AN INVESTIGATION OF THE RELATIONSHIP BETWEEN BALANCE OF PAYMENTS AND ECONOMIC GROWTH IN NAMIBIA

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ABSTRACT

The study investigated the relationship between balance of payments and economic growth for Namibia using quarterly time series data over the period 1999q1to 2018q2. The variables used include real gross domestic product, balance of payments, real exports, real effective exchange rate, net foreign capital inflow and terms of trade. This study employed time series techniques such as unit root and cointegration. The Bounds co-integration analysis and Autoregressive Distributive Lag (ARDL) model were used in estimating the long run relationship between balance of payments and economic growth. Cointegration was found among the variables in the models that were estimated, that is, Thirlwall's extended model for developing countries and the weak version of Thirlwall's law. The study found a significant long run relationship between balance of payments and economic growth in Thirlwall's extended model suggesting that the Namibian economy is balance of payments constrained. The findings endorse that effective policies that promote exports and boost trade have a positive impact on economic growth in Namibia. Therefore, promoting expansion of the export sector and maintaining a favorable balance of payments position in various avenues can enhance economic growth in Namibia.

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DEDICATION

This thesis is dedicated to my lovely family, my parents Mr and Mrs J. R. Simemeza, my husband, Rutendo and my sons, Adiel and Ashriel who are my source of inspiration.

DECLARARTION

I, Karen Kudzai Mangwendeza, hereby declare 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.

…….. Date ….……

Karen Kudzai Mangwendeza

ACRONYMS

ACP	African Caribbean and Pacific Countries
ADF	Augmented Dickey Fuller
AGOA	Africa Growth and Opportunity Act
AIC	Akaike Information Criterion
AR	Auto-Regressive
ARDL	Autoregressive Distributed Lag
BON	Bank of Namibia
BOP	Balance of payments
BPCG	Balance of payments constrained growth
CMA	Common Monetary Area
COTONOU	EU and ACP Trade Agreement
ECT	Error correction term
EPZ	Export Processing Zone
FDI	Foreign Direct Investment
FEVD	Forecast Error Variance Decomposition
FPE	Final Prediction Error
GDP	Gross Domestic Product

GIRF	Generalised Impulse Response Function
GRN	Government of the Republic of Namibia
HQ	Hannan-Quinn Information Criterion
IMF	International Monetary Fund
IPP	International Investment Position
KPSS	Kwiatkowski, Phillips, Schmidt and Shin
LFS	Labour Force Survey
MTISMED	Ministry of Industrialisation, Trade and SME Development
NDG	National Development Goal
NDP	National Development Plan
NFCI	Net Foreign Capital Inflow
NSA	National Statistics Agency
OECD	Organisation for Economic Cooperation and Development
OLS	Ordinary Least Squares
PP	Phillips and Perron
REER	Real Effective Exchange Rate
RSADC	Rest of the Southern Africa Development Community
SACU	Southern Africa Customs Union

SADC	Southern Africa Development Community
SC	Schwarz Information Criterion
SDR	Special Drawing Rights
SSA	Su-Saharan Africa
TOT	Terms of Trade
UECM	Unrestricted Error Correction Model
USA	United States of America
VAR	Vector Auto-Regressive
VAT	Value Added Tax
VECM	Vector Error Correction Model
WEO	World Economic Outlook
WTO	World Trade Organisation

CHAPTER ONE

INTRODUCTION

1.1 Background

Over the years, international trade which involves imports, exports and the balance of payments (BOP) has reflected contribution towards the direction in which economic growth takes in most countries in the world. According to Lima and Setterfield (2008), aggregate demand plays an important role in determining economic growth in the long run. Accumulations of potential output are demand-determined (Setterfield, 2003). Lima and Setterfield (2008) argue that the Keynesian demand-oriented approach that emphasizes the external constraint on growth is the replica of balance of payments constrained growth. Balance of payments relates to transactions between a country and the rest of the world and these inevitably affect that country's economic growth rate.

The components of the BOP include the current account, the capital account and the financial account. A country's balance of payments is the net of all imported and exported goods, services, financial capital and financial transfers. Thus, it represents a summation of demand for the country's currency, and the country's demand for foreign currencies (Brown, 2016). In the balance of payments, sources of funds for a nation, such as exports or the receipts of loans and investments, are recorded as positive or surplus items and uses of funds, such as for imports, are recorded as negative or deficit items. As long as the capital account is defined broadly, the sum of all transactions recorded in the balance of payments must be zero. According to Seth (2019),

equilibrium is that state of the balance of payments over the relevant time period which makes it possible to sustain an open economy without severe unemployment on a continuing basis. A sign of the soundness of a country's economy is therefore equilibrium in the balance of payments. Several variables join together to constitute equilibrium in the balance of payments position of a country. These include national income at home and abroad, the prices of goods and factors, the supply of money and the rate of interest among others, all of which determine the exports, imports and demand and supply of foreign currency (Mukher, 2019). For short or long periods, disequilibrium may arise. When a country is heading towards economic and financial bankruptcy, it is indicated by a continued disequilibrium in the balance of payments. Every country, consequently, must attempt to maintain balance of payments in equilibrium.

Balance of payments constrained growth can be defined as the situation where the performance of a country in foreign markets as well as the response of the world to this performance constrained the growth of the country to a rate less than the rate required for addressing domestic economic problems (Adewuyi & Adeoye, 2000). These problems include: the prevalence of unemployment, underemployment, high import demand by Namibians, low export, the existence of idle resources and low capacity utilization (Hussain 1999; McCombie & Thirlwall 1994). Empirical studies have been carried out to evaluate the relationship between balance of payments and gross domestic product (GDP) growth in various African countries and the studies found out that growth in such countries depended on their respective balance of payments positions. A

small open economy such as Namibia, its balance of payments (BOP) is arguably the single most important indicator of the health of the local economy (Brown, 2016). Over the years, Namibia has been experiencing an overall balance of payments deficit which has been a cause of concern to the economic and monetary authorities. The merchandise trade deficit has been increasing substantially throughout the years and has influenced the country's overall balance of payments significantly. The country experienced an overall balance of payments surplus in the early years since independence, but from 2003 the balance of payments significantly changed into a deficit (BON, 2003). In Namibia, where a currency peg and twin deficits (current account and fiscal) present a form of "impossible trinity" if continued in perpetuity, it is pertinent to ensure an optimal BOP position in the long run.

The increase in the inflation-adjusted market value of the goods and services produced by an economy over time is economic growth. It is conventionally measured as the percent rate of increase in real gross domestic product, or real GDP, (IMF, 2012). To determine economic growth, the GDP is compared to the population, also known as the per capita income. Growth rate is associated with countries embracing the ongoing globalization and increasing openness to international exchange of goods and services as well as ideas and technologies (Osabuolien, 2007). Growth does not occur in isolation as events in one country and region can have a significant effect on growth prospects in another.

According to the International Monetary Fund in its World Economic Outlook (WEO) for April 2018, the global economic growth strengthened to 3.8 percent in 2017 and was expected to reach 3.9 percent in both 2018 and 2019 in its continued upward momentum. Favourable market sentiment, accommodative financial conditions together with international spin-offs resulting from expansionary fiscal policy in the United States will support global growth. Namibia experienced episodes of slow economic growth in the 1990s, the transitional period after independence. Although some acceleration in GDP growth was experienced 2000 – 2015, a very low GDP growth rate of 0.7% was recorded in 2016, (BON, 2018). Namibia's real GDP growth is projected to improve from -0.8 percent in 2017 to 0.6 percent and 1.9 percent in 2018 and 2019, respectively (BON, 2018). The growth projections of 1.4 percent and 2.1 percent forecasted during February 2018 were not attained, reflecting the disappointing growth rate for 2017 that was published in the Preliminary National Accounts for 2017.

In Namibia, Eita and Gaomab (2012) investigated the macroeconomic determinants of balance of payments and found that fiscal balance, GDP and interest rate are the main determinants of balance of payments in Namibia. Fleermuys (2005) examined the monetary approach to BOP for Namibia and found that the BOP was not a purely monetary phenomenon. Eita (2013) estimated the Marshall–Lerner condition in Namibia and found that the Marshall-Lerner condition holds for the Namibian economy. With regards to BOP and economic growth in Namibia, it appears little has been done in the area of singularly testing the balance of payments constrained growth model on the Namibian economy.

The rationale is that Namibia is an ideal economy where economic growth is constrained by external factors since substantial income is derived from export of non-fuel minerals, therefore, Thirwall's model is a capable medium to test Namibia's economic growth pattern constrained by unfavorable balance of payments. It is against this background that this study attempts to narrow the gap in the available literature of BOP and economic growth and recommend policy actions which may be considered by the government through the Ministry of Industrialisation, Trade and SME Development (MITSMED).

1.2 Problem Statement

Given the BOP deficit episodes and periods of slow economic growth in Namibia it is imperative that the relationship between BOP and economic growth be investigated to determine the impact of BOP position on economic growth in the long run. The overall BOP fluctuated between surpluses and deficits since 1990 recording its maximum value in 2008 and minimum value in 2010 (BON, 2017). Eita and Jordan (2007); Nashiidi and Ogbokor (2013) investigated export-led growth in Namibia concentrating only on the impact of exports on economic growth. The Granger causality test indicates a uni-directional causation from export to economic growth. Economic growth is dependent on export performance as suggested by the findings. Eita, Manuel and Naimhwaka (2018) investigated the macroeconomic determinants of the current account balance and found a twin deficit case in Namibia meaning a shortfall in the current account is matched with a fiscal deficit during the study period. A deficit in the current account naturally affects the overall BOP position. It is argued that persistent BOP difficulties

in many developing countries may be explained by the BOP constrained model (Alleyne & Francis, 2007). The research gap is that no study has been conducted so far in reference specifically to Namibia in which the BOP constrained growth theory has been tested. The theory should be tested in Namibia as it helps to explain the relationship between balance of payments and economic growth. It is against this background that this study would like to narrow the gap in the available literature of balance of payments position and economic growth in Namibia. The study also unfolds problems of low economic growth emanating from inadequate industrialisation initiatives for export.

1.3 Objective of the study

The study is based on the following broad objective:

To investigate the relationship between the balance of payments and economic growth in Namibia.

Specific objectives are:

1) To test if there is a long run relationship between balance of payments and economic growth.
2) To test if there is a long run relationship between exports and economic growth.

1.4 Hypotheses of the study

To give the scientific base to the study, the following hypotheses are tested in the study:

1) H_0: There is no long run relationship between balance of payments and economic growth in Namibia

   H_1: There is a long run relationship between balance of payments and economic growth in Namibia

2) H_0: There is no long run relationship between export and economic growth in Namibia

   H_1: There is a long run relationship between export and economic growth in Namibia

1.5 Significance of the study

On the basis of previous studies, a conclusion can be drawn that management of balance of payments position is an important issue for a country because it affects the whole economy and depreciates or appreciates the value of its currency. The study needs to be carried out in order to inform the government of the need to enhance, formulate and implement policies and strategies that enables the economy to maintain a certain optimal level of the balance of payments position that stimulates positive economic growth. Government will be able to implement the appropriate effective trade policies informed by the nature of relationship between BOP and economic growth in Namibia established by the study. The study also adds to the available literature of balance of payments in Namibia by showing the impact that different BOP positions have on the economic growth of the country.

1.6 Limitations of the study

In order to obtain robust results, the study would have used a larger sample from years dating further back from the 1980s. Unfortunately, data for some of the variables is not available for those years as Namibia had not yet obtained independence.

1.7 Delimitations of the study

The study makes use of Quarterly frequency rather than the yearly frequency that other researchers used in their studies on the topic in order to ensure an adequate data sample for regression analysis.

1.8 Outline of the study

The study is organized as follows: Chapter 2 focuses on Namibia's economic structure. Chapter 3 analyses the literature review both theoretical and empirical literature. Chapter 4 covers the methodology used in the study. Chapter 5 reveals the empirical results. Lastly, chapter 6 provides conclusions and recommendations

CHAPTER TWO

NAMIBIA'S ECONOMIC STRUCTURE AND ITS BALANCE OF PAYMENTS

2.1 Introduction

The purpose of this chapter is to provide an overview of Namibia's BOP and economic structure. The chapter is organized as follows: section 2.2 reviews Namibia's economic structure, section 2.3 reviews the import and export market and section 2.4 reviews financial and capital account. Section 2.5 reviews capital flows, and section 2.6 reviews real exchange rate and terms of trade, 2.7 reviews trade regime, section 2.8 reviews sustainable debt accumulation and interest payments whilst section 2.9 concludes the chapter.

2.2 Namibia's economic structure

Namibia is located in southern Africa and has 2.641 million inhabitants and a gross domestic product (GDP) of approximately US$13.24 billion (2017), with per capita annual income registered at US$5227.18 (BON, 2017). The World Bank and the IMF classified Namibia as a higher-middle-income country yet Namibia has one of the most unequal income distributions on the African continent, with a Gini coefficient of 0.59. Unemployment (estimated at 34% labor force survey, LFS 2016), poverty (18.3% of the population live on less than US$1.90 a day) and household food security are major challenges faced by the country (World Bank, 2018). According to Humavindu (2013), the Namibian economy is dualistic in character as it comprises a modern market sector based on capital-intensive industry and farming, producing most of the country's

wealth, and a traditional subsistence farming sector. The Namibian currency is pegged at the same rate with the neighbouring South Africa's currency, an economy 40 times larger (Sherborne, 2009). This means that policy makers in South Africa determine important economic variables such as prices, interest rates and exchange rates (Samundengu, 2016).

The extraction and processing of minerals for export is what Namibia's economy heavily dependent on. According to the CIA World Factbook (2015), mining accounts for 11.5% of GDP but provides more than 50% of foreign exchange earnings. Namibia is a primary source for gem-quality diamonds because of rich alluvial diamond deposits in the country. The primary sector in Namibia also includes the rearing of livestock, processing of meat products, crop farming and forestry. Namibia also has one of the most productive fishing industries in the world based on the Benguela Current system (World Bank, 2017). Namibia relies on primary sector outputs for export earnings, particularly diamonds, uranium, gold, meat, fish and grapes. In the early 2000s, export prices were broadly favourable, especially for commodities. However, commodity prices have taken a dive, which has resulted in lower export earnings for Namibia, at least in hard currency terms (Brown, 2016).

It is accepted that countries with good export performance also do well in their Gross Domestic Product (GDP) performance and vice versa (Jordaan & Eita, 2007). Naturally the growth rate of the economy was affected by the reduction in the world commodity

prices and episodes of economic contraction were witnessed over the years in the country. The global economic crisis of 2008/09 confirmed the vulnerability of the Namibian economy to external shocks that led to the slowdown of Namibia's mining sector and hence, economic shrinkage of 2009. Historically much of the foreign investment came in the form of foreign direct investment into the mining sector, but this flow has over time intermittently been hampered by the commodity price cycle turns against the country.

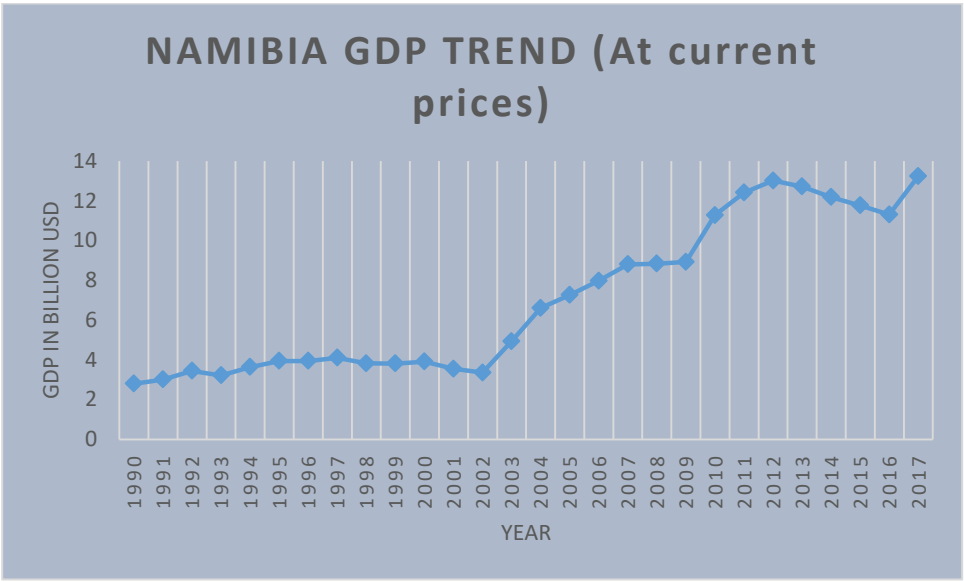

Figure 2.1: Author's compilation using data from Bank of Namibia

The mining sector, and diamond mining in particular, has been one of the largest contributors to growth over the years. The accelerated growth in the early to mid-2000's can be attributed to the boom in the mining sector which resulted from relatively higher prices and increased volumes from the mining production. The mining sector has also attracted significant foreign direct investment (FDI) during those years (Nakale, 2015).

Overall, inflation rate has been of single digit except in 2002 and 2008 (BON, 2019). Inflation rate hit 11.3% in 2002 due to depreciation of the South African Rand to which

Namibian Dollar is pegged, causing higher importation of inflation while the 2008 rate was attributed to fuel and food prices global spike. Inflation in 2018 was 3.51% and stands at 4.70% as of January 2019 (BON, 2019).

2.3 Import and Export market

Namibia is made vulnerable to short and long-term environmental shocks because the Namibian economy is not well diversified as it concentrates on primary sector activities namely the extraction and processing of minerals, commercial livestock farming and fishing (World Bank, 2013). Namibia does not produce many luxury products; therefore these goods must be sourced externally. Namibia imports food products; petroleum products and fuel, machinery, transport equipment, production equipment and chemicals. Top import sources include South Africa, Bulgaria, Botswana, China, Zambia, India, United States of America, Peru, United Arab Emirates and Germany (NSA, 2017). A negative is reflected on Namibia's current account as money flows out of the country to purchase these goods. Sizable construction boom has occurred in Namibia since 2011. Some of this construction has been externally funded, particularly in the mining sector, while the rest has been funded domestically (Brown, 2016). Construction products have been imported since little construction material is domestically produced thereby increasing the import bill.

South Africa is Namibia's major trading partner because of the historical connection between the two countries. Namibia's imports that come from neighboring South Africa constitute 66% of the total imports. Countries that follow South Africa where Namibia

imports from include the Netherlands, United Kingdom and China (Trading Economics, 2019). Namibia imports substantial quantities of agricultural food products because of the geographical nature of the country that reduces its capacity to produce adequate food products. Machinery and other equipment that is not manufactured locally are also imported potentially increasing the merchandise trade deficit which affects the current account.

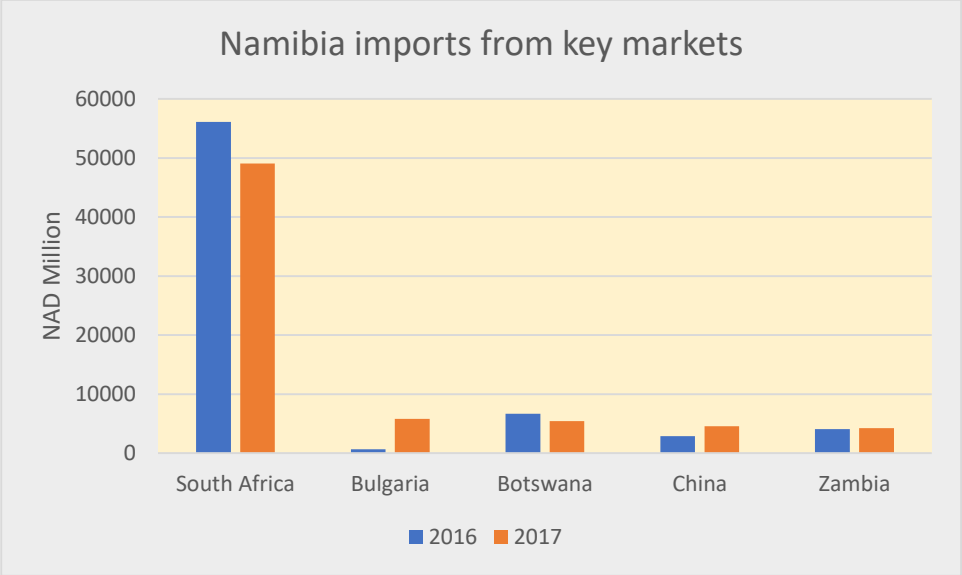

Figure 2.2: Author's compilation with data from NSA Annual Trade Statistics Bulletin

The exports of Namibia are mostly diamonds comprising 25% of the total exports. Other exports include uranium, lead, zinc, tin, silver, tungsten, food and live animals and manufactured products. The main exports partners for Namibia are South Africa with 27% of total exports and the United Kingdom with 17% of total exports. The other major export destinations include the USA, Angola, Netherlands and Spain, (Trading Economics, 2019).

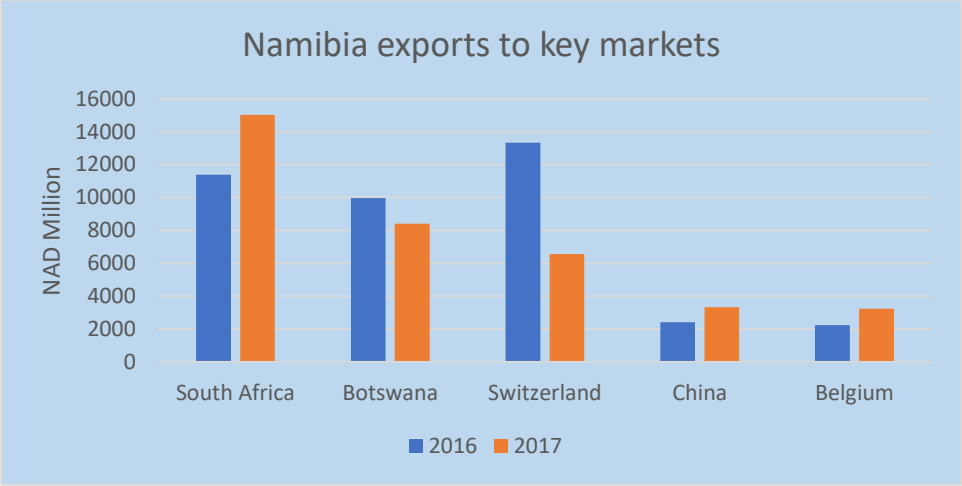

Figure 2.3: Author's compilation with data from Namibia Statistics Agency Annual trade statistics bulletin 2017

Namibia is a member of both Southern African Customs Union (SACU) and Southern African Development Community (SADC) and as a result Namibian exports enjoy duty free access to the economies of Botswana, Lesotho, South Africa and Swaziland. The target is to deepen economic integration and ensure that there is a free trade area among the economies of the SADC 15 member states. However, Namibian exports are relatively minimal to the rest of SADC region (Trading Economic, 2013). Namibia has experienced ever larger merchandise trade deficits over the past years. Historically the merchandise trade deficit has been funded from three major sources: firstly, within the current account, via net inflows from tourism activities as well as inflows from the (SACU); secondly, from capital and financial account surpluses, primarily driven by inward foreign investment; and of late, by foreign public debt issuance, (Brown, 2016). The government of Namibia through the Ministry of Industrialisation, Trade and SME Development (MITSMED) has put measures in place to boost trade through investment

incentives, export processing zones, tax free regimes and investment center and the foreign investment act.

- Investment incentives

  The Ministry of Trade and Industry implemented investment incentives to boost export and growth through value addition to attract foreign direct investment (FDI) inflows. Fiscal incentives are policies that are designed to reduce tax burden of a firm and they include tax concessions in the form of reduction of the standard corporate income tax rate, accelerated depreciation allowances on capital taxes, exemption from import duties on capital taxes, exemption from import duties and duty drawbacks on exports (Banga, 2003). The government also adopted financial incentives, which involve direct contributions to a firm from the government to encourage increased production for the export market (including direct capital subsidies or subsidized loans).

- Export processing zones

  The government of Namibia adopted the export processing zones (EPZs) in 1995 to mainly enhance export and ultimately economic diversification (GRN, 2006). The main objectives of EPZs include facilitating imports of raw materials and capital, facilitating the transfer of technical and industrial skills to the local labor force, contributing towards an increased share of the manufacturing sector to job creation and GDP and enhancing the diversification of the local economy. The companies established under EPZ are in Swakopmund, Walvis Bay, Okahandja, Keetmanshoop, Tsumeb and Oshikango. Walvis Bay is located strategically to reduce costs on transportation where bulk cargo is efficiently

handled and hence is an attraction to companies with intentions of operating under the EPZ.

- Tax free regimes

  Corporate income tax, duties and value added tax (VAT) on machinery, equipment and raw materials imported into the country for manufacturing purposes are exempted for EPZ enterprises. Taxes that are paid include the income tax on employees' income as well as the 10% withholding tax (non-resident shareholders) on declared dividends. Equal treatment and eligibility to the EPZ incentives is extended to local and international investors who meet the conditions for admission under the EPZ.

- Investment centre and the Foreign Investment Act

  In 1992 the Namibian Investment Centre was established under the Ministry of Trade and Industry and serves to administer the Foreign Investments Act (GRN, 1993). Provided the foreign nationals comply with any formalities or requirements prescribed by any law in relation to the relevant business activity, the act allows that any business activity in which any Namibian may undertake they can invest and engage in them. In 2016, the Namibia investment promotions Act was enacted and showed changes from the foreign investment Act to emphasize more capital retainment and increased local share ownership.

2.4 Financial and Capital Account

The net change in ownership of national assets illustrates the capital account. It measures financial transactions that do not affect income, production, or savings and examples include international transfers of drilling rights, trademarks, and copyrights (Amadeo, 2019). In Namibia, on the capital account side, the overall balance is determined by portfolio flows into and out of the country, and foreign direct investment inflows, primarily (Brown, 2016). Historically Namibia's merchandise trade deficit was funded among other sources from capital and financial account surpluses, primarily driven by inward foreign investment; and later on, issuance of foreign public debt. The financial account is a measurement of increases or decreases in international ownership of assets owned by individuals, businesses, the government or the central bank. Assets include direct investments, securities such as stocks and bonds, and commodities like gold and hard currencies. The financial account has two sub-accounts; that is, domestic ownership of foreign assets and foreign ownership of domestic assets. Domestic ownership of foreign assets is by the private sector, the government or central bank reserves and the assets include deposits at foreign banks, loans to foreigners, securities of foreign-owned companies, direct investments made in foreign countries and commodities, such as gold, held in other countries. Foreign assets owned by the government can include foreign currencies held in reserve and this component does not include the central bank's reserve position in the International Monetary Fund (IMF). The central bank also owns currency swaps with other central banks.

The other subaccount, foreign ownership of domestic assets has two types of ownership: private and foreign official assets. These domestic assets include deposits

owned by foreigners held at the country's banks, loans made by foreign banks to domestic banks, foreign private purchases of a country's government bonds, such as treasury bills, Corporate securities, such as stocks and bonds, owned by foreigners, foreign direct investment such as reinvested earnings, equities, and debt, other debts owed to foreigners, hard assets, such as gold and other commodities and the country's currency. Foreign official assets include assets mentioned above that are held by foreign governments or foreign central banks and net shipments of the country's currency to foreign governments or foreign central banks.

2.5 Capital flows

Namibia recorded a capital and financial account deficit of N$482.90 Million in the third quarter of 2018 (Trading Economics, 2019). Capital Flows in Namibia averaged -N$1181.41 Million from 1999 until 2018, reaching an all-time high of N$3084.50 Million in the first quarter of 2009 and a record low of -N$8357.80 Million in the third quarter of 2015 (Trading Economics, 2019). High capital inflows in Namibia in 2009 are attributed to large foreign direct investments made in the mining sector at that time. However, average capital account deficits over the years show that Namibia is characterised by capital flight, for instance, between the periods 2003-2012, Namibia was estimated to have lost about US$ 6 032 million in capital flight (Kar & Spanjers, 2014).

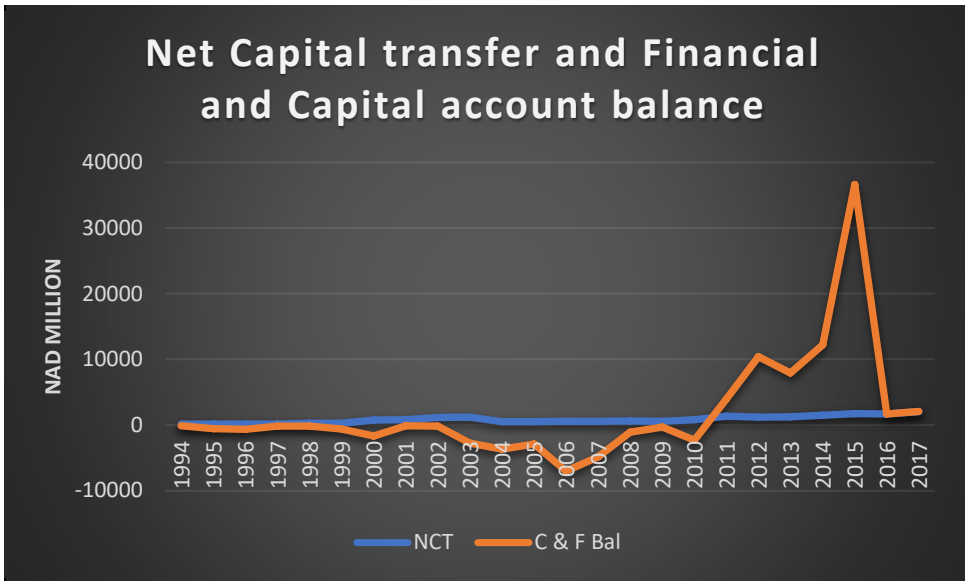

Figure 2.4: Author's compilation with data from Bank of Namibia Annual Report Bulletins

Considering high unemployment and weak employment growth over the years, the government planned to tighten domestic investment regulations for the pension and insurance industries. Namibia experienced large capital outflows in the early 2000s and the largest part consisted of net portfolio outflows which averaged at 15.5%. According to international investment position (IPP) data for mid-2007, total gross foreign assets amounted to an estimated 105% of GDP and 70% was made up of portfolio investment. Nambia's international capital flows are governed by the Common Monetary Area (CMA) agreement with Lesotho, South Africa and Swaziland. Under the agreement, Namibia maintains free transfer of funds for current and capital transactions with other members (IMF, 2013). Namibia is allowed to introduce domestic investment requirements to promote domestic development and domestic industries by the CMA agreement. In line with these provisions, in 1994 the government amended Regulation 28 of the Pension Fund Act and Regulation 15 of the Long-Term Insurance Act to gradually increase to 35% the share of portfolios that pension and insurance funds must

invest in domestic assets. As a result of this government action, capital outflows were gradually reduced in Namibia.

2.6 The real exchange rate and the terms of trade

Namibia's Real Effective Exchange Rate (REER) and Nominal Effective Exchange Rate (NEER) have been largely dictated by the South African rand because of the peg. Namibia's REER has been relatively unchanged since independence. The average annual inflation in Namibia has been about 1% higher than in South Africa keeping its REER stronger (Miyajima, 2007).

Terms of trade (TOT) represent the ratio between a country's export prices and its imports prices. The amount of import goods an economy can purchase per unit of export goods can be interpreted as TOT. Terms of Trade in Namibia increased to 136.20 Index Points in 2017 from 125 Index Points in 2016 (Trading Economics, 2019). Terms of Trade in Namibia averaged at 111.56 Index Points from 2007 until 2017, reaching an all-time high of 136.20 Index Points in 2017 and a record low of 93.70 Index Points in 2007 (Trading Economics, 2019). When more capital is leaving the country than entering the country then the country's TOT is less than 100%. When the TOT is greater than 100%, the country is accumulating more capital from exports than it is spending on imports. Namibia's average TOT over the years has been 111.56 index points indicating the country's ability to honour its external obligations and that it is accumulating more capital from exports than what is spent on imports over the years. For countries that are heavily dependent on import, the effect of terms of trade on economic growth is very important especially. Namibia is not an exception, given that

its trade activities are closely linked to South Africa (Sherbourne, 2009). A study done by Kalumbu and Shefeeni (2014) shows that there is a negative relationship between terms of trade and economic growth in Namibia. These findings are in line with the theoretical perspective of the relationship between terms of trade and economic growth. The negative effect of TOT can also be explained by the phenomena that, when domestic demand of foreign goods increases, it leads to decrease in demand for domestic goods that further affects the trade balances, and as a result it will adversely impact economic growth.

2.7 Trade Regime

Namibia is a member to regional, bilateral and multilateral trade arrangements and economic groupings. These include the Southern African Customs Union (SACU), Southern African Development Community (SADC), African, Caribbean and Pacific (ACP) Countries, World Trade Organization (WTO), SACU-European Free Trade Area (Iceland, Liechtenstein, Norway and Switzerland) Trade Agreement, SACU-MERCOSUR (Argentina, Brazil, Chile, Paraguay and Uruguay) Trade Agreement, SACU-India preferential Trade Agreement, Africa Growth and Opportunity Act (AGOA), Namibia/Zimbabwe preferential trade agreement, SACU-USA trade, investment and development cooperation agreement, SADC economic partnership agreement (EPA) and the COTONOU Agreement.

SACU revenue is the major contributor to Namibia's government revenue. In 2007 there was an increase in payment from SACU which put Namibia's budget into a surplus since its independence. SACU income to Namibia dropped in 2010 and 2011

due to global recession with a total revenue averaging at 39.3% of total average. In 2011/2012 Namibia's total revenue and grants from SACU estimated at N$26,9 billion, decreased than originally estimated at N$28,0 billion (SACU, 2012), while in 2010/2011 the revenue outturn was estimated at N$22,7 billion. This decrease in revenue was as a result of a decline in SACU revenue (SACU, 2010/11). The year 2016/17 has been predominantly harsh in this regard, as Namibia has been required to refund an overpayment made to the country in prior years, and as such the SACU inflow has been particularly weak (Brown, 2016).

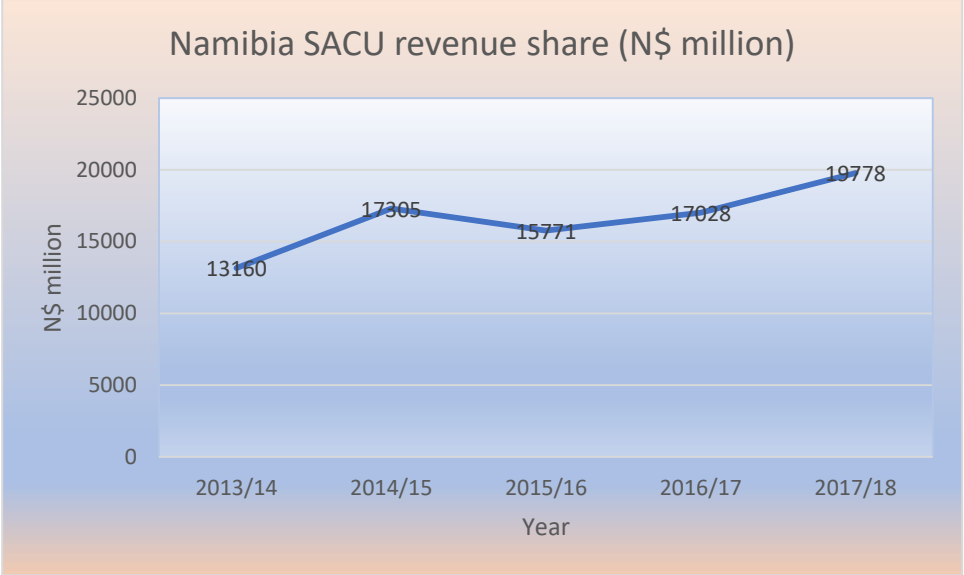

Figure 2.5: Author's compilation using data from SACU Annual reports

Namibia received N$19 778 million in total revenue share from the SACU revenue pool in the year 2017/18. In 2013/14 however, the revenue receipts were N$13160 million exhibiting a low share in the five years. With the rising level of globalization, openness through export-led growth strategy is inevitable, particularly in consideration of other

development constraints such as limited external financing and declining revenue from the Southern African Customs Union (SACU) (Kaakunga & Matongela, 2013).

2.8 Sustainable debt accumulation and interest payments

The proliferation of the Namibia Central Government debt, particularly domestic debt, poses the question of medium to long term sustainability of the Central Government debt and fears are being expressed about the possibility of the country falling into a debt crisis that has affected a number of sub-Saharan African countries (BON, 2004). An economy is said to have achieved fiscal sustainability when the ratio of Government debt to GDP is stationary and declining in the long run. Namibia has been experiencing an increasing level of Government debt particularly domestic component and this has raised concerns regarding the sustainability of fiscal policy in Namibia. During the third quarter of 2018, the private sector borrowed the most from outside the country, increasing its external debt stock to N$82.2 billion (+19.8%), simultaneously driving the country's external debt stock to N$118.4 billion, up by 14%. (BON, 2019).

This increased private sector debt was mostly due to increased loans between non-banking foreign parent companies and their local subsidiaries, as well as a weaker Namibian Dollar which raised the local currency value of subsidiaries' long-term debt. On the other hand, during the period under review, third quarter 2018, public sector foreign debt rose by 9.6% to N$36.3 billion, mostly driven by an increase in the central bank's debt stock, owing to a weaker Namibia Dollar which raised the local currency value of the country's Special Drawing Right (SDR) allocations.

Interest payments on government debt including long-term bonds, long-term loans, and other debt instruments to domestic and foreign residents are the interest payments that affect BOP. The associated increase in debt servicing costs tends to crowd out government spending on capital expenditure, which weighs on economic growth and development.

2.9 Conclusion

This chapter looked at the Namibian economic structure and its balance of payments. In an effort to reduce the country's vulnerability to external shocks the government of Namibia formulated and implemented policies to encourage domestic investment and capital retainment to improve economic growth and achieve the targeted economic goals. The policies include industrial policies, trade policies, Harambe Prosperity Plan, NDGs, NDPs and Vision 2030.The behaviour of domestic and foreign investors also affects the flow of capital in and out of the country. The Namibian government had to amend some of the investment Acts in order to encourage domestic investment and implement some form of capital controls. The world is increasingly becoming a global village through growth and development as well as technological advancement. It is imperative that the Namibian economy diversifies and move away from primary production to manufactured and advanced products thereby improving its export structure. The flow of capital and foreign external debt also affects the BOP; therefore, the government should maintain a sustainable level of debt to reduce capital flight

through interest payments. Persistent BOP deficits amount to negative economic growth hence BOP management is important to enable sustainable economic growth.

CHAPTER THREE

LITERATURE REVIEW

3.1 Introduction

This chapter provides an overview of theoretical and empirical literature in order to understand how the balance of payments position affects economic growth. The chapter is organised as follows: - Section 3.2 reviews theoretical literature on BOP and growth. The section is broken down to 3.2.1 the traditional theory. A review of recent empirical literature will be presented in Section 3.3 and Section 3.4 concludes the chapter.

3.2 Theoretical Literature

Throughout history from David Ricardo onwards, and in more modern times, from the birth of neoclassical growth theory (Solow, 1956), the orthodoxy has been that the balance of payments and growth of demand did not matter for long run economic growth. The balance of payments is self-adjusting, and economic growth is supply-driven by the growth of factor inputs and technical progress, exogenously given meaning supply creates its own demand. Adam Smith, in his *Wealth of Nations* (1776) also argued that the mercantilists confused money and wealth, and that they were anti free trade. Keynes's view expressed in his *General Theory* (1936) that throughout history the propensity to save has been greater than the propensity to invest, and that the desire for liquidity and pervasive uncertainty has kept the rate of interest too high in general. In an open macro economy context, a forceful Keynesian demand-oriented

approach emphasizing the external constraints to growth is the theory of "balance-of-payments-constrained growth" also known as "Thirlwall´s Law". Thirlwall (1979) developed a post-Keynesian long run growth model, which gives a central role to demand, using Harrod's (1933) foreign trade multiplier. Thirlwall (2013) argues that for most countries demand constraints operate long before supply constraints take effect.

3.2.1 The traditional theory

The Thirlwall's model emphasized that, the Dynamic Harrod Foreign Trade Multiplier determine long-term economic growth. The model stresses that demand factors induced economic growth. In an open economy, the dominant constraint on demand is balance of payments. The basic idea of Thirlwall's approach is how balance of payments affects the growth performance of an economy. This model links trade to growth because exports pull demand. Apparently, trade represents a vital constraint to economic growth when there are balance of payments problems. The original Thirlwall (1979) model to estimate the balance of payments constrained growth rate starts with the balance of payments equilibrium condition,

$$P_d X = P_f ME \qquad (3.2.1a)$$

where P_d is the price of exports in the domestic currency, X is the volume of exports, P_f is the price of imports in foreign currency, E is the exchange rate measured as the domestic price of foreign currency and M is the volume of imports. The traditional version of Thirlwall, (1979) model can be presented in the following three equations:

$$X = \lambda(P_d - P_f) + Pz \qquad (3.2.1b)$$

$$M = \alpha(P_d - P_f) + \Pi Y \qquad (3.2.1c)$$

$$X + P_d = M + P_f \qquad (3.2.1d)$$

where, P, Π, and $\alpha > 0$ and $\lambda < 0$, P = income elasticity of exports, Π = income elasticity of imports, λ = price elasticity of exports, α = price elasticity of imports, X = the growth rate of real exports, M = the growth rate of real imports, Z = the growth rate of the rest of the world real income, Y = the growth rate of real domestic income, (Pd – Pf) = the rate of growth of relative prices (rate of growth of domestic prices less rate of growth of prices in the rest of the world). It should be noted that equation (3.2.1b) and (3.2.1c) are export and import demand functions, respectively, while equation (3.2.1d) is current account equilibrium. Solving equation (3.2.1d) for the growth of real income or substituting for the growth rate of the world real income, Z from equation (3.2.1b) yields:

$$Y^* = [(1 + \lambda - \alpha)/ \Pi] ((Pd - Pf) + (P/ \Pi)Z \qquad (3.2.1e)$$

or

$$Y^* = [(1/ \Pi)(1 - \alpha)]((Pd - Pf) + 1P/ \Pi)X \qquad (3.2.1f)$$

Supposing the Marshall-Lerner condition holds or that relative prices are constant if measure in common currency, then (Pd – Pf) = 0, equation (5) becomes:

$$Y^* = (1/ \Pi) X \qquad (3.2.1g)$$

Where the BOP constrained growth Y* is equal to the growth in exports X. Perraton (2003) recognised equation (3.2.1g) as the weak version of Thirlwall's law as only the import demand function is needed to derive the balance of payments constrained growth

rate. The equation can also be interpreted as the dynamic Harrod (1933) trade multiplier result. The higher the income elasticity of demand for imports (Π) the lower the balance of payments equilibrium growth rate (Grossman and Helpman, 1992).

3.3 Empirical Literature

In determining the relationship between BOP and economic growth, a range of research has been undertaken both country specific and cross country. While some studies confirmed that economies were balance of payments constrained, others did not. In this section, the empirical literature discussed covers the link between BOP and income, export growth and economic growth, the long run relationship between BOP and economic growth and the indirect impact of the BOP position on economic growth in the long run.

Hussain and Thirlwall (1982) tested the model for 20 developing countries covering the 1951 to 1969 period. Just three sub-Saharan African countries were included in the study: Kenya, Sudan and Zaire which is now the Democratic Republic of Congo. The weak version of Thirlwall's law, as well as an extended model which incorporates growth in real capital flows and the terms of trade effects were used. Their results showed that the countries in the sample had a "very mixed" experience, however on balance; changes in the terms of trade constrained growth by 0.6% per annum while capital inflows relaxed the balance of payments constraint and allowed countries to grow faster by about 0.05% per annum.

Hussain (1999) tested the weak version of Thirlwall's law, extending the model to account for capital flows and the terms of trade as outlined in Hussain and Thirlwall (1982), for 29 African and 11 Asian economies covering the 1970 to 1990 period. Results for the group of African and Asian countries, when tested separately, provided evidence that both the original weak version and the extended model were good predictors of actual growth. Hussain (1999) therefore concludes that the extended model developed by Hussain and Thirlwall (1982), is the most appropriate model for sub-Saharan Africa. One of the limitations of the study is that Ordinary Least Squares (OLS) was used to estimate the import demand functions for each country without pre testing the stationarity of the data. The results obtained may therefore be spurious.

Elliott and Rhodd (1999) included interest rate payments and the argument was that, demand financed by capital flows generally carries with it debt accumulation and servicing. Drawing from the sample of countries employed in the Hussain and Thirlwall (1982) study and extending the model to include external debt financing, Elliott and Rhodd (1999) were able to reduce the degree of over prediction for 9 out of 13 countries, concluding that economic growth is additionally constrained by debt service payments which drain on the limited financial resources needed for economic growth.

Moreno-Brid (2003) applied the basic balance-of-payments constraint model (BPC model), developed by A.P. Thirlwall, analysing Mexico's economic growth in 1950-96. With the use of unit-root tests and cointegration analysis the study estimated the long-run association between the growth of Mexico's real exports and real output in 1950-96

and selected sub-periods. The results tended to show significant and positive cointegration between these two variables, thus giving support to the BPC-model as a relevant hypothesis to explain Mexico's long-term economic growth.

Nell (2003) generalised the balance of payments constrained growth model to include many countries. The study applied a 'generalised' version of Thirlwall's balance-of-payments (BOP) constrained growth model by testing for long-run relationships between the output growth rates of OECD countries and two neighbouring regions; South Africa (SA) and the rest of the Southern African Development Community (RSADC). The empirical results found strong support for the 'generalised' BOP growth model, which stresses the mutual interdependence of the world economy where one country's growth rate depends on others.

Razmi (2005) applied the Balance of Payments Constrained Growth (BPCG) model to India, a large developing country with a relatively low trade to GDP ratio. Instead of assuming similar elasticities of substitution between goods produced in different regions, the study extends the model to relax these assumptions. Johansen's cointegration technique was employed to estimate trade parameters. Short-run adjustments were explored within a vector error correction framework. Various forms of the BPCG hypothesis predicted average growth rates and these are found to be close to the actual average growth rate over the period 1950-1999, although individual decades display substantial deviations.

Britto and McCombie (2009) used the balance-of-payments-constrained model to estimate the determinants of the long-run rate of growth of Brazil. The regression results, apart from providing renewed support for the thesis that the country's growth rate has been constrained by the balance of payments, allowed the study to argue that Thirlwall's law is associated with a notion which is fundamentally distinct from that of mainstream economics, of long-run equilibrium growth rate

Jeon (2009) empirically tested the validity of Thirlwall's law in China during the reform period of 1979-2002. For the income elasticity of import demand, an aggregate import demand function for the Chinese economy was estimated using ARDL – UECM model and the bounds test. The study found out that for 1979-2002, the Chinese economy grew on average as fast as Thirlwall's law predicts and that the growth of GDP and of exports are cointegrated. Both outcomes provide strong support for Thirlwall's law in China during the reform period after 1978.

Anega (2010) empirically tested the validity of the simplified version of the balance of payment-constrained economic growth model for Ethiopia during the period 1971-2008. The finding showed that the average economic growth over the sample period was 2.84 percent, whereas the economic growth as suggested by Thirwall's law is 7.42 percent. Ethiopia's economy has been growing at a low rate as compared to the model's predicted growth rate as shown by the findings.

Gouvea and Lima (2010) contributed to the literature on balance-of-payments-constrained growth by investigating how structural change, identified with changes in the sectoral composition of exports and imports, affects the external constraint. The study tested both the original and a multisectoral version of Thirlwall's law for a sample of Latin American and Asian countries. The original Thirlwall's law was found to hold for all sample countries except South Korea, whereas the multisectoral analogue holds for all of them. As the sectoral composition of exports and imports is found to matter for growth, the study analyzed the evolution of each country's weighted trade income elasticities.

Bagnai, Rieber and Tran (2012) using a multi-country generalization of Thirlwall's law, investigated the contribution to the growth performance of Sub-Saharan Africa (SSA) countries of trade with the low and lower-middle income countries in SSA and South Asia in the last two decades. The generalized law was estimated using a panel cointegration approach on a sample of 20 developing SSA countries, using annual data from 1990 to 2008 and considering three partner areas: SSA, developing Asia, and the rest of the world. The generalized law was found to perform better than other versions of the law. Moreover, the empirical analysis showed that although each partner area contributed to the relaxation of SSA countries' BOP constraint, these contributions have occurred through different channels of transmission.

Anoka and Takon (2014) examined balance of payments constrained growth in Nigeria. The analysis was based on the theoretical underpinnings of the Original and Expanded Thirlwall's model derived from the Harrods Foreign Trade Multiplier. The study

adapted the Ordinary Least Squares (OLS) econometric technique to analyze empirical data. The results showed that, all the variables in the model contributed 71 per cent to changes in economic development.

Lanzafame (2014) synthesised the two growth literatures on the Harrod (1939) natural rate of growth and the balance of payments constrained growth model. Using 22 OECD countries for the 1960 to 2010 period, the study provided evidence that the natural rate of growth was equal to the balance of payments constrained rate of growth. Significant support for Thirlwall's Law was found. Granger-causality methods results indicated the existence of unidirectional long-run causality from BOP-constrained growth rate to the natural rate of growth, thus reinforcing the view, embodied in Thirlwall's Law, demand-determined is the long-run growth and constrained by the BOP.

The relevance of a demand-led growth model for long run economic growth is tested for the sub-Saharan African region by Sumra (2016) using an augmented balance of payments constrained growth model which permits for sustainable debt accumulation, interest rate payments and the terms of trade movements. An autoregressive distributive lag (ARDL) model was used to estimate the model for 22 sub-Saharan African economies. The region was balance of payments constrained between the 1960 to 2014 period as indicated by the results. In addition, the growth experience of the region is best explained by the model which allows for sustainable debt accumulation and interest rate payments abroad.

Emmanuel (2017) applied the adjusted balance of payment (BOP) constrained growth framework modified by Thirwall and Hussain (1982) on Nigeria's economic growth to estimate the determinants of the long run rate of growth in Nigeria. The study applied cointegration test on time series data to estimate the long-run relationship between Nigeria's real GDP (output) and its real export. Results signify cointegration between the variables, lending support to Thirwall's BOP constrained model as a suitable framework.

Elish (2018) examined the Thirlwall Balance of Payment (BOP) constraint growth model in the case of Egypt for the period of 1980 to 2016 using the bounds testing Auto Regressive Distributed Lag (ARDL) model. A long run relation between imports, gross domestic product (GDP) and relative prices having a negligible effect as suggested by the model validates Thirlwall's assumption. The actual growth rate was found to be equal to the calculated potential growth rate given the BOP constraint assumption. The empirical results support the historical development of the Egyptian BOP analysis which shows how the external balance was and remains a major factor affecting Egypt's growth rate.

Lélis, Silveira, Cunha and Haines (2018) analysed the balance-of-payments-constrained growth in Brazil considering Thirwall's Law (1979). The study estimated export and import demand functions using two econometric models: vector error correction and structural state space model for the period of 1995–2013. The results suggest that the balance of payments is a constraint to the Brazilian economic growth.

In the case of Namibia, Fleermuys (2005) examined the monetary approach to the Namibian balance of payments for the period 1993–2003 using cointegration tests and error-correction modelling. Monetary variables do not play a dominant role in determining Namibia's balance of payments as shown by the empirical results. The balance of payments is not a purely monetary phenomenon and disequilibrium can, therefore, not be corrected only through monetary actions by the authorities.

Jordaan and Eita (2007) analysed the causality between exports and GDP of Namibia and evaluated the relationship of these variables for the period 1970 to 2005. Time-series econometric techniques (Granger causality and cointegration) were applied to test the hypothesis of a growth strategy led by exports. Exports Granger cause GDP and GDP per capita as revealed by the results. The export-led growth strategy has a positive influence on growth through various incentives. Eita and Gaomab (2012) investigated macroeconomic determinants of the balance of payments in Namibia for the period 1999 to 2009. The analysis was conducted through cointegrated vector autoregression methods. The investigation revealed that fiscal balance, GDP and interest rate are the main determinants of balance of payments in Namibia.

According to the Marshall-Lerner condition, the sum of trade elasticities should be greater than one for a change in exchange rate to have an impact on the country's balance of payments. Eita (2013) applied cointegrated vector autoregression to empirically estimate the Marshall-Lerner condition in Namibia. The results indicated

that imports and exports respond significantly to a change in the exchange rate and suggest that Marshall-Lerner condition holds for Namibia.

Niishinda and Ogbokor (2013) investigated the export-economic growth relationship for Namibia. The Johansen co-integration test, the vector-error correction model (VECM) and the Granger causality tests were employed to test for the nature of the relationship. The Granger causality test indicated a uni-directional causation from export to economic growth. Allowing for confirmation of the validity of the export-led growth hypothesis in the case of Namibia. Eita, Manuel and Naimhwaka (2018) investigated macroeconomic determinants of the current account balance in Namibia. The results showed that there is evidence of twin deficit hypothesis in Namibia. Evidence of twin deficit hypothesis suggest that it is important for Namibia to have fiscal discipline in order to improve its current account.

3. 4 Conclusion

The chapter reviewed the demand oriented economic growth theory in the form of the balance of payments constrained growth theory. The empirical literature reviewed in the study, showed that the methodology and variables used play a role in the results that emerge from the studies. Some of the studies used time-series data and employed the Autoregressive Distributed lag (ARDL) Model while others employed the Vector Auto regression (VAR) approach. Cointegration techniques were employed and the error correction models were employed when cointegration was found among the variables to verify the speed of adjustment towards the long run equilibrium. The results from most

of the studies indicate support of Thirlwall's law and that the balance of payments position of most countries determine the long run economic growth rate of these countries. In some studies carried out in Namibia, exports showed that they drive economic growth during the study period. However, there is no study in which the relationship between BOP and economic growth is determined in the country, therefore this is the evidence gap which this study aims to fill. The Balance of Payments Constrained Growth (BPCG) model is therefore tested for Namibia in this study.

CHAPTER FOUR

RESEARCH METHODS

4.1 Introduction

This chapter presents the research methods of the study. It is structured as follows: Section 4.2 reviews the econometric framework and model specification, Section 4.3 contains data measurements and data source. Section 4.4 presents description of variables.

4.2 Econometric Framework and Model Specification

4.2.1 Model Specification

Developing countries are allowed to run balance of payments deficits for considerable periods of time financed by various types of capital inflows. The extension of the basic Thirlwall's law by (Thirlwall and Hussain, 1982) which includes capital flows best suits developing countries such as Namibia. By definition, the overall balance of payments of a country, including current and capital transactions, must reflect an equilibrium balance. From the balance of payments equilibrium condition where the value of exports is equal to the value of imports an extension is derived as follows:

$$P_d X + C = P_f ME \qquad (4.2.1a)$$

P_d represents domestic prices, P_f represents foreign prices, M stands for imports, X stands for exports and E represents the exchange rate.

This is a simple extension of equation (3.2.1a) where C > 0 represents positive capital inflows. Taking rates of change of equation and using expressions for the rate of growth of exports and imports, gives the growth rate consistent with overall balance of payments of:

$$y_b = [(1 + \theta\eta + \psi) (p_d - p_f - e) + \theta\varepsilon(z) + (1 - \theta) (c - p_d)] / \pi \qquad (4.2.1b)$$

Where θ is the share of export receipts in total receipts to pay the import bill; c is the growth of nominal capital inflows, so that (c - pd) is the growth of real capital inflows.

From equation (4.2.1b), the growth rate of any country can in principle be disaggregated into four component parts:

(i) Growth associated with real terms of trade movements: $(p_d - p_f - e)/\pi$

(ii) Growth associated with terms of trade movements combined with the price elasticities of exports and imports: $[(1 + \theta\eta + \psi) (p_d - p_f - e)]/\pi$

(iii) Growth related to exogenous changes in income growth abroad: $\theta\varepsilon (z)/\pi$

(iv) Growth effects of real capital flows: $[(1 - \theta) (c - p_d)]/\pi$

The second-generation balance of payments constrained growth model propounded by Thirlwall and Hussain (1982) states that growth in real income is a function of real export, real exchange rate, net foreign capital inflows and terms of trade. This study extends the model to include overall balance of payments as another explanatory

variable for GDP growth. The theoretical statement can be reduced to a functional relation as follows:

GDP= f (BOP, REER, EXPO, NFCI, TOT) (4.2.1c)

Where:

GDP: real gross domestic product

BOP: overall balance of payments

REER: real effective exchange rate

EXPO: real exports

NFCI: net foreign capital inflows

TOT: terms of trade

The study makes use of the Autoregressive Distributive Lag (ARDL) model and the bounds testing procedure to test for cointegration. The ARDL model contains the lagged values of the dependent variable, the current and lagged values of regressors as explanatory variables. The ARDL model uses a combination of endogenous and exogeneous variables, unlike a VAR model that is strictly for endogenous variables.

The generalised ARDL (p, q) model is specified as:

$$Y_t = \gamma_{0i} + \sum_{i=1}^{p} \delta_i Y_{t-i} + \sum_{i=0}^{q} \beta_i^{'} X_{t-i} + \varepsilon_{it} \quad (4.2.1d)$$

Where $Y_t^{'}$ is a vector and the variables in $X_t^{'}$ are allowed to be purely I(0) or I(1) or cointegrated. β and δ are coefficients and γ is the constant; i = 1,…, k; p,q are optimal lag orders.

ε_{it} is a vector of the error terms – unobservable zero mean white noise vector process which is serially uncorrelated or independent.

The ARDL (p, q) model with six variables is therefore specified as:

$$\Delta LNGDP_t =$$

$$a_{01} + b_{11}LNGDP_{t-i} + b_{21}LNBOP_{t-i} + b_{31}LNEXPO_{t-i} + b_{41}LNREER_{t-i} +$$

$$b_{51}LNNFCI_{t-i} + b_{61}LNTOT_{t-i} + \sum_{i=1}^{p} a_{1i}\,\Delta LNGDP_{t-i} + \sum_{i=1}^{q} a_{2i}\,\Delta LNBOP_{t-1} +$$

$$\sum_{i=1}^{q} a_{3i}\,\Delta LNEXPO_{t-i} + \sum_{i=1}^{q} a_{4i}\,\Delta LNREER_{t-i} + \sum_{i=1}^{q} a_{5i}\,\Delta LNNFCI_{t-i} +$$

$$\sum_{i=1}^{q} a_{6i}\,\Delta LNTOT_{t-i} + e_{1t} \qquad (4.2.1e)$$

The other five equations which have each of the other variables as dependent variables in five different equations are specified in a similar way with different coefficients and error terms.

p lags are used for the dependent variable

q lags are used for exogenous variables

a and b represent the different parameters that are non zero

The study employs the theory of Thirlwall (1989) to address the second objective of the study, hence, it is necessary to determine if the relationship described in the objective

can be derived or generated from the theory of the balance of payments constrained growth.

The growth rate consistent with the overall balance of payments (or the balance of payments constrained growth rate starting from initial disequilibrium on the current account) is the weighted sum of the growth of exports and real capital flows divided by the income elasticity of demand for imports (Thirlwall, 2011). With the assumption that the sum of the price elasticities (η + ψ) is equal to unity in absolute values, and/or if relative prices in international trade, i.e. the real exchange rates are constant, then the broad equation reduces to:

$$y_b = \varepsilon z/\pi \qquad (4.2.1f)$$

y_b which is the balance of payments constrained growth rate, is equal to the income elasticity of demand for exports (ε) multiplied by the growth in world income, (z), divided by (π), the income elasticity of demand for imports. Using the same assumption of constant relative prices, the equation is further reduced to,

$$y_b = x/\pi \qquad (4.2.1g)$$

The functional relation is:

$$\text{GDP} = 1/\pi \; f(\Delta \text{EXPO}) \qquad (4.2.1h)$$

The above relation specified as an ARDL model with two variables is expressed as follows:

$$\Delta LNGDP_t = a_{01} + b_{11} LNGDP_{t-i} + b_{21} LNEXPO_{t-i} + \sum_{i=1}^{p} a_{1i} \Delta LNGDP_{t-i} + \sum_{i=1}^{q} a_{2i} \Delta LNEXPO_{t-1} + e_{1t} \qquad (4.2.1i)$$

$$\Delta LNEXPO_t = a_{02} + b_{12}LNGDP_{t-i} + b_{22}LNEXPO_{t-i} + \sum_{i=1}^{p} a_{1i}\,\Delta LNEXPO_{t-i} + \sum_{i=1}^{q} a_{2i}\,\Delta LNGDP_{t-1} + e_{2t} \quad (4.2.1j)$$

In this case, the balance of payments constrained growth rate would be equal to the growth in exports and this is the weak version of Thirlwall's law according to Perraton (2003). The strong version of Thirlwall's law includes estimation of both import and export demand functions including estimation of the growth in world income as well as the income elasticity of export demand. Equation (4.2.1e) is the dynamic Harrod (1933) trade multiplier result which is the weak version of Thirlwall's law, of which this study is also testing for the Namibian economy.

4.2.2 Econometric Framework – Estimation technique

Testing for Stationarity

The stationarity of variables is very important in econometric analysis when investigating the different time series behavioral patterns. Non-stationary time series give rise to spurious regression and traditional approaches to handling non-stationary variables include detrending and differencing. Furthermore, incorrect conclusions caused by non-stationary variables lead to incorrect policy formation. This study examines the patterns and trends in the data by testing for stationarity through unit root tests. Several methods are used in research studies in testing stationarity and these

include the Augmented Dickey-Fuller (ADF) test (Dickey & Fuller, 1981), the Philips-Perron (PP) unit root test (Philips & Perron, 1988) and the Kwiatkowski-Phillips-Schmidt-Shin (KPSS) test (Kwiatkowski, Phillips, Schmidt & Shin, 1992. This study makes use of two methods namely the ADF test and the PP test which include both for intercept with and without trend. The tests are based on the first order auto-regressive [AR (1)] process as proposed by (Enders, 2004). The ADF test uses additional explanatory variables by lagging the left-hand side variable to approximate the autocorrelation as shown below:

$$\Delta Y_t = \delta y_{t-1} + \sum_{i=1}^{k} \delta_i . y_{t-i} + e_t \qquad (4.2.2a)$$

Where k denotes the number of lags for Δy_{t-1}, which is large enough to include the existence of autocorrelation in e_t but small enough to save the degrees of freedom.

The PP tests which is advantageous over ADF, capture time series properties in the presence of possible structural change, for it needs no lag length specification in the regression test (Enders, 2004). The ADF and PP tests use the same critical values. Both tests are used in the study to ensure that the series adhere to the condition of an ARDL estimation which require a maximum of I(0) and I(1), but not I(2) or higher order. PP test permits dependence among disturbances of auto-regressive (AR) form. This test is based on the first order auto-regressive [AR (1)] process as proposed by (Enders 2004):

$$\Delta y_t = \beta' \mathbf{D_t} + \pi y_{t-1} + \varepsilon_t \qquad (4.2.2b)$$

Where Δy_t is the variable of interest, $\mathbf{D}_t$, Deterministic components (constant/constant & trend) and ε_t is I(0) and may be heteroscedastic. Furthermore, PP tests corrects for heteroscedasticity in the errors and for any serial correlation. The correction mainly

estimates the spectrum of ε_t at zero frequency that is robust to unknown form of autocorrelation and heteroscedasticity.

Testing for Co-integration

The statistical expression of the nature of long run equilibrium relationships can be viewed as cointegration. There are possibilities that individual series could diverge and be unstable in the short run from each other, but in the long run equilibrium values may converge. The importance of co-integration enables identification of short run and long run relationships and also prevents non stationary series from the problem of spurious regression. Subsequently, the order of integration is tested and should the variables found to be integrated of order one or I (1) or a combination of order zero and one I(0) and I(1) then tests for co-integration between variables can be conducted. The approaches that are commonly used in co-integration testing include, the Engle and Granger (1987), the Johansen (1988) likelihood ratio test and the Bounds test Pesaran and Shin (1998). The study employs the latter test since the Johansen and Engle and Granger procedure are restricted to only I(1) variables. The Bounds test procedure is considered simple than other multivariate cointegration techniques. Testing for co-integration using the Bounds testing procedure the generalized VAR (p) model in vector ECM form is as follows:

$$\Delta z_t = a_0 + a_1 trend + \pi z_{t-1} + \sum_{i=1}^{p-1} \forall_i \Delta z_{t-i} + \varepsilon_t$$

(4.2.2c)

Where z_t is all the *n* variables in the VAR and ε_t is the error term. The Bounds test is performed by computing an 'F-test' of the null and alternative hypotheses as follows:

$H_0 = \beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6$ (no long run relationship)

Against the alternative hypothesis

$H_0 \neq \beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq \beta_5 \neq \beta_6$ (a long run relationship exists)

The decision-making rule using the F-statistics would be to reject the null hypothesis if the calculated value of the test statistic is greater than the critical value. The null hypothesis of no co-integration is rejected, and it can be concluded that that there is co-integration. Therefore, in general if the Wald F-statistic falls above the upper bound critical value there will be cointegration among the variables. If it falls between the lower bound and the upper bound critical value then the inference will be inconclusive. If it falls below the lower bound critical value then the conclusion will be no cointegration among the variables and the ARDL model is estimated. Furthermore, the Bounds test allows the cointegration relationship to be estimated by OLS once the appropriate lag length order of the model is identified.

Autoregressive Distributive Lag Model

The ARDL model utilizes a single equation estimation technique making interpretation relatively simple and, therefore, is preferred to the Vector Autoregressive (VAR) model.

This technique is efficient in estimations that involve small or finite sample size. When using the ARDL model, the lag order of the dependent and independent variables are allowed to vary without affecting the asymptotic result and this is another advantage of this model. Selecting the right lag order is important for valid inferences, therefore, the study uses the appropriate lags as selected by the majority of criteria in the statistical software of Eviews. ARDL model provides consistent results even when variables include a mixture of I(0) and I(1). When variables are cointegrated, there must also be an error correction model (ECM) that describes the short-run dynamics or adjustments of the cointegrated variables towards their equilibrium values and this is according to the Granger Representative Theorem. The ARDL model reparameterised as an ECM yields:

$$\Delta LNGDP_t =$$

$$a_0 + \sum_{i=1}^{p} a_{1i}\,\Delta LNGDP_{t-i} + \sum_{i=1}^{q} a_{2i}\,\Delta BOP_{t-i} + \sum_{i=1}^{q} a_{3i}\,\Delta LNEXPO_{t-i} +$$

$$\sum_{i=1}^{q} a_{4i}\,\Delta LNREER_{t-i} + \sum_{i=1}^{q} a_{5i}\,\Delta LNNFCI_{t-i} + \sum_{i=1}^{q} a_{6i}\,\Delta LNTOT_{t-i} + \lambda ECT_{t-1} +$$

$$e_t \qquad (4.2.2d)$$

In an ARDL model, the VECM is specified only if there is cointegration in all the equations of a model. A VEC model is a restricted VAR that has cointegration restrictions built into the specification so that it is designed for use with nonstationary series that are known to be cointegrated. The cointegration term is known as the error correction term since a series of partial short run adjustments gradually corrects the deviation from the long run equilibrium. If there is no cointegration in some of the equations of the model then an ECM is estimated for the equations with cointegration and ARDL will be estimated for equations without cointegration. Diagnostic tests

which include heteroskedasticity, serial correlation, CUSUM and normality tests were performed on the model in order to validate the results.

4.3 Data, measurements and sources

This study used secondary data obtained from the publications of various statistic agencies. Quarterly time-series data covering the period 1999Q1-2018Q2 is used representing a sample size of 74 observations. The data is obtained from various sources namely, Bank of Namibia's Quarterly Bulletins and Annual Reports and National Statistics Agency. The data for the following variables are obtained namely, gross domestic product, overall balance of payments, real exports, real effective exchange rate, net foreign capital inflows and terms of trade. The variables are described in the table with their expected sign based on the economic theory.

4.4 Description of Variables

Table 4.1: Description of variables in the Study

Variables	Description of variables	Expected signs
GDP	Gross Domestic Product	Dependent
BOP	Overall balance of Payments	Positive
EXPO	Real exports	Positive
REER	Real effective exchange	Positive

	rate	
NFCI	Net Foreign Capital Inflow	Positive
TOT	Terms of Trade	Negative

Source: Author's compilation

4.5 Measurement of variables

Gross Domestic Product (GDP) is the dependent variable while balance of payments, real export, net foreign capital inflow, real effective exchange rate and terms of trade are independent variables. A positive sign is expected for GDP.

Balance of payments (BOP) is a summarized record of a country's international transactions with the rest of the world. BOP is measured as the net of inflows and outflows of money in the country in a given period of time. A positive figure or BOP surplus means a country exports more than it imports in that period. According to theory, surplus boosts economic growth in the short term.

Real exports (EXPO) are derived from dividing the export value of goods by the consumer price index. The dynamic Harrod trade multiplier would be exhibiting induced 'multiplier' effects since exports permit all components of demand to grow faster than otherwise would be the case. For this variable a positive sign is therefore expected.

The weighted average of a country's currency in relation to an index or basket of other major currencies is the real effective exchange rate (REER). Changes in the real

exchange rate also affect investment and capital accumulation, which are directly linked with economic growth. This variable is projected to have a positive sign.

Net Foreign Capital Inflow (NFCI) is the net of money flowing in and out of the domestic economy from abroad during a certain period of time. According to Thirlwall and Hussain (1982) countries grew faster as a result of capital inflows and the growth rate was more than predicted by the simple Harrod trade multiplier in each case. A positive sign is hence expected for this variable.

Terms of trade (TOT) which is the ratio between a country's export prices and its import prices affects the growth rate of a country by measuring its trading efficiency. If the sum of the price elasticities of demand for exports and imports is greater than -1, however, an improvement in the real terms of trade or a deterioration in competitiveness will worsen the growth rate consistent with balance of payments equilibrium (Thirlwall, 2011). The expected sign for the variable is negative as shown in the empirical work reviewed.

Empirical studies, however, have indicated that export growth dominates all the other causes of the balance of payments constrained growth rate. This study only considered capital flows and terms of trade as an extension of the basic Thirlwall's law. The overall balance of payments is incorporated in order to capture the direct impact of the balance of payment position on economic growth in Namibia.

CHAPTER FIVE

EMPIRICAL ANALYSIS AND RESULTS

5.1 Introduction

This chapter discusses the empirical analysis and results of the study. The chapter is presented as follows: Section 5.2 contains the detailed estimation of variables which is analyzed using techniques namely unit root test for stationarity, the Bounds cointegration testing procedure and the error correction model.

5.2 Detailed Estimations

The study tested if there is a long run relationship between output growth and balance of payments which alternatively is the estimation of the balance of payments constrained growth model (Thirlwall's model for developing countries).

5.2.1 Unit Root Tests

In order to determine whether the series can provide correct inferences for precise policy formulation and implementation, the statistical properties of the series were initially investigated through unit root tests. The stationarity test is important to ascertain that estimations of regression are consistent according to standard economic theory. The study applied the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests to ensure that variables are stationary. The results of unit root test are presented in Table 5.1.

Table 5.1: Unit root tests: ADF and PP in levels and first difference

Variable	Model Specification	ADF	PP	ADF	PP	Order of Integration
		Levels	Levels	First Difference	First Difference	
LnGDP	Intercept	-1.163502	-1.028483	-5.685201***	-22.78773***	1
	Intercept and trend	-1.625995	-7.151236***	-5.775743***	-23.90928***	1
BOP	Intercept	-9.227680***	-9.229939***	-7.390085***	-32.24868***	0
	Intercept and trend	-7.551506***	-9.488798***	-7.330692***	-31.92939***	0
LnEXPO	Intercept	-0.956550	-1.071921	-8.037994***	-26.14403***	1
	Intercept and trend	-3.844200**	-6.167330***	-8.011545***	-26.11100***	0
LnREER	Intercept	-2.985096**	-2.916731**	-10.15124***	-10.17947***	0
	Intercept and trend	-3.314485*	-3.320927*	-10.08908***	-10.11656***	0
LnNFCI	Intercept	-2.579987	-2.412719	-6.382967***	-10.93911***	1
	Intercept and trend	-3.396774*	-3.366974*	-6.358608***	-11.13499***	0
LnTOT	Intercept	-1.495693	-3.766255***	-7.719975***	-20.37706***	1
	Intercept and trend	-2.874757	-5.53304***	-7.683956***	-20.78863***	1

Source: Author's compilation with values obtained from Eviews

*Notes: ***, ** and * denotes rejection of the null hypothesis at 1%, 5% and 10% respectively*

The null hypothesis being tested in each series is that, 'there is presence of a unit root'. The ADF test and the PP test in levels reveals that some variables such as gross domestic product and terms of trade are non-stationary in levels. The calculated ADF test and PP test rejected the null hypothesis of unit root after taking first difference when the respective test statistics were compared in relation to their critical values. Different order of integration was, however, depicted. A linear combination of a series

integrated of order one I(1)and a series integrated of order zero I(0) is estimated using the ARDL model approach. If economic series are non-stationary and their linear combination is stationary, then the variables are said to be co-integrated. The study, therefore, went further to test the model for a long run equilibrium relationship using the Bounds co-integration test.

5.2.2 Co-integration test

The co-integration test enables the identification of the relationship between variables, with reference to long run equilibrium. To test the linear combination of two or more time series, co-integration test is used. When the series are more than one they link to form a long run relationship that is possible even if individually they contain stochastic trend/non-stationary, as over time they are assumed to move together and be stable and stationary (Granger,1990). As variables are conclusively integrated of order zero and order one, variables are expected to have a long run relationship and the Bounds test was used in this study to verify the relationship. The Bounds test allows for testing for the existence of a relationship between variables in levels using a combination of I(0) and I(1) variables as regressors. The unit root tests were done to ensure that variables are either I(0) or I(1) or both but not I(2). Table 5.2 shows the Bounds co-integration test for all the equations in the model.

Table 5.2: Bounds cointegration test

Dependent	**F Statistic**	**Cointegration**	**Action**

Variable			
LNGDP	F_{LNGDP}= 6.2219** t_{LNGDP} = -5.9440	Yes	ECM
BOP	F_{BOP} = 16.8945** t_{BOP} = 10.00091	Yes	ECM
LNEXPO	F_{LNEXPO}= 2.7829 t_{LNEXPO} = -3.7001	No	ARDL
LNREER	F_{LNREER} = 4.247** t_{LNREER} = -4.1859	Yes	ECM
LNNFCI	F_{LNNFCI} = 4.4827** t_{LNNFCI} = -3.7247	Yes	ECM
LNTOT	F_{LNTOT} = 3.3233 t_{LNTOT} = -4.4145	No	ARDL

Source: Author's compilation using values from Eviews

*Note: ** mean the null hypothesis is rejected at 5%.*

The null hypothesis of co-integration is that there is no co-integration or levels relationship among the variables. Rejection of the null hypothesis applies when the calculated value of the Bounds F- test statistic is greater than the critical value and a conclusion is drawn that there is co-integration. In Table 5.2, the Bounds test shows that the calculated F-statistic is greater than the upper bound critical value for equations with LNGDP, BOP, LNREER and LNNFCI as dependent variables and a conclusion was drawn in each case that there was co-integration between the variables. However, the

Bounds test revealed that there is no cointegration in equations with LNEXPO and LNTOT as dependent variables. The equation with LNGDP as the endogenous variable which is the main focus of the study shows that a unique long run relationship exists among the variables, that is, output growth, balance of payments, real exports, real effective exchange rate, net foreign capital inflow and terms of trade are co-integrated. Given the co-integration results, the study further estimates Error Correction model (ECM) for equations with cointegration and ARDL for equations where no cointegration was found.

5.2.3 Error Correction Model (LNGDP as dependent variable)

In this study the ARDL – ECM model was used to test the relationship between GDP growth, balance of payments, real export, real effective exchange rate, net foreign capital inflow and the terms of trade. The unrestricted VAR was first applied to test the information on lag for the model. The information on lag is shown in Table 5.3

Table 5.3: Lag order selection

Lag	LR	FPE	AIC	SC	HQ
0	N/A	0.2189	15.5082	15.6950	15.5827
1	406.1517	**0.0014***	**10.4192***	**11.7269***	**10.9409***
2	41.9742	0.0018	10.7041	13.1327	11.6729
3	36.0304	0.0026	11.0220	14.5715	12.4379
4	**52.6937***	0.0026	10.9196	15.5900	12.7826

Source: Author's compilation using values from Eviews

*Note: *indicates lag order selected by the criterion*

Table 5.3 shows that the optimal lag for the model is one lag as selected by FPE, AIC, SC and HQ.

Table 5.4: The long run model

	Independent Variables					
Dependent Variable	**C**	**BOP**	**LNEXPO**	**LNREER**	**LNNFCI**	**LNTOT**
LNGDP	6.652** (20.2000)	-1.07E-06 (-0.307)	0.361** (24.465)	0.067 (0.851)	-0.046** (-2.766)	-0.249** (-6.23)

Source: Author's compilation using values from Eviews

*Notes: t-values in parentheses and ** significant 5%*

The long run model is specified in order to obtain the residuals which are also known as the error correction term. When estimating the error correction model, the error correction term is included alongside other variables of the model. Therefore variable ECT in table 5.5 is obtained from the residuals acquired from the long run model.

Table 5.5: Error Correction Model results

Dependent Variable: D(LNGDP)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.009033	0.006743	1.339626	0.1852
D(LNGDP(-1))	-0.170723	0.129304	-1.320323	0.1915
D(BOP)	-2.37E-06	2.52E-06	-0.942861	0.3494
D(BOP(-1))	1.24E-06	2.54E-06	0.486843	0.6281
D(LNEXPO)	0.144957	0.061813	2.345080	0.0222
D(LNEXPO(-1))	-0.019529	0.066459	-0.293845	0.7698

D(LNREER)	-0.043346	0.106911	-0.405437	0.6865
D(LNREER(-1))	-0.037150	0.102028	-0.364120	0.7170
D(LNNFCI)	-0.054683	0.020852	-2.622487	0.0109
D(LNNFCI(-1))	0.013754	0.020139	0.682970	0.4971
D(LNTOT)	-0.089360	0.059856	-1.492910	0.1405
D(LNTOT(-1))	-0.004452	0.062589	-0.071139	0.9435
ECT(-1)	-0.497547	0.143925	-3.456987	0.0010
R-squared	0.433335	Mean dependent var		0.009289
Adjusted R-squared	0.325399	S.D. dependent var		0.064090
S.E. of regression	0.052640	Akaike info criterion		-2.896184
Sum squared resid	0.174569	Schwarz criterion		-2.497506
Log likelihood	123.0550	Hannan-Quinn criter.		-2.736853
F-statistic	4.014741	Durbin-Watson stat		2.075209
Prob(F-statistic)	0.000130			

Source: Author's compilation using values from Eviews

Table 5.5 presents the regression output of the error correction model for the equation with LNGDP as the dependent variable. The results showed that about 43% of variation in output growth can be explained jointly by balance of payments, real exports, real effective exchange rate, net foreign capital inflow and terms of trade. The F-statistic in the model represents the joint significance of the independent variables to explain GDP growth in the economy. The corresponding p-value of the F-statistics for the equation is significant concluding that independent variables in the model are jointly significant to explain the dependent variable. The constant term is positive, therefore, if the independent variables are held constant, real gross domestic product will increase by 0.9%. The coefficient of lagged GDP is negative and insignificant meaning that economic shrinkages from previous periods affect the current output level in an insignificant way. The probability value of each coefficient is the smallest evidence

required to reject the null hypothesis and tells whether the relationship is significant or not.

The short run coefficients of BOP, REER, and TOT are not significant according to the p -values. Variables EXPO and NFCI which are not lagged have significant coefficients. A percentage change in real exports in the current period brings about 14% increase in GDP. The key focus of the study is the value of the coefficient of the error correction term and its significance in investigating the relationship between the balance of payments and economic growth. The error correction term is significant, has a negative sign and is less than unity as desired, showing that the variables converge to a long run equilibrium over time. The error correction term shows the speed of adjustment, in particular, the previous period's deviation from long run equilibrium is corrected in the current period at an adjustment speed of 50% in each period. The error correction term being significant means there is joint Granger causality running from the explanatory variables to the dependent variable.

5.2.4 Diagnostic tests

The LM test was used to test any serial correlation in the model. The probability value (P-value) of the computed F-statistic (0.0837) is greater than 5% therefore there was no evidence of serial correlation that was found in the equation. The Breusch Pagan Godfrey test was used to test heteroskedasticity and there was no evidence of heteroskedasticity in the model since p-value (0.986) of the calculated F-statistic is

greater than 0.05 level of significance. Results tables of diagnostic tests are included in the appendix. The CUSUM test performed with the graphs shown in the appendix indicated some slight deviation of the model outside the 5% boundary indicating some structural breaks in the series.

Table 5.6 Summary of estimations of five other equations in the model

Dependent Variable	BOP	LNEXPO	LNREER	LNNFCI	LNTOT
Lag length	1	1	1	1	1
ARDL	1,0,1,0,0,0	1,0,0,0,0,1	1,0,0,0,1,0	1,0,0,1,0,1	1,0,0,1,0,0
R^2	0.65	0.66	0.33	0.32	0.68
ECM	-1.35 (0.000)	ARDL	-0.29 (0.0017)	-0.34 (0.040)	ARDL
LM Test	0.4173 No serial correlation	0.1949 No serial correlation	0.5819 No serial correlation	0.7347 No serial correlation	0.1338 No serial correlation
BPG Heteroskedasticty Test	0.9182 No Heterosked	0.8396 No Heterosked	0.5407 No Heterosked	0.8013 No Heterosked	0.1170 No Heterosked

Source: Author's compilation using values from Eviews

When the dependent variable was BOP the Bounds test found cointegration among the variables hence an error correction model was estimated. The results show that lagged BOP, LNREER and lagged LNNFCI are significant in explaining the variation in the

balance of payments. Past values of BOP therefore, affect the current BOP position in Namibia in any given period of time. The flow of capital also exhibits some significant weight in determining the balance of payments in each period together with the prevailing real effective exchange rate in that period. The error correction term from the regression has a negative sign signifying convergence towards a long run equilibrium of the variables in this equation. The error correction term is also significant meaning that there is a long run joint Granger causality running from the explanatory variables to the dependent variable BOP.

The equation where LNEXPO was the dependent variable no cointegration among the variables was found therefore a short run dynamic ARDL model was estimated. The results show that the lagged LNEXPO, LNGDP, current and lagged LNTOT were significant in explaining the change in exports. The significance of LNGDP conforms to the economic apriori expectation because the level of economic output is directly related to the level of output available for export. The terms of trade also significantly affects the level of exports as poor competitiveness on the global market will mean lower volumes of exports and vice versa.

In the equation with LNREER as the dependent variable, the cointegration test revealed that a long run level relationship existed among the variables and consequently an ECM was estimated. The output revealed that lagged LNGDP, LNNFCI and BOP significantly explain the fluctuations in the real effective exchange rate in Namibia. Large capital outflows and persistent BOP deficits weaken the local currency and

increases the exchange rate. The opposite will occur to the local currency and the exchange rate in the case of huge capital inflows and BOP surpluses. The error correction term in this case was negative representing convergence torwards a long run equilibrium and its significance means that the variables in the equation jointly long run Granger cause the variations in the real effective exchange rate.

Cointegration was found in the equation where LNNFCI was the dependent variable and an error correction model estimated showed that LNGDP significantly explains net foreign capital inflow. A highly productive country exhibiting high GDP growth levels is an attractive investment ground for investors, therefore, LNGDP clarifies direction of movements in capital in and out of the country. The error correction term in this case was significant and negative reflecting long run causality and convergence of variables, respectively.

When LNTOT was the dependent variable, bounds cointegration test found no long run levels relationship among the variables therefore the ARDL model was estimated. In the results of this estimation lagged LNTOT and LNEXPO were significant in clarifying the movement in terms of trade. Exports and global competitiveness are strongly related components in this model as the terms of trade determine the volumes of exports that are procured on the global market.

5.2.5 Estimation of the second model (Harrod trade multiplier) which is the weak version of Thirlwall's law

From the unit roots tested above, the variables of the model LnGDP and LnEXPO are integrated of order zero and one I (0) and I (1). Co-integration test is therefore done for the variables of the model using the Bounds test and the ARDL estimation method is used to estimate the weak version of Thirlwall's law.

Table 5.7: Bounds cointgration test

Dependent Variable	**F Statistic**	**Cointegration**	**Action**
LNGDP	F_{LNGDP} = 9.4030** t_{LNGDP} = -4.3291	Yes	ECM
LNEXPO	F_{LNEXPO} = 15.39** t_{LNEXPO} =-5.548	Yes	ECM

Source: Author's compilation using values from Eviews

*Note: ** mean the null hypothesis is rejected at 5%.*

The two equations both have the computed F statistics greater than the critical values indicating the presence of long run level relationships among the variables thus, the VEC model is specified in order to make both short run and long run analyses. Consequently the vector error correction model is estimated.

Table 5.8 The Long-run Model

	Independent variables	
	C	**LNEXPO**
Dependent Variable LNGDP	6.626** (61.737)	0.377** (30.267)

Source: Author's compilation using values from Eviews

*Notes: t-values in parentheses and ** significant 5%*

In order to obtain the residuals which are also known as the error correction term, the long run model is specified and estimated. The error correction term is used in the estimation of the error correction model and is included alongside all the other variables of the model. The variable ECTG in table 5.9 are the residuals obtained from the long run model.

The results of the error correction model for the relationship between output and real exports are presented in table 5.9. The optimal lags for the variables as selected by FPE, AIC, SC and HQ selection criteria is four. The results table for lag selection is included in the appendix.

Table 5.9 Error correction model.

Dependent Variable: D(LNGDP)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.029392	0.007886	3.726920	0.0004
D(LNGDP(-1))	-0.599494	0.162530	-3.688518	0.0005
D(LNGDP(-2))	-0.508483	0.157415	-3.230208	0.0020
D(LNGDP(-3))	-0.445608	0.144162	-3.091023	0.0030
D(LNGDP(-4))	0.235853	0.123661	1.907253	0.0611

D(LNEXPO)	0.004866	0.036911	0.131837	0.8955
D(LNEXPO(-1))	-0.043978	0.047356	-0.928656	0.3567
D(LNEXPO(-2))	-0.075082	0.046098	-1.628755	0.1084
D(LNEXPO(-3))	-0.078998	0.042979	-1.838069	0.0708
D(LNEXPO(-4))	-0.031464	0.035370	-0.889544	0.3771
ECTG(-1)	-0.079436	0.110819	-0.716810	0.4762
R-squared	0.643293	Mean dependent var		0.008701
Adjusted R-squared	0.585760	S.D. dependent var		0.063291
S.E. of regression	0.040735	Akaike info criterion		-3.425405
Sum squared resid	0.102880	Schwarz criterion		-3.080268
Log likelihood	136.0273	Hannan-Quinn criter.		-3.287862
F-statistic	11.18123	Durbin-Watson stat		2.102489
Prob(F-statistic)	0.000000			

Source: Author's compilation using values from Eviews

The regression output of the vector error correction model are presented in Table 5.9. The results shows that about 64.3% of variation in output growth can be explained jointly by output in previous periods and real exports. The corresponding p-value of the F-statistics is significant concluding that independent variables in the model are jointly significant to explain the dependent variable. The error correction term has as negative sign and is less than a unit as desired showing that the variables converge to a long run equilibrium over time. The speed of adjustment is represented by the error correction term, in particular, the previous period's deviation from long run equilibrium is corrected at a speed of 7.9% in each period. However, the error correction term is not significant, suggesting that there is a weak long run levels relationship among the variables.

The coefficients of the lagged LNGDP variable are significant and this suggests that the current level of economic output in each period in Namibia is strongly influenced by previous economic performance of the country. The negative coefficients of the lagged GDP variables may be reflecting economic shrinkage or negative growth that has been affecting the country in recent years. The coefficient of exports lagged three periods behind is significant at 10% level suggesting that the current levels of economic output can be explained by the past production levels of exports.

5.2.6 Diagnostic tests

The LM test was used to test any serial correlation in the model. The P-value of the calculated F-statistic 0.0806 is greater than 5% level of significance therefore there is no evidence of serial correlation that is found in the equation. The Breusch Pagan Godfrey test was used to test heteroskedasticity and there was no evidence of heteroskedasticity in the model since the p-value of the computed F-statistic 0.410 was greater than 5% level of significance. The CUSUM test executed indicated that the model is stable. The tables and figures of results of the diagnostic tests are shown in the appendix. The residual normality test was used to test if the residuals followed a normal distribution. The result showed that the system is normally distributed.

The level of economic activity as measured by GDP is also of significant importance in fostering the desired level of economic development in the country. Economic expansion in the current period has a multiplicative effect and will highly likely result in positive future economic growth prospects. In the same vain economic shrinkage tend

to pull the economy towards future negative growths (as reflected by the negative coefficients of the lagged GDP variables) unless relevant remedial policies are implemented to counteract the economic contraction.

CHAPTER SIX

CONCLUSION AND POLICY IMPLICATIONS

6.1 Conclusion

The study investigated the relationship between balance of payments and economic growth in Namibia using quarterly time series data for a period 1999q1 to 2018q2. The objective of the study was to examine the possibility of a long run relationship between economic growth and balance of payments thereby determining whether the Namibian economy is balance of payments constrained. In investigating the relationship between balance of payments and economic growth in the Namibian economy; balance of payments, real exports, real effective exchange rate, net foreign capital inflow and terms of trade were used as explanatory variables while GDP was the dependent variable in the models. Two models were used, that is, Thirlwall's balance of payments constrained growth model for developing countries and the weak version of Thirlwall's law. Stationarity test results using ADF test and PP test showed that variables were integrated of order zero and order one therefore the ARDL estimation approach was used.

The Bounds co-integration test on the two models confirmed that unique long run relationships exist among the variables. Therefore, the main finding is that there is a

significant long run relationship between the balance of payments and economic growth. The balance of payments constrained growth model, the first model estimated, revealed a significant long run relationship among the variables, suggesting that Namibia is balance of payments constrained. An insignificant long run relationship was, however, found on the weak version of the balance of payments constrained growth model because of the insignificant error correction term. This suggests that the weak version of Thirlwall's law is not suited for Namibia but rather the extended version for developing countries applies to the country. The study by Sumra (2016) for Sub-Saharan countries purported that the balance of payments constrained growth model which was an extension of Thirlwall's Law and included capital inflow and terms of trade had poor predictive power for Namibia and other African countries. The results of the study by Sumra (2016) were also inconclusive because of the lack of data on interest payments abroad for Namibia. In this study on the other hand, the model exhibited a significant long run relationship among the variables, thus, the country is balance of payments constrained.

Studies by Jordaan and Eita (2007); Niishinda and Ogbokor (2013) found that real exports had a strong ability to stimulate economic growth in Namibia. The positive significant coefficient of exports in the extended Thirwall's model estimated and the long run model for the weak version of Thirlwall's law confirm these findings. One of the coefficients of lagged exports in the equation explaining the relationship between exports and economic growth was significant suggesting a causal relationship running from exports to GDP. Jointly the equation revealed a long run weak relationship

between GDP and real exports as shown by the insignificant error correction term in the ECM.

6.2 Policy Implication and recommendations

Exports and net foreign capital inflow which are components of BOP have proved to be important in explaining output growth. According to the findings, the Namibian economy is balance of payments constrained and the extended version of Thirlwall's law applies to the country. Consequently the following recommendations are made:

- The policy implication of this study are: since real export is a strong determinant of economic growth, government investment in capital infrastructure to attract investment and new technology is vital. This will in turn stimulate skills development, increase economic growth, create employment, improve standards of living and alleviate poverty.
- The balance of payments constrained growth model has one of the implications that the structure of production and exports determines the income elasticity of demand for exports. The elasticity determines the rate of growth, hence, exports have to do with how economic activity is structured. Therefore, changing the structure of the economy by improving and expanding the manufacturing sector is imperative in order to bring about long term economic growth and development in Namibia.

- The Namibian government would do well by formulating and implementing trade-led policies that will improve exports and encourage import substitution of primary products that have inelastic demand. The study recommends that the government take advantage of the recently 'agreed on' African Free Trade Area to expand Namibia's export market.
- The study also revealed that GDP is a significant influencer of itself, therefore, it is in the interest of the national authorities to implement policies that stimulate GDP growth, policies that encourage massive industrialisation. The export sector would perform better on the global market by changing its export structure, that is, moving away from exporting primary products and increase the production of value added products. Innovation in this case is, therefore, pertinent to the growth of the economy.

6.3 Areas for Further Research

The theoretical and empirical literature on the economic effects of balance of payments on growth are reviewed in this thesis. The relationship between growth and balance of payments was the primary focus of the study. Several empirical explorations of the relationship between BOP and economic growth arising from the assessment and a critical assessment of the literature still needs to be made. Since the study has confirmed that Namibia is balance of payments constrained, the effect of external debt stock and interest payments on loans which affect the balance of payments of the country also need to be tested and their effect on economic growth be determined.

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Appendix

ARDL Long Run Form and Bounds Test
Dependent Variable: D(LNGDP)
Selected Model: ARDL(1, 0, 0, 0, 1, 0)
Case 3: Unrestricted Constant and No Trend
Sample: 1999Q1 2018Q4
Included observations: 77

Conditional Error Correction Regression

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.971628	0.710137	5.592765	0.0000
LNGDP(-1)*	-0.579426	0.097480	-5.944024	0.0000
BOP**	-1.63E-06	3.14E-06	-0.519922	0.6048
LNEXPO**	0.204193	0.038330	5.327180	0.0000
LNREER**	0.012476	0.074934	0.166489	0.8683
LNNFCI(-1)	-0.018092	0.017651	-1.024956	0.3090
LNTOT**	-0.149887	0.043280	-3.463150	0.0009
D(LNNFCI)	-0.050378	0.020274	-2.484862	0.0154

* p-value incompatible with t-Bounds distribution.
** Variable interpreted as Z = Z(-1) + D(Z).

Levels Equation
Case 3: Unrestricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
BOP	-2.82E-06	5.46E-06	-0.515537	0.6078
LNEXPO	0.352406	0.023489	15.00301	0.0000
LNREER	0.021531	0.129038	0.166859	0.8680
LNNFCI	-0.031223	0.029654	-1.052941	0.2960
LNTOT	-0.258681	0.066643	-3.881624	0.0002

EC = LNGDP - (-0.0000*BOP + 0.3524*LNEXPO + 0.0215*LNREER
-0.0312*LNNFCI -0.2587*LNTOT)

F-Bounds Test — Null Hypothesis: No levels relationship

Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	6.221855	10%	2.26	3.35
k	5	5%	2.62	3.79
		2.5%	2.96	4.18
		1%	3.41	4.68
			Finite Sample: n=80	
Actual Sample Size	77			
		10%	2.355	3.5
		5%	2.787	4.015
		1%	3.725	5.163

		Finite Sample: n=75	
	10%	2.38	3.515
	5%	2.802	4.065
	1%	3.772	5.213

t-Bounds Test — Null Hypothesis: No levels relationship

Test Statistic	Value	Signif.	I(0)	I(1)
t-statistic	-5.944024	10%	-2.57	-3.86
		5%	-2.86	-4.19
		2.5%	-3.13	-4.46
		1%	-3.43	-4.79

ARDL Long Run Form and Bounds Test
Dependent Variable: D(BOP)
Selected Model: ARDL(1, 0, 1, 0, 0, 0)
Case 3: Unrestricted Constant and No Trend
Sample: 1999Q1 2018Q4
Included observations: 77

Conditional Error Correction Regression

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	22170.86	28304.57	0.783296	0.4361
BOP(-1)*	-1.172937	0.117283	-10.00091	0.0000
LNGDP**	31.03429	3979.846	0.007798	0.9938
LNEXPO(-1)	556.2807	1547.868	0.359385	0.7204
LNREER**	-6076.550	2633.122	-2.307736	0.0240
LNNFCI**	54.39674	593.7905	0.091609	0.9273
LNTOT**	-2070.979	1772.726	-1.168245	0.2467
D(LNEXPO)	3273.599	1917.212	1.707479	0.0922

* p-value incompatible with t-Bounds distribution.
** Variable interpreted as Z = Z(-1) + D(Z).

Levels Equation
Case 3: Unrestricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNGDP	26.45861	3392.889	0.007798	0.9938
LNEXPO	474.2630	1320.826	0.359065	0.7206
LNREER	-5180.627	2211.926	-2.342134	0.0221
LNNFCI	46.37651	506.3708	0.091586	0.9273
LNTOT	-1765.635	1514.030	-1.166182	0.2476

EC = BOP - (26.4586*LNGDP + 474.2630*LNEXPO -5180.6269*LNREER
+ 46.3765*LNNFCI -1765.6346*LNTOT)

F-Bounds Test — Null Hypothesis: No levels relationship

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

			Asymptotic: n=1000	
F-statistic	16.89451	10%	2.26	3.35
k	5	5%	2.62	3.79
		2.5%	2.96	4.18
		1%	3.41	4.68
			Finite Sample: n=80	
Actual Sample Size	77			
		10%	2.355	3.5
		5%	2.787	4.015
		1%	3.725	5.163
			Finite Sample: n=75	
		10%	2.38	3.515
		5%	2.802	4.065
		1%	3.772	5.213

t-Bounds Test — Null Hypothesis: No levels relationship

Test Statistic	Value	Signif.	I(0)	I(1)
t-statistic	-10.00091	10%	-2.57	-3.86
		5%	-2.86	-4.19
		2.5%	-3.13	-4.46
		1%	-3.43	-4.79

ARDL Long Run Form and Bounds Test
Dependent Variable: D(LNEXPO)
Selected Model: ARDL(1, 0, 0, 0, 0, 1)
Case 3: Unrestricted Constant and No Trend
Sample: 1999Q1 2018Q4
Included observations: 77

Conditional Error Correction Regression

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-4.903124	1.458537	-3.361672	0.0013
LNEXPO(-1)*	-0.283923	0.076734	-3.700116	0.0004
LNGDP**	0.732395	0.199179	3.677074	0.0005
BOP**	6.30E-06	6.26E-06	1.005604	0.3181
LNREER**	0.010236	0.141652	0.072264	0.9426
LNNFCI**	0.024477	0.032380	0.755916	0.4523
LNTOT(-1)	0.187854	0.103246	1.819474	0.0732
D(LNTOT)	0.679496	0.083407	8.146746	0.0000

* p-value incompatible with t-Bounds distribution.
** Variable interpreted as Z = Z(-1) + D(Z).

Levels Equation
Case 3: Unrestricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNGDP	2.579553	0.257902	10.00207	0.0000
BOP	2.22E-05	2.28E-05	0.972903	0.3340
LNREER	0.036053	0.499564	0.072169	0.9427
LNNFCI	0.086209	0.104775	0.822804	0.4135
LNTOT	0.661637	0.336192	1.968035	0.0531

EC = LNEXPO - (2.5796*LNGDP + 0.0000*BOP + 0.0361*LNREER + 0.0862*LNNFCI + 0.6616*LNTOT)

F-Bounds Test — Null Hypothesis: No levels relationship

Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	2.782930	10%	2.26	3.35
k	5	5%	2.62	3.79
		2.5%	2.96	4.18
		1%	3.41	4.68
			Finite Sample: n=80	
Actual Sample Size	77			
		10%	2.355	3.5
		5%	2.787	4.015
		1%	3.725	5.163
			Finite Sample: n=75	
		10%	2.38	3.515
		5%	2.802	4.065
		1%	3.772	5.213

t-Bounds Test — Null Hypothesis: No levels relationship

Test Statistic	Value	Signif.	I(0)	I(1)
t-statistic	-3.700116	10%	-2.57	-3.86
		5%	-2.86	-4.19
		2.5%	-3.13	-4.46
		1%	-3.43	-4.79

ARDL Long Run Form and Bounds Test
Dependent Variable: D(LNREER)
Selected Model: ARDL(1, 0, 0, 0, 1, 0)
Case 3: Unrestricted Constant and No Trend
Sample: 1999Q1 2018Q4
Included observations: 77

Conditional Error Correction Regression

Variable	Coefficient	Std. Error	t-Statistic	Prob.

C	1.072989	0.833675	1.287059	0.2024
LNREER(-1)*	-0.310894	0.074272	-4.185912	0.0001
LNGDP**	0.021455	0.114775	0.186935	0.8523
BOP**	-7.75E-06	3.30E-06	-2.350401	0.0216
LNEXPO**	-0.010170	0.043677	-0.232845	0.8166
LNNFCI(-1)	0.041294	0.018252	2.262511	0.0268
LNTOT**	0.010388	0.049355	0.210480	0.8339
D(LNNFCI)	-0.013014	0.022730	-0.572548	0.5688

* p-value incompatible with t-Bounds distribution.
** Variable interpreted as Z = Z(-1) + D(Z).

Levels Equation
Case 3: Unrestricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNGDP	0.069012	0.368532	0.187262	0.8520
BOP	-2.49E-05	1.20E-05	-2.077842	0.0414
LNEXPO	-0.032712	0.140735	-0.232436	0.8169
LNNFCI	0.132825	0.060664	2.189522	0.0319
LNTOT	0.033414	0.159326	0.209721	0.8345

EC = LNREER - (0.0690*LNGDP -0.0000*BOP -0.0327*LNEXPO + 0.1328*LNNFCI + 0.0334*LNTOT)

F-Bounds Test — Null Hypothesis: No levels relationship

Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	4.246741	10%	2.26	3.35
k	5	5%	2.62	3.79
		2.5%	2.96	4.18
		1%	3.41	4.68
			Finite Sample: n=80	
Actual Sample Size	77			
		10%	2.355	3.5
		5%	2.787	4.015
		1%	3.725	5.163
			Finite Sample: n=75	
		10%	2.38	3.515
		5%	2.802	4.065
		1%	3.772	5.213

t-Bounds Test — Null Hypothesis: No levels relationship

Test Statistic	Value	Signif.	I(0)	I(1)
t-statistic	-4.185912	10%	-2.57	-3.86
		5%	-2.86	-4.19
		2.5%	-3.13	-4.46

1%	-3.43	-4.79	

ARDL Long Run Form and Bounds Test
Dependent Variable: D(LNNFCI)
Selected Model: ARDL(1, 0, 0, 1, 0, 1)
Case 3: Unrestricted Constant and No Trend
Sample: 1999Q1 2018Q4
Included observations: 77

Conditional Error Correction Regression

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	13.18309	4.225796	3.119671	0.0027
LNNFCI(-1)*	-0.340130	0.091318	-3.724658	0.0004
LNGDP**	-1.837566	0.575410	-3.193487	0.0021
BOP**	6.27E-06	1.77E-05	0.353860	0.7245
LNEXPO(-1)	0.822287	0.214731	3.829380	0.0003
LNREER**	-0.075559	0.413812	-0.182593	0.8557
LNTOT(-1)	-0.579593	0.292522	-1.981366	0.0516
D(LNEXPO)	0.125346	0.337559	0.371331	0.7115
D(LNTOT)	-0.146071	0.329658	-0.443098	0.6591

* p-value incompatible with t-Bounds distribution.
** Variable interpreted as Z = Z(-1) + D(Z).

Levels Equation
Case 3: Unrestricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNGDP	-5.402544	2.068187	-2.612212	0.0111
BOP	1.84E-05	5.26E-05	0.350455	0.7271
LNEXPO	2.417568	0.776635	3.112875	0.0027
LNREER	-0.222148	1.238937	-0.179305	0.8582
LNTOT	-1.704036	0.774993	-2.198776	0.0313

EC = LNNFCI - (-5.4025*LNGDP + 0.0000*BOP + 2.4176*LNEXPO
-0.2221*LNREER -1.7040*LNTOT)

F-Bounds Test — Null Hypothesis: No levels relationship

Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	4.482743	10%	2.26	3.35
k	5	5%	2.62	3.79
		2.5%	2.96	4.18
		1%	3.41	4.68
			Finite Sample: n=80	
Actual Sample Size	77			
		10%	2.355	3.5
		5%	2.787	4.015
		1%	3.725	5.163

		Finite Sample: n=75	
	10%	2.38	3.515
	5%	2.802	4.065
	1%	3.772	5.213

t-Bounds Test — Null Hypothesis: No levels relationship

Test Statistic	Value	Signif.	I(0)	I(1)
t-statistic	-3.724658	10%	-2.57	-3.86
		5%	-2.86	-4.19
		2.5%	-3.13	-4.46
		1%	-3.43	-4.79

ARDL Long Run Form and Bounds Test
Dependent Variable: D(LNTOT)
Selected Model: ARDL(1, 0, 0, 1, 0, 0)
Case 3: Unrestricted Constant and No Trend
Sample: 1999Q1 2018Q4
Included observations: 77

Conditional Error Correction Regression

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.737573	1.557715	2.399394	0.0191
LNTOT(-1)*	-0.424574	0.096177	-4.414509	0.0000
LNGDP**	-0.457971	0.217583	-2.104814	0.0390
BOP**	-3.30E-06	6.49E-06	-0.509165	0.6123
LNEXPO(-1)	0.140210	0.084900	1.651473	0.1032
LNREER**	-0.060237	0.145794	-0.413164	0.6808
LNNFCI**	-0.049738	0.032966	-1.508772	0.1359
D(LNEXPO)	0.721540	0.088568	8.146746	0.0000

* p-value incompatible with t-Bounds distribution.
** Variable interpreted as Z = Z(-1) + D(Z).

Levels Equation
Case 3: Unrestricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNGDP	-1.078661	0.443070	-2.434515	0.0175
BOP	-7.78E-06	1.51E-05	-0.513888	0.6090
LNEXPO	0.330238	0.183315	1.801480	0.0760
LNREER	-0.141877	0.342669	-0.414034	0.6801
LNNFCI	-0.117147	0.070140	-1.670180	0.0994

EC = LNTOT - (-1.0787*LNGDP -0.0000*BOP + 0.3302*LNEXPO -0.1419 *LNREER -0.1171*LNNFCI)

F-Bounds Test — Null Hypothesis: No levels relationship

Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	3.323314	10%	2.26	3.35
k	5	5%	2.62	3.79
		2.5%	2.96	4.18
		1%	3.41	4.68
			Finite Sample: n=80	
Actual Sample Size	77			
		10%	2.355	3.5
		5%	2.787	4.015
		1%	3.725	5.163
			Finite Sample: n=75	
		10%	2.38	3.515
		5%	2.802	4.065
		1%	3.772	5.213

t-Bounds Test — Null Hypothesis: No levels relationship

Test Statistic	Value	Signif.	I(0)	I(1)
t-statistic	-4.414509	10%	-2.57	-3.86
		5%	-2.86	-4.19
		2.5%	-3.13	-4.46
		1%	-3.43	-4.79

Dependent Variable: LNGDP
Method: ARDL
Sample (adjusted): 1999Q2 2018Q2
Included observations: 77 after adjustments
Maximum dependent lags: 1 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (1 lag, automatic): BOP LNEXPO LNREER LNNFCI LNTOT
Fixed regressors: C
Number of models evalulated: 32
Selected Model: ARDL(1, 0, 0, 0, 1, 0)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LNGDP(-1)	0.420574	0.097480	4.314446	0.0001
BOP	-1.63E-06	3.14E-06	-0.519922	0.6048
LNEXPO	0.204193	0.038330	5.327180	0.0000
LNREER	0.012476	0.074934	0.166489	0.8683
LNNFCI	-0.050378	0.020274	-2.484862	0.0154
LNNFCI(-1)	0.032287	0.021447	1.505393	0.1368
LNTOT	-0.149887	0.043280	-3.463150	0.0009
C	3.971628	0.710137	5.592765	0.0000
R-squared	0.960487	Mean dependent var		9.870378

Adjusted R-squared	0.956479	S.D. dependent var	0.253369
S.E. of regression	0.052857	Akaike info criterion	-2.944350
Sum squared resid	0.192778	Schwarz criterion	-2.700838
Log likelihood	121.3575	Hannan-Quinn criter.	-2.846947
F-statistic	239.6102	Durbin-Watson stat	2.135627
Prob(F-statistic)	0.000000		

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

Dependent Variable: LNGDP
Method: Least Squares
Sample (adjusted): 1999Q1 2018Q2
Included observations: 78 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	6.651522	0.329287	20.19980	0.0000
BOP	-1.07E-06	3.49E-06	-0.306997	0.7597
LNEXPO	0.361079	0.014759	24.46484	0.0000
LNREER	0.067138	0.078855	0.851416	0.3974
LNNFCI	-0.046425	0.016786	-2.765611	0.0072
LNTOT	-0.249035	0.041349	-6.022821	0.0000

R-squared	0.950409	Mean dependent var	9.865358
Adjusted R-squared	0.946965	S.D. dependent var	0.255594
S.E. of regression	0.058862	Akaike info criterion	-2.753448
Sum squared resid	0.249459	Schwarz criterion	-2.572162
Log likelihood	113.3845	Hannan-Quinn criter.	-2.680876
F-statistic	275.9731	Durbin-Watson stat	1.323050
Prob(F-statistic)	0.000000		

ARDL Error Correction Regression
Dependent Variable: D(LNGDP)
Selected Model: ARDL(1, 0, 0, 0, 1, 0)
Case 3: Unrestricted Constant and No Trend
Sample: 1999Q1 2018Q4
Included observations: 77

ECM Regression
Case 3: Unrestricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.971628	0.626215	6.342272	0.0000
D(LNNFCI)	-0.050378	0.017881	-2.817490	0.0063
CointEq(-1)*	-0.579426	0.091574	-6.327423	0.0000

R-squared	0.376534	Mean dependent var	0.008848
Adjusted R-squared	0.359684	S.D. dependent var	0.063785
S.E. of regression	0.051040	Akaike info criterion	-3.074220

Sum squared resid	0.192778	Schwarz criterion	-2.982903
Log likelihood	121.3575	Hannan-Quinn criter.	-3.037694
F-statistic	22.34567	Durbin-Watson stat	2.135627
Prob(F-statistic)	0.000000		

* p-value incompatible with t-Bounds distribution.

Dependent Variable: D(LNGDP)
Method: Least Squares
Sample (adjusted): 1999Q3 2018Q2
Included observations: 76 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.009033	0.006743	1.339626	0.1852
D(LNGDP(-1))	-0.170723	0.129304	-1.320323	0.1915
D(BOP)	-2.37E-06	2.52E-06	-0.942861	0.3494
D(BOP(-1))	1.24E-06	2.54E-06	0.486843	0.6281
D(LNEXPO)	0.144957	0.061813	2.345080	0.0222
D(LNEXPO(-1))	-0.019529	0.066459	-0.293845	0.7698
D(LNREER)	-0.043346	0.106911	-0.405437	0.6865
D(LNREER(-1))	-0.037150	0.102028	-0.364120	0.7170
D(LNNFCI)	-0.054683	0.020852	-2.622487	0.0109
D(LNNFCI(-1))	0.013754	0.020139	0.682970	0.4971
D(LNTOT)	-0.089360	0.059856	-1.492910	0.1405
D(LNTOT(-1))	-0.004452	0.062589	-0.071139	0.9435
ECT(-1)	-0.497547	0.143925	-3.456987	0.0010

R-squared	0.433335	Mean dependent var	0.009289
Adjusted R-squared	0.325399	S.D. dependent var	0.064090
S.E. of regression	0.052640	Akaike info criterion	-2.896184
Sum squared resid	0.174569	Schwarz criterion	-2.497506
Log likelihood	123.0550	Hannan-Quinn criter.	-2.736853
F-statistic	4.014741	Durbin-Watson stat	2.075209
Prob(F-statistic)	0.000130		

Breusch-Godfrey Serial Correlation LM Test:

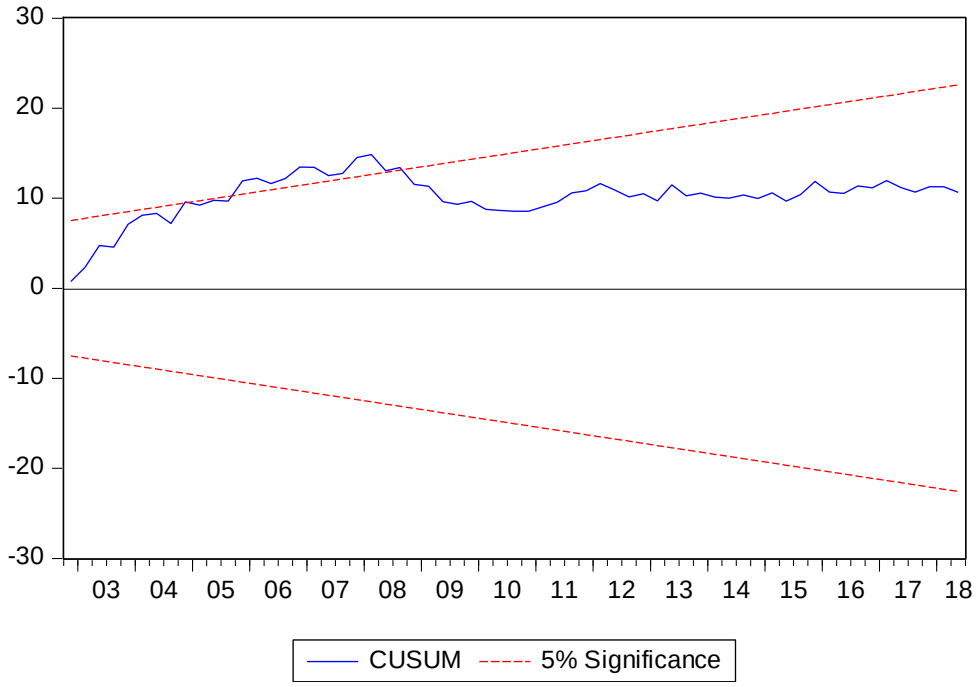
F-statistic	3.089354	Prob. F(1,62)	0.0837
Obs*R-squared	3.607209	Prob. Chi-Square(1)	0.0575

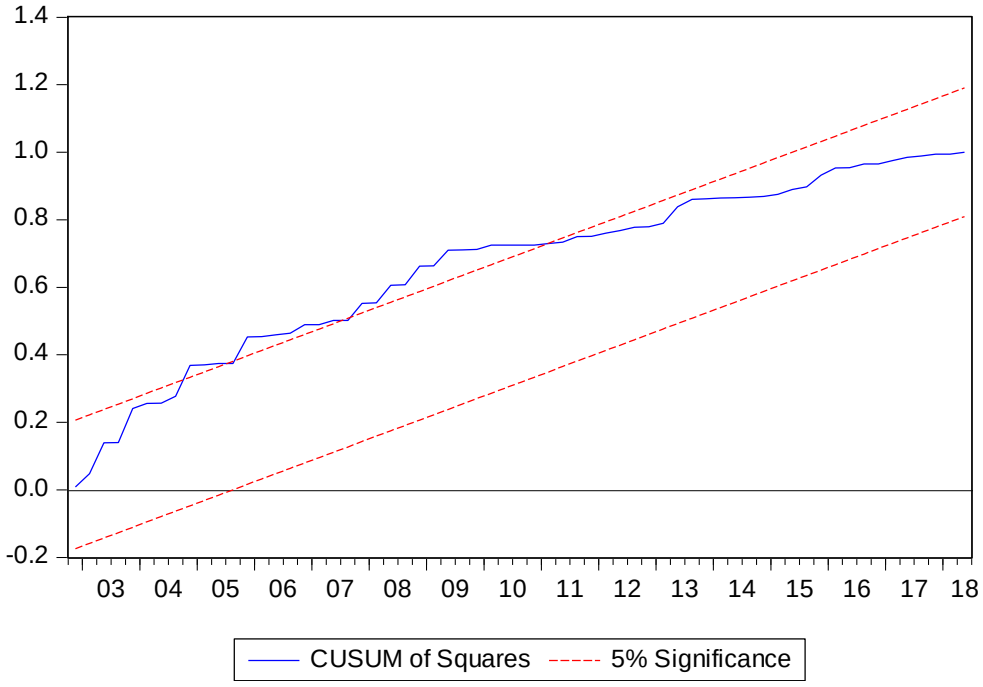
Test Equation:
Dependent Variable: RESID
Method: Least Squares
Sample: 1999Q3 2018Q2
Included observations: 76
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.002812	0.006824	-0.412058	0.6817

D(LNGDP(-1))	0.274935	0.201620	1.363631	0.1776
D(BOP)	4.10E-07	2.49E-06	0.164923	0.8695
D(BOP(-1))	1.82E-06	2.71E-06	0.673403	0.5032
D(LNEXPO)	-0.020579	0.061930	-0.332289	0.7408
D(LNEXPO(-1))	0.021128	0.066479	0.317817	0.7517
D(LNREER)	0.019343	0.105755	0.182905	0.8555
D(LNREER(-1))	0.028877	0.101713	0.283911	0.7774
D(LNNFCI)	0.003167	0.020593	0.153774	0.8783
D(LNNFCI(-1))	0.018930	0.022551	0.839436	0.4045
D(LNTOT)	0.010455	0.059187	0.176640	0.8604
D(LNTOT(-1))	-0.025672	0.063285	-0.405663	0.6864
ECT(-1)	0.443957	0.289566	1.533180	0.1303
RESID(-1)	-0.776028	0.441513	-1.757656	0.0837

R-squared	0.047463	Mean dependent var	-4.25E-18
Adjusted R-squared	-0.152262	S.D. dependent var	0.048245
S.E. of regression	0.051788	Akaike info criterion	-2.918495
Sum squared resid	0.166284	Schwarz criterion	-2.489150
Log likelihood	124.9028	Hannan-Quinn criter.	-2.746908
F-statistic	0.237643	Durbin-Watson stat	2.171567
Prob(F-statistic)	0.996740		





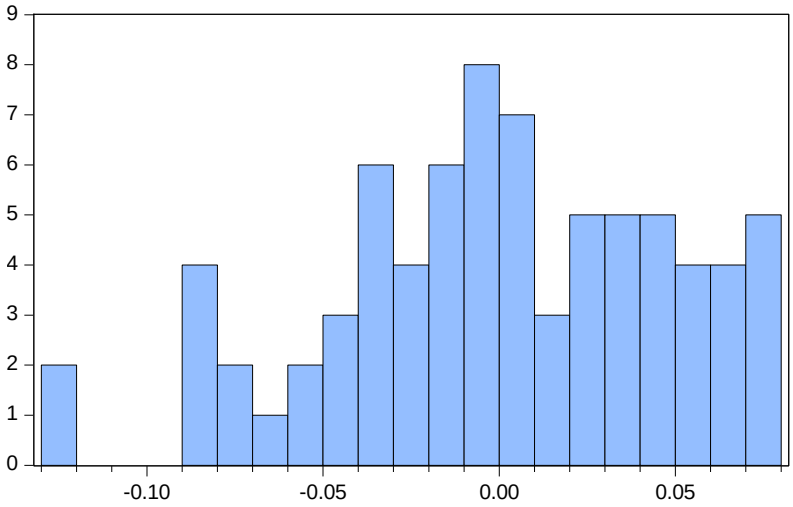
Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.302548	Prob. F(12,63)	0.9867
Obs*R-squared	4.141103	Prob. Chi-Square(12)	0.9808
Scaled explained SS	2.418921	Prob. Chi-Square(12)	0.9984

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Sample: 1999Q3 2018Q2
Included observations: 76

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.002295	0.000410	5.601580	0.0000
D(LNGDP(-1))	0.000144	0.007857	0.018300	0.9855
D(BOP)	3.34E-08	1.53E-07	0.218545	0.8277
D(BOP(-1))	1.05E-07	1.54E-07	0.679245	0.4995
D(LNEXPO)	-0.001565	0.003756	-0.416720	0.6783
D(LNEXPO(-1))	-0.000332	0.004038	-0.082151	0.9348
D(LNREER)	0.003783	0.006496	0.582400	0.5624
D(LNREER(-1))	0.001324	0.006200	0.213496	0.8316
D(LNNFCI)	0.001351	0.001267	1.066471	0.2903
D(LNNFCI(-1))	-0.000117	0.001224	-0.095288	0.9244
D(LNTOT)	-0.002351	0.003637	-0.646410	0.5204
D(LNTOT(-1))	-0.003052	0.003803	-0.802558	0.4252
ECT(-1)	0.002433	0.008746	0.278205	0.7818

R-squared	0.054488	Mean dependent var	0.002297
Adjusted R-squared	-0.125609	S.D. dependent var	0.003015
S.E. of regression	0.003199	Akaike info criterion	-8.497676
Sum squared resid	0.000645	Schwarz criterion	-8.098998
Log likelihood	335.9117	Hannan-Quinn criter.	-8.338345
F-statistic	0.302548	Durbin-Watson stat	2.209718
Prob(F-statistic)	0.986721		



Series: Residuals	
Sample 1999Q3 2018Q2	
Observations 76	
Mean	-4.25e-18
Median	-0.000246
Maximum	0.078247
Minimum	-0.124549
Std. Dev.	0.048245
Skewness	-0.429242
Kurtosis	2.700129
Jarque-Bera	2.618577
Probability	0.270012

ARDL Long Run Form and Bounds Test
Dependent Variable: D(LNGDP)
Selected Model: ARDL(1, 0)
Case 3: Unrestricted Constant and No Trend
Sample: 1999Q1 2018Q4
Included observations: 77

Conditional Error Correction Regression

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.683151	0.618959	4.334939	0.0000
LNGDP(-1)*	-0.402898	0.093067	-4.329116	0.0000
LNEXPO**	0.151057	0.036967	4.086286	0.0001

* p-value incompatible with t-Bounds distribution.
** Variable interpreted as Z = Z(-1) + D(Z).

Levels Equation
Case 3: Unrestricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNEXPO	0.374927	0.025641	14.62199	0.0000

EC = LNGDP - (0.3749*LNEXPO)

F-Bounds Test — Null Hypothesis: No levels relationship

Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	9.402961	10%	4.04	4.78
k	1	5%	4.94	5.73
		2.5%	5.77	6.68

		1%	6.84	7.84
			Finite Sample:	
Actual Sample Size	77		n=80	
		10%	4.135	4.895
		5%	5.06	5.93
		1%	7.095	8.26
			Finite Sample:	
			n=75	
		10%	4.15	4.885
		5%	5.14	5.92
		1%	7.225	8.3

t-Bounds Test — Null Hypothesis: No levels relationship

Test Statistic	Value	Signif.	I(0)	I(1)
t-statistic	-4.329116	10%	-2.57	-2.91
		5%	-2.86	-3.22
		2.5%	-3.13	-3.5
		1%	-3.43	-3.82

VAR Lag Order Selection Criteria
Endogenous variables: LNGDP LNEXPO
Exogenous variables: C
Sample: 1999Q1 2018Q4
Included observations: 72

Lag	LogL	LR	FPE	AIC	SC	HQ
0	22.77004	NA	0.001925	-0.576946	-0.513705	-0.551769
1	141.0903	226.7805	8.04e-05	-3.752509	-3.562787	-3.676980
2	149.9250	16.44235	7.03e-05	-3.886806	-3.570602	-3.760924
3	154.0383	7.426843	7.02e-05	-3.889954	-3.447269	-3.713720
4	178.3856	42.60777*	3.99e-05*	-4.455157*	-3.885990*	-4.228570*
5	180.3547	3.336529	4.23e-05	-4.398743	-3.703095	-4.121803
6	182.8750	4.130438	4.43e-05	-4.357639	-3.535510	-4.030347

* 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

Dependent Variable: D(LNGDP)
Method: Least Squares
Sample (adjusted): 2000Q2 2018Q2
Included observations: 73 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.029392	0.007886	3.726920	0.0004
D(LNGDP(-1))	-0.599494	0.162530	-3.688518	0.0005
D(LNGDP(-2))	-0.508483	0.157415	-3.230208	0.0020
D(LNGDP(-3))	-0.445608	0.144162	-3.091023	0.0030
D(LNGDP(-4))	0.235853	0.123661	1.907253	0.0611
D(LNEXPO)	0.004866	0.036911	0.131837	0.8955
D(LNEXPO(-1))	-0.043978	0.047356	-0.928656	0.3567
D(LNEXPO(-2))	-0.075082	0.046098	-1.628755	0.1084
D(LNEXPO(-3))	-0.078998	0.042979	-1.838069	0.0708
D(LNEXPO(-4))	-0.031464	0.035370	-0.889544	0.3771
ECTG(-1)	-0.079436	0.110819	-0.716810	0.4762

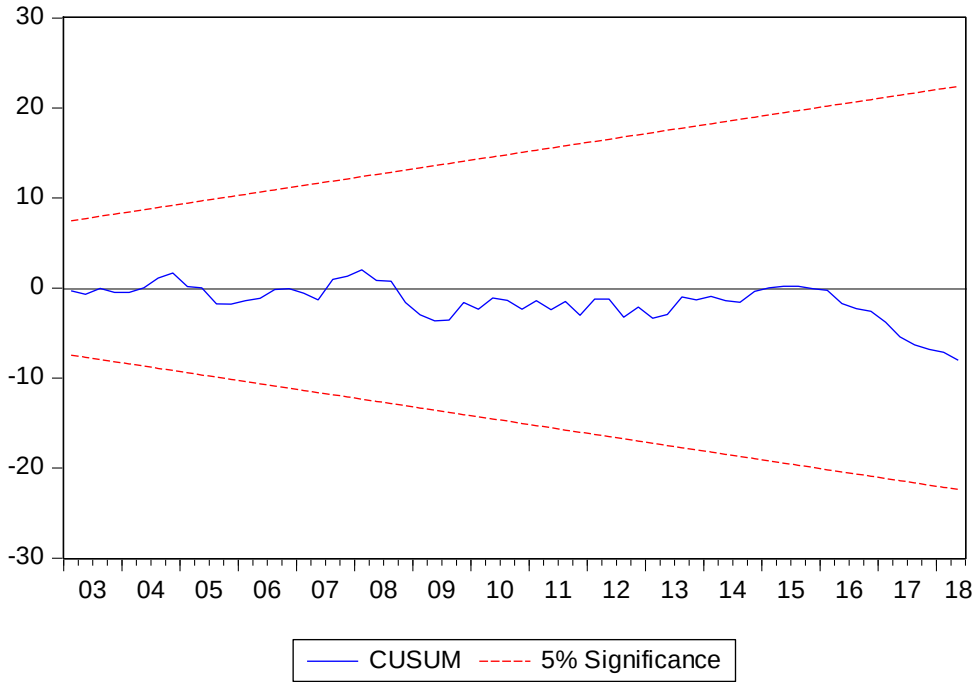
R-squared	0.643293	Mean dependent var	0.008701
Adjusted R-squared	0.585760	S.D. dependent var	0.063291
S.E. of regression	0.040735	Akaike info criterion	-3.425405
Sum squared resid	0.102880	Schwarz criterion	-3.080268
Log likelihood	136.0273	Hannan-Quinn criter.	-3.287862
F-statistic	11.18123	Durbin-Watson stat	2.102489
Prob(F-statistic)	0.000000		

ARDL Error Correction Regression
Dependent Variable: D(LNGDP)
Selected Model: ARDL(4, 0)
Case 3: Unrestricted Constant and No Trend
Sample: 1999Q1 2018Q4
Included observations: 74

ECM Regression
Case 3: Unrestricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.158721	0.088777	1.787873	0.0783
D(LNGDP(-1))	-0.800725	0.088375	-9.060544	0.0000
D(LNGDP(-2))	-0.721422	0.095992	-7.515462	0.0000
D(LNGDP(-3))	-0.674349	0.086318	-7.812405	0.0000
CointEq(-1)*	-0.004798	0.003361	-1.427483	0.1580

R-squared	0.611753	Mean dependent var	0.008999
Adjusted R-squared	0.589246	S.D. dependent var	0.062909
S.E. of regression	0.040318	Akaike info criterion	-3.518853
Sum squared resid	0.112163	Schwarz criterion	-3.363173
Log likelihood	135.1976	Hannan-Quinn criter.	-3.456750
F-statistic	27.18047	Durbin-Watson stat	1.715500
Prob(F-statistic)	0.000000		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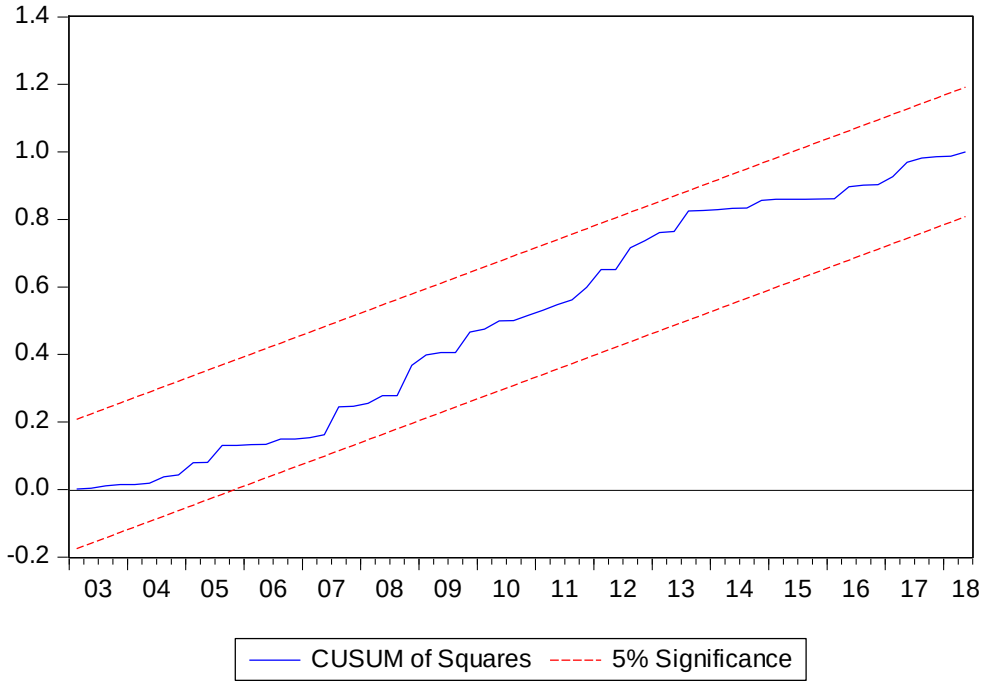
CUSUM
5% Significance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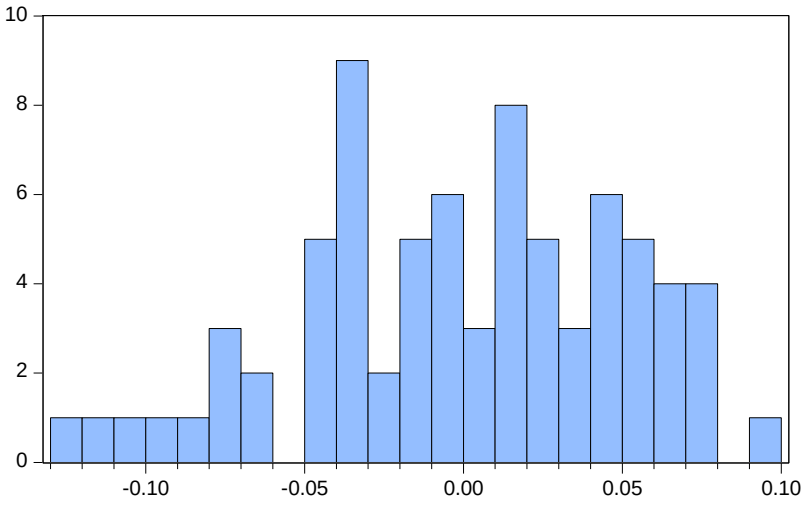
CUSUM of Squares
5% Significance



Series: Residuals	
Sample 1999Q3 2018Q2	
Observations 76	
Mean	-3.38e-18
Median	0.002661
Maximum	0.090553
Minimum	-0.127147
Std. Dev.	0.050438
Skewness	-0.382159
Kurtosis	2.561489
Jarque-Bera	2.458833
Probability	0.292463