correlation LM Test:				
F-statistic	0.487064	Prob. F (2,21)		0.6212
Obs*R-squared	1.241260	Prob. Chi-Square (2)		0.5376
Test Equation:				
Dependent Variable: RESID				
Method: Least Squares				
Date: 05/26/19 Time: 17:19				
Sample: 1990 2017				
Included observations: 28				
Pre-sample missing value lagged residuals set to zero.				
Variable	Coefficient	Std. Error	t-Statistic	Prob.

C	0.169693	1.218583	0.139254	0.8906
LNGE	-0.017114	0.383837	-0.044588	0.9649
LNTR	0.140165	0.646580	0.216778	0.8305
LNGDP	-0.125967	0.738251	-0.170629	0.8661
LNRI	0.012023	0.046873	0.256496	0.8001
RESID (-1)	0.234210	0.245755	0.953023	0.3514
RESID (-2)	-0.096186	0.258905	-0.371513	0.7140
R-squared	0.044331	Mean dependent var		7.99E-16
Adjusted R-squared	-0.228718	S.D. dependent var		0.173037
S.E. of regression	0.191807	Akaike info criterion		-0.252334
Sum squared resid	0.772590	Schwarz criterion		0.080717
Log likelihood	10.53267	Hannan-Quinn criter.		-0.150517
F-statistic	0.162355	Durbin-Watson stat		1.867682
Prob(F-statistic)	0.984054			

6. Heteroscedasticity Test

Heteroskedasticity Test: White			
F-statistic	0.745840	Prob. F (13,14)	0.6984
Obs*R-squared	11.45706	Prob. Chi-Square (13)	0.5726
Scaled explained SS	10.08691	Prob. Chi-Square (13)	0.6868

Test Equation:
 Dependent Variable: RESID^2
 Method: Least Squares
 Date: 05/26/19 Time: 17:48
 Sample: 1990 2017
 Included observations: 28
 Collinear test regressors dropped from specification

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.444659	5.185170	-0.278614	0.7846
LNGE	3.658423	6.184255	0.591570	0.5636
LNGE^2	1.930407	1.320330	1.462063	0.1658
LNGE*LNTR	-2.270976	1.774443	-1.279825	0.2214
LNGE*LNGDP	-1.748329	3.104547	-0.563151	0.5822
LNGE*LNRI	0.141741	0.164168	0.863390	0.4025
LNTR	-4.693544	7.195834	-0.652259	0.5248
LNTR^2	0.487729	2.019052	0.241563	0.8126
LNTR*LNGDP	1.601087	3.129923	0.511542	0.6169
LNTR*LNRI	-0.287119	0.371078	-0.773744	0.4520
LNGDP	1.210141	3.445160	0.351258	0.7306

LNGDP*LNRI	0.157769	0.397942	0.396462	0.6977
LNRI	-0.287571	0.492848	-0.583489	0.5688
LNRI^2	-0.011594	0.018719	-0.619393	0.5456
R-squared	0.409181	Mean dependent var		0.028872
Adjusted R-squared	-0.139437	S.D. dependent var		0.047497
S.E. of regression	0.050701	Akaike info criterion		-2.818904
Sum squared resid	0.035988	Schwarz criterion		-2.152802
Log likelihood	53.46465	Hannan-Quinn criter.		-2.615270
F-statistic	0.745840	Durbin-Watson stat		2.123260
Prob(F-statistic)	0.698407			

Source: values obtained from EViews

7. Lang length structure test ARDL model

VAR Lag Order Selection Criteria
Endogenous variables: LNI LNGDP LNGE
LNRI LNTR
Exogenous variables: C
Date: 05/26/19 Time: 18:52
Sample: 1990 2017
Included observations: 26

Lag	LogL	LR	FPE	AIC	SC	HQ
0	6.627759	NA	6.07e-07	-0.125212	0.116729	-0.055542
1	112.1489	162.3401*	1.29e-09*	-6.319143*	-4.867493*	-5.901120*
2	133.5809	24.72926	2.17e-09	-6.044683	-3.383325	-5.278308

* indicates lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion

8. Stability Test

Date: 04/03/19 Time: 17:12

Sample selected: 1991:3Q17

Included observations: 37 after adjustment

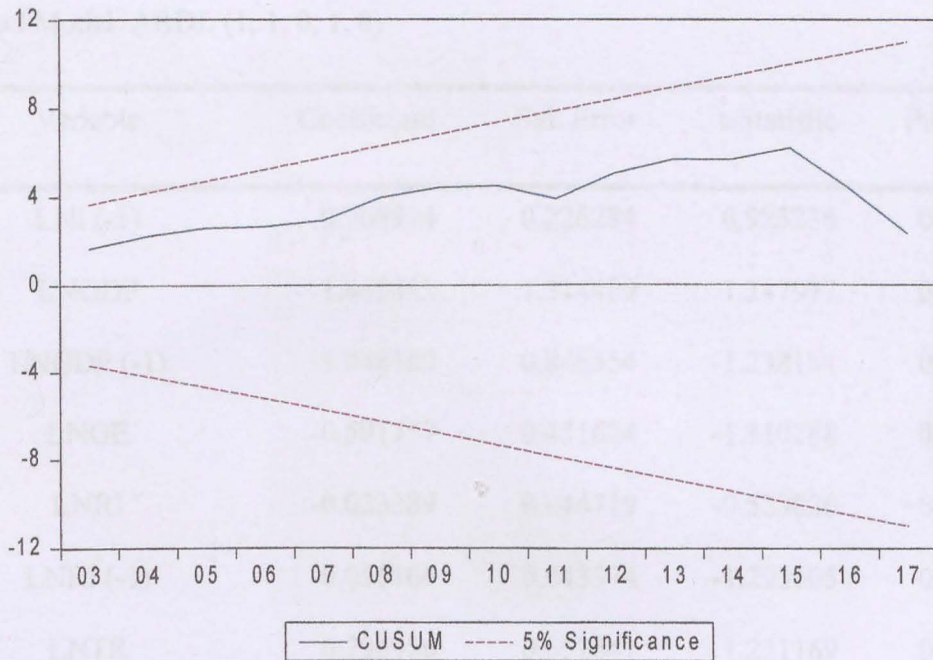
Maximum dependent lags: 1 (Automatic selection)

Model selection method: Akaike info criterion (AIC)

Dynamic regressors (lag, constant): LNQDP LNCS LNEX LNEX2

Fixed regressors: C

Number of models evaluated: 16



Source: values obtained from EViews

9. ARDL bound Test

Dependent Variable: LNI

Method: ARDL

Date: 06/03/19 Time: 17:12

Sample (adjusted): 1991 2017

Included observations: 27 after adjustments

Maximum dependent lags: 1 (Automatic selection)

Model selection method: Akaike info criterion (AIC)

Dynamic regressors (1 lag, automatic): LNGDP LNGE LNRI LNTR

Fixed regressors: C

Number of models evaluated: 16

Selected Model: ARDL (1, 1, 0, 1, 0)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LNI (-1)	0.208914	0.226284	0.923236	0.3675
LNNGDP	1.640452	1.314489	1.247977	0.2272
LNNGDP (-1)	-1.048189	0.846554	-1.238184	0.2307
LNNGE	-0.591757	0.451624	-1.310288	0.2057
LNRI	-0.023389	0.044719	-0.523020	0.6070
LNRI (-1)	-0.056104	0.043374	-1.293505	0.2113
LNTR	0.796986	0.652641	1.221169	0.2370
C	-0.913527	1.412058	-0.646948	0.5254
R-squared	0.977760	Mean dependent var		9.143866
Adjusted R-squared	0.969566	S.D. dependent var		1.023587
S.E. of regression	0.178569	Akaike info criterion		-0.366490
Sum squared resid	0.605850	Schwarz criterion		0.017462
Log likelihood	12.94761	Hannan-Quinn criter.		-0.252321
F-statistic	119.3289	Durbin-Watson stat		2.324426
Prob(F-statistic)	0.000000			

*Note: p-values and any subsequent tests do not account for model selection.



CONTACT

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 Windhoek,
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LANGUAGE & COPY-EDITING CERTIFICATE

8th June 2018

RE: LANGUAGE, COPYEDITING AND PROOFREADING OF GODFRED KENDINGUA'S THESIS FOR THE MASTER OF BUSINESS ADMINISTRATION DEGREE OF THE NAMIBIA BUSINESS SCHOOL OF THE UNIVERSITY OF NAMIBIA

This certificate serves to confirm that I copyedited and proofread GODFRED KENDINGUA'S Thesis for the MASTER OF BUSINESS ADMINISTRATION DEGREE entitled: AN INVESTIGATION INTO THE IMPACT OF FISCAL POLICY ON INVESTMENT IN NAMIBIA FROM 1996 TO 2017

I declare that I professionally copyedited and proofread the thesis and removed mistakes and errors in spelling, grammar, and punctuation. In some cases, I improved sentence construction without changing the content provided by the student. I also removed some typographical errors from the thesis and formatted the thesis so that it complies with the University of Namibia's guidelines.

I am a trained language and copy editor and have edited many Postgraduate Diploma, Masters' Thesis, Dissertations and Doctoral Dissertations for students studying with universities in Namibia, Zimbabwe, eSwatini, South Africa and abroad. I have also copy-edited company documents for companies in the region and abroad.

Please feel free to contact me should the need arise.

Yours Sincerely,

The Rev. Dr. Greenfield Mwakipesile

Levels Equation				
Case 2: Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNGDP	0.748671	1.053367	0.710741	0.4859
LNGE	-0.748031	0.619054	-1.208344	0.2417
LNRI	-0.100486	0.075401	-1.332694	0.1984
LNTR	1.007457	0.909555	1.107638	0.2818
C	-1.154776	1.665051	-0.693538	0.4964

$EC = LNI - (0.7487 * LNGDP - 0.7480 * LNGE - 0.1005 * LNRI + 1.0075 * LNTR - 1.1548)$