AN INVESTIGATION INTO THE RELATIONSHIP BETWEEN OIL PRICES AND ECONOMIC GROWTH IN NAMIBIA

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LIST OF ABBREVIATIONS

ADF	Augmented Dickey-Fuller
AR	Autoregressive
ARDL	Autoregressive Distributed Lag
BoP	Balance of Payment
BoN	Bank of Namibia
COP	Crude Oil Prices
CUSUM	Cumulative Sum of Recursive Residuals
ECM	Error Correction Model
EC	Economic Growth
EXC	Exchange Rate
GDP	Gross Domestic Product
H_0	Null hypothesis
H_1	Alternative hypothesis
INF	Inflation Rate
MS-VAR	Markov Switching-Vector Autoregressive
OECD	Organisation for Economic Co-operation and Development
OLS	Ordinary Least Square
OPEC	Organization of the Petroleum Exporting Countries

RGDP	Real Gross Domestic Product
SC	Scwartz information Criterion
TOT	Terms of Trade
UK	United Kingdom
UNAM	University of Namibia
USA	United States of America
VAR	Vector Auto-Regressive
WDI	World Bank Development Indicators
WTI	West Texas Intermediate

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DEDICATION

I dedicate this thesis to my parents, Fillipus Namhindo and Rauna Namhindo for having nurtured me into the young courageous and optimistic young lady that I am today. May God bless your beautiful souls. Your endless love is a blessing.

I would also like to dedicate this thesis to my daughter Magano Amunyela you were my strength through it all.

DECLARATION

I, Maria Ndapunikwa Naveuye Namhindo, hereby declare that I understand what plagiarism entails and am aware of the University's policy in this regard. I assert that this study is a true reflection of my own research and that this work or part thereof has not been submitted for a degree at any other institution of higher education.

I declare that this thesis is my own, original work. Wherever, someone else's work was used (whether from a printed source, the Internet or any other source), due acknowledgement was given and reference was made according to the requirements of the University of Namibia.

19-11-2019

Maria Ndapunikwa Naveuye Namhindo Date

CHAPTER ONE

INTRODUCTION

1.1 Background of the study

Crude oil is an essential source of energy and is used in domestic, transport and industrial sector. This source of energy is considered as the central and important factor of economic development of any given country. Every time oil prices rise, people's financial gains and also the worth of their assets decline by some measures. Conferring to Baffes (2007) based on capital market theory, any future cost stream that rises at a time when economic activity and asset values are in decline is highly risky. This adds an important dimension to fossil price risk and the idea of energy security and diversity of oil (Awerbuch, 1993).

Upsurge within the oil worth causes a rise within the price, import bills and worth of fossil fuel merchandise. Hence, the call productivity attributable to the rising worth of oil, this will be as a result of input decrease inside the consumption level, investment and presently in process. Farhani (2012) postulated that oil price shocks limit the oil consumption which could be led to diminish the economic growth. Consumption of energy plays vital role in improving the growth of any economy.

According to Eita, Manuel and Naimhwaka (2018) non-producing oil countries like Namibia, whose key imports are oil and oil products, rely heavily on oil as input in industrial, transport and electricity sector. Additionally, many developing countries generate electricity from low cost sources such as water and wind. Nevertheless, in Namibia oil is the key source to produce goods (commodities) in agriculture, mining and fishery as well as for transportation.

In Namibia, the operation of the oil industry is coordinated by the Ministry of Mines and Energy (Wiggill, 2015). This is done by regulation oil worth stability through examining oil costs whereas at an equivalent time certifying that the industry remains cost-efficient and property. Wiggill (2015) further noted that the price of oil depends on landed costs which are total costs of the shipped product, including the purchase price, freight, insurance and any other costs.

Oil and exchange rate are some of the commodity prices that significantly affect economic growth. According to Kurihara (2015) oil price variation is considered from a perspective of whether the country is an oil importing or oil exporting country. He further noted that oil price increase is commonly good news for oil exporting countries and bad news for oil importing countries. The oil exporting countries profited significantly when the oil price rose. Governments earn profits that are beneficial to the country.

Oil importing countries like Namibia benefit from lower oil prices as it reduces transport and other business costs. Nkomo (2006) noted that falling oil prices help to decrease the cost of living causing oil-related transport costs to directly fall, leading to lower cost of living, lower inflation and higher output. Low oil prices have had an optimistic impact on producer and motorists, the overall economic impacts are not as clear-cut (Bank of Namibia, 2014).

On the other hand, when oil price decreases, the public sector faces terrible losses because it is hard for it to reduce the spending instantly. Jawad and Niazi (2017) pointed out that the country faces fiscal imbalances with oil price declining because the country's economy was highly dependent on oil revenues. It is due to a decline in oil revenues that fiscal imbalance occurred. A decrease in oil revenue occasioned in the purchasing power of oil-

crude oil prices at US$38.30 per barrel. This, according to Oertzen (2010) was brought about by capital-intensive industries such as mining and farming which are the largest contributors to the Gross Domestic Product (GDP) of the country. The aforementioned industries are heavily reliant on oil products. It is important to investigate the impact of oil prices on economic growth in an oil importing country like Namibia.

Chimhangwa and Haingura (2015) observed that oil prices and growth rates with lags involved do not give conclusive results. They observed a decrease in oil prices and at the same time, a decrease in economic growth. In 2010, the oil price was US$79.64 per barrel and the economic growth was 6.04%. In 2011, the oil price was US$110.94 per barrel and the economic growth was 5.09%, whereas, in 2012 the oil price was US$111.97 per barrel and the economic growth was 5.07% (The World Bank, 2018). However, in 2016 at a price of US$44.05 per barrel, the recorded growth was 1.08% and such variations are evident. It is against the aforementioned backdrop that this study sought to shed light on the relationship between oil prices and economic growth in Namibia.

1.3 Objectives of the study

The main objective of this study was to investigate the relationship between oil prices and economic growth in Namibia. The specific objective of the study was:

- To examine if there is a long-run relationship between oil prices and the economic growth in Namibia.

1.4 Hypotheses of the study

H_0: There is no long-run relationship between oil prices and economic growth.

H_1: There is a long-run relationship between oil prices and economic growth.

1.5 Significance of the study

The study is substantial because it employed a causal relation research design in order to empirically evaluate the relationship between oil prices and economic growth in developing countries such as Namibia, which are heavily reliant on oil as a primary input in the production of most goods. Despite independence from South Africa, Namibia is still closely linked to the South African Rand. One important challenge that Namibia faces in terms of being in the Common Monetary Area (CMA) is the suitability and stability level of exchange rate that should support growth in the country. Suffice to say that monetary policy stance of Namibia is the pursuance of price stability with growth. And therefore in order to maintain that price stability, it is of utmost importance that the exchange rate remains at an appropriate level to support price stability with ensured growth. Secondly, this study serves as literature to researchers who might wish to pursue studies in this field. Lastly, the findings would help students and policymakers in seeking to understand the problems associated with the changes in oil prices and economic growth.

1.6 Limitation of the study

The study was based on Namibia thus, the study could not be generalised to other countries because of resources and time constraints. The study was also limited to the availability of data as Namibia gained independence in 1990 hence, more variables and extended data could not be obtained. The study was limited to secondary data obtained from the world economic indicator (The World Bank, 2018) and the Bank of Namibia for the period of 1980 to 2016. Consequently, the results of the study might not be generalised to other areas or time periods. Thus, further empirical studies and replications across different populations are called for.

1.7 Delimitation of the study

The study examined the relationship between oil prices and economic growth in Namibia from the period of 1980 to 2016, the study only focused on the economic growth, crude oil prices, terms of trade, exchange rate and inflation rate. These variables were relevant in explaining oil prices and economic growth.

1.8 Outline of the study

This thesis is presented in six chapters. Chapter one discusses the introduction of the study. Particularly, the chapter shed light on the background information on the topics needed to understand the direction of the paper. Chapter two provides an overview of economic performance, which covered the critical evaluated relations between oil prices and economic growth in Namibia. Chapter three presents the literature review. Chapter four outlines the research methods undertaken in the study. Chapter five presents the results and discussion from the tests employed in the study. Chapter six concludes the study and offers some recommendations.

CHAPTER TWO

OVERVIEW OF ECONOMIC PERFORMANCE AND OIL PRICES

2.1 Introduction

This chapter reviews literature pertaining to global crude oil prices and economic growth trends of Namibia. It further discusses the interactions that have occurred between the inflation rates, exchange rates, terms of trade and crude oil prices in relation to Namibia's economic growth.

2.2 Global crude oil prices, inflation rates, exchange rates, terms of trade and the economic growth trends of Namibia

Oil has continually been viewed as an indicator for economic stability in modern times, because of the high dependence on oil products. The price of oil is of critical prominence to today's economy, given that oil is the largest traded good worldwide, both in value terms and volume. Idrisov and Polbin (2015) declared that, the costs of energy concern with listed product and services are allied to energy prices, of that oil makes up the only most vital share. They summarised that, the value of oil is connected to some extent to the price of different fuels even supposing oil is not fully compatible for coal and electricity, largely within the transportation space. Hence, for these reasons, unexpected changes in the price of oil have widespread implications for both oil producing and oil consuming countries.

Generally, Namibia is dependent on imported oil as a primary energy source, therefore, making Namibia vulnerable to changes in oil prices. According to Sahlen (2008) the Namibian economy was affected negatively during the period of rising market prices of

crude oil, in 2008. Prices of fuel and food had escalated during that period, and the unfavorable weather conditions (drought) made the situation even worse as the output generated by the agricultural sector had declined (Sahlen, 2008). Another phenomenon that had occurred during this time period was the inflationary impact, whereby the inflation rate had risen sharply when oil prices peaked during 2008. Despite the above mentioned, adverse situations that were triggered by increased oil prices, of some other sectors where advantaged from the high prices. Katali (2013) mentioned that, higher oil prices had a positive impact on the Namibian oil exploration efforts as revenues to be generated from oil sales increased.

As aforementioned, Namibia is extremely dependent on oil for daily desires. Viewing from a micro perspective, most of the products are made of fossil fuel and gasoline. Hence, oil costs tend to possess vital impacts on the pattern of individual consumption. The National Planning Commission (2018) stated that inflated oil prices trigger inflation because it affects the costs of inputs, which increase the value of product like gasoline and petrol and/or diesel for transportation. A number of these products are necessities to the daily lives of households. As a result, individuals are forced to demand less different product, so as to consume the currently high-ticket petrol product (Laourari & Gasmi, 2016). The marketplace for different product would also face depressed demand levels, resulting in even an extent that it becomes less profitable for business to work. Individual companies that use oil as an input in their production processes are affected via high production prices.

However, at a macro level, oil prices have an effect on inflation and employment amongst other things, although, most firms are profit-driven. An increase in production costs, due

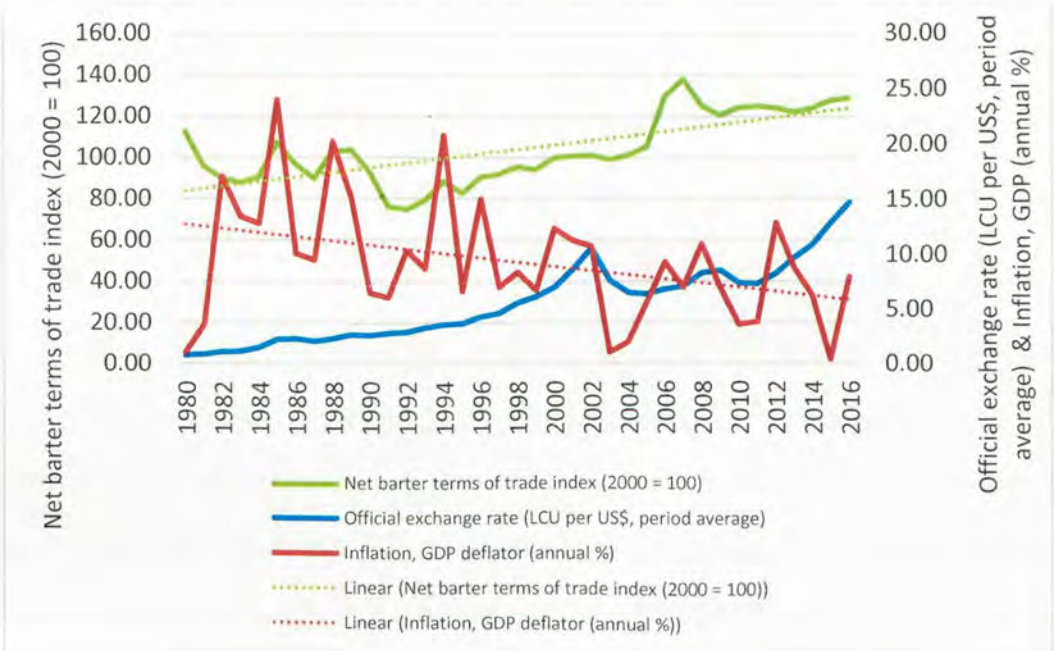
crude oil to US$54.44 per barrel from the US$34.30 per barrel of the previous year. This was explained by the supply and demand patterns associated with international markets. In 2014, the price of crude oil declined to US$98.94 per barrel from US$108.86. In 2015, there was a further drop in the price of crude oil to US$52.37 per barrel. Since then, the price of crude oil has been declining to US$44.05 per barrel, which was recorded in 2016. This was mainly due to the historical global fall in oil prices (Chimhangwa & Haingura, 2015).

The peculiarity of oil price and economic growth behaviour in the predictability of economic growth given the changes in the price of crude oil has not been definitive. In comparison to crude oil prices, this is illustrated in the period 1982 to 1984; economic growth had been decreasing to negatives before Namibia gained independence. In 1989, the growth rate had increased at a rate of 1.85% to 8.16% whilst the oil price gradually rose. In 2004, Namibia recorded the highest economic growth of 12.26%, which according to Oertzen (2010) was brought about by capital-intensive industries such as mining and farming. The two aforementioned factors are the largest contributors to Gross Domestic Product (GDP) of the country.

Niishinda and Ogbokor (2013) added that, economic growth had been prolonged through development of primary export-orientated areas such as agriculture, fisheries and mining as well as by great non-tradable government areas. Chimhangwa and Haingura (2015) noted that, in 2015 crude oil was US$50 (N$572) per barrel whilst the economy was growing at a rate of 5.90%. This was due to time lags between international crude prices and the pump prices. Nakale (2016) stated that, the economy had grown by a 4.30% average rate in 2016 at a lower price of US$44.05 per barrel of crude oil.

Namibia has been characterised by unsteady and declining long-term inflation levels, increases in its terms of trade and rate of exchange. The increase within the rate of exchange (depreciation) is not foreboding well for an import dependent country, especially, being oil dependent and an input integral to numerous import sectors of the country.

Figure 2.2: Namibia 1980-2016 Terms of Trade, Inflation rates and Exchange rates



Source: *Author's compilation from WDI indicators and Bank of Namibia data*

The behaviour noted above is interesting and peculiar because when the oil prices rose, the economic growth was not predictable. This coupled with an increasing exchange rate (depreciation), and an increasing trade balance is interesting given that Namibia is an oil import dependent country, warranting further scrutiny.

2.3 Effect of imported oil price changes on the balance of payment (BoP)

Prices of energy- raw materials on the world markets are sharply affecting not only changes in domestic price levels but also external trade relation. Of late, current account sustainability has become one of the most conferred topics in macroeconomics. Large and persistent current account deficits are the mid most serious difficulties in many developing countries such as Namibia, as they might subsequently lead to economic and currency crises, escalating external debt and lessening in international reserves (Manuel, Eita & Naimhwaka, 2018). According to the National Planning Commission (2018) the recent growth in economic activity, specifically in mining and construction areas together with slow global and lower commodity prices, more specifically from 2015, occasioned in large current account deficit in Namibia.

According to Eita, Manuel and Naimhwaka (2018) Namibia experienced imperative current account deficit throughout the period, 2009-2017. Moreover, the insistent current account deficit places pressure on Namibia's foreign reserves and have reached worrisome levels. Nambinga (2015) stated that Namibia's current account deficit has been declining since 2009, and stood at 13.60% of Gross Domestic Product in 2015. In addition, the deficit stood at 11.30% of Gross Domestic Product in 2016. The deficit averaged at 6.50% between 2009 and 2016.

Namibia is largely dependent on imports of oil and the price of oil is mainly derived from energy raw materials, which is a crucial factor of trade balance and current account developments. Prices of imported oil are closely related to the global oil prices. Nakale (2016) stated that the balance of payment recoded a surplus of N$906 million in 2016 in comparison to N$10 billion. He noted that on an annual basis, the current account

continues to degenerate as imports of goods such oil increases as Namibia continues to import oil regardless of the price because of its dependency on imported oil. However, with the aforementioned, there is a need to stretched monetary policy, to be applied, in order to control inflationary pressures.

2.4 Exchange rate effects on the balance of payment

The real exchange rate is an important player in the growth of an economy as both its level and stability are important in driving up exports and private investment. The agreement in policy circles in developing nations is that, the main objective of exchange rate policy should be to reduce persistence in misalignment, which is a common issue in most developing countries (Nambinga, 2015). However, in order to manage misalignments, it is relevant to identify what determines the real exchange rate. Importers, exporters, investors and the monetary authorities are all concerned with the behavior of the exchange rate, as it directly or indirectly affects them.

Wilson and Sheefeni (2014) indicated that, when a currency appreciates or depreciates against other currencies there are both positive and negative effects on the economy. Commonly, when a currency appreciates or strengthens in relation to other currencies, imports of foreign goods and services become cheaper. Whereas, exports of domestic produced goods and services become more expensive. The positive effect of a currency appreciation is that it would exert pressure on domestic firms to cut their inputs and production costs in order to remain competitive, which would consequently lead to lower prices of domestic goods and services produced to the benefit of consumers. However, they further noted that, the negative effect associated with a currency appreciation is that

it might lead to a balance of payments deficit, in which case, the value of imports would exceed that of exports.

During 2015 and 2016 the National Planning Commission (2018) stated that, the Namibian Dollar/ South African Rand traded positively against major currencies like the U.S Dollar, British Pound and the Euro. This is shown by the year to year appreciation of 5.70%, 22.70% and 9.90% against the U.S Dollar, the British Pound and the Euro respectively. They further noted that, the appreciation is accredited to base effects (seasonal variations to changes in demand) and moderate increase in commodity prices of oil. The appreciation of the Namibian Dollar between 2015 and 2016 made imports into Namibia such as machinery used in mining, construction and fishery as well as food products cheaper, whilst exports of Namibian products such as meat products and mineral products were expensive.

2.5 Effects of exchange rate, inflation, oil prices, terms of trade on the BoP

According to Ogunsola, Olofinle and Adeyemi (2017) currencies would alter to changes in trade balances. After, oil worth agreements are paid in U.S. dollars whereby oil exporters invest a part of their payout remunerations in US dollar subject assets, wherever higher oil prices would result in increase in the value of U.S dollar by contracts. This can be as a result of oil contracts which are settled in U.S. dollar and oil exporters invest a part of their windfall earnings in U.S dollar dominated assets, higher oil prices would result in the raise worth of us dollar by mounting the transactions demand for it. Oyeyemi (2013) postulated that, U.S dollar would increase the value of servicing the external debt of oil importing developing countries like Namibia, as a result of debt is mostly denominated in U.S. dollars, worsening the economic impairment caused by higher oil prices.

Nkomo (2006) further noted that, the past oil shocks triggered debt management crisis in many developing countries. He further explained that changes in oil prices have affected corporate earnings and inflation, economic activity and financial markets specifically affecting equity values and exchange rates if there is no adjustment in monetary policies. In fact, Bank of Namibia (2014) remarked that, higher oil prices would be reviewed downwards in the international capital market assessments of equity and debt in oil importing countries like Namibia and upwards for those in oil exporting countries. This influences the extent of the credit worthiness of some importing countries that are running consecutive large current account deficits that might lead to an upward pressure on interest rate. Ghalayini (2011) stated that, tighter monetary policies to comprise inflation would add pressure on interest rate hence, would also surge the value of domestic currencies. He added that, worldwide, the countries' reliance of oil products is assorted and fluctuations in oil prices could have different impacts.

2.6 The effects of oil price increases on oil importing countries

- **Adjustment effects**

Bernanke et al (1997) outlined adjustment effects because the result from value, real wage and structural rigidities within the economy. They more noted that, the degree of labour market establishments delays the adjustment of real wages to shocks, which the deterioration within the terms of trade ensuing from associate degree oil shock may have an effect on equilibrium employment, afterwards making a wedge between value-added and consumer prices. In regards to oil as an important factor in transportation, Kitous et al (2016) stated that higher oil prices increase the cost of inputs and if the cost increase is not passed on to consumers, economic inputs such as capital stock and labour might be

altered. They concur that, the adverse revenue effects would primarily be endured by producers during a competitive market, regarding that they would be unable to pass on the higher costs because of fixing prices, as a result of oil is associate input into price-elastic of final goods. On the other hand, there is a confrontation on the part of workers to real decreases in wages.

According to Atkinson and Hamilton (2003) oil price increases naturally lead to an upward pressure on nominal levels. The range that producers are shaken, profit margins and returns on capital would fall with effects on the allocation of capital. Capital is the most flexible and unrestricted of all factors of production in the long run. It moves from energy intensive regions to regions with higher rates of return. In the short term of capital in energy intensive regions, this is relatively inflexible, and makes it tolerant to an income loss.

According to Foudeh (2017) changes in oil prices could cause economic losses when macroeconomic resistances prevent hasty changes in nominal prices for final goods and/or for key inputs, such as wages. Hence, higher oil prices might cause employees layoffs and idling of plants, decreasing economic output in the short run. Generally, the short run economic impact of an oil shock on output and employment would be minor, the advanced proportion of the price increase that could be passed on to consumers and/or the more elastic are wages if the price rise could not be passed on.

Aimer (2016) noted that, the adverse effect of an oil price increase domestic demand and income would decline over time as consumers and producers adjust their behaviors. However, he coincided that research appears to show that oil demand does not revert to its preliminary level as oil prices decrease. Tehranchian and Seyyedkolaee (2017)

inscribed nominal price "stickiness" to be asymmetric in firms, unions and other organisations are Nominal price "stickiness" is asymmetric, in that firms, unions, and other organisations are much more averse to lower nominal prices and the wages they receive than they are to increase them.

Thus, the income losses experienced by oil importers such as Namibia might ultimately be partly overturned. Oil shock might result in the loss of business and consumer sureness that could lead to substantial shifts in levels and patterns of investment, savings and spending. Baffes (2007) stated that, a loss of confidence and unsuitable policy responses could strengthen economic effects in the medium term. He further explained that, changes in oil prices create uncertainty, which might be a deduction in the trend of investment activity; hence, it is unclear that the effects on profitability and/or capacity utilisation are asymmetric.

Moreover, in terms of oil price increase nature Berument, Ceylan and Dogan (2010) noted that sudden large price increases create common uncertainty about appropriate production techniques, purchases of new equipment and consumer durable goods like automobiles and wage and price negotiations. Firms and households alter to new conditions, some plant and equipment would remain idle, certain employees would be temporarily unemployed and the economy might no longer operate laterally its long run production possibility frontier. Though differentiating gradual from rapid price increases on a conceptual foundation may seem easy, empirical differentiation is said to be problematic.

- **Direct effect**

According to Ghalayini (2011) the direct effect given, oil price rise for importing countries is known as income loss. This income loss is said to depend on the oil intensity of production and the range to which the demand for oil is price inelastic. He further explained that, income losses might depend on secondary effects on primary inflation from changes in oil prices, the extent to which oil prices increase in response to an oil price rise, the oil concentration of the economy and the impact of higher oil prices on other systems of energy that compete with and/or in the case of electricity generated from oil and gas. In addition, Awuyo-Vitor, Samanhyia and Bonney (2018) indicated that if the price of oil products increase and consumers are incapable and/or unwilling to ease the consumption of oil products, then consumers might ease on expenditures of other goods and services, possibly decelerating the rate of Gross Domestic Product (GDP) growth. They further noted that the larger the range of oil price increase and the longer higher prices are constant and the larger the macroeconomic effect.

Al-sasi, Taylan and Demirbas (2017) viewed direct impact within the case of ultimate consumption product like petrol and concurred that financial gain ascending from the price rise would be abided by consumers since the demand for oil and oil price products are inelastic in the short run. They noted that consumer price inflation can be triggered on taxes of oil product facilitate to shield the price level from price changes, essentially by serving to decrease oil concentration within the long-term conjointly, statistically within the short run. After, the comparative impact of an oil price increase is reciprocally associated with the tax content of retail prices.

Bank of Namibia (2014) pointed out that the second sound effect depends on the increase in price level (thereby causing a shift in core inflation). The monetary policy regime in place determines if employees and enterprises are to be rewarded for the income loss through higher wages and prices. Chimhangwa and Haingura (2015) stated that, if monetary authorities infer rising oil prices as generalised price inflation, restrictive policies might be adopted which could slow economic growth. They summarised that, restrictive monetary and fiscal policies might contain inflationary pressures that could worsen the recessionary income and unemployment effects.

However, Bank of Namibia (2014) noted that overly restrictive monetary and fiscal policies comprise inflationary pressures, could aggravate the recessionary income and unemployment effects. Conversely, expansionary monetary and fiscal policies might simply defer the fall in real income required by the rise in oil prices, stoke up inflationary pressures and worsen the effect of higher prices in the long run. Additionally, in terms of the state of the economy, Ghalayini (2011) elaborated that if the economy is and/or was already suffering from high inflation and unemployment, then the oil price will increase the potential to cause severe loss by limiting economic policy choices and may have an effect on the economic impact of higher oil costs over the long run.

CHAPTER THREE

LITERATURE REVIEW

3.1 Introduction

The economic growth and oil have been examined through oil prices ever since petroleum became a central commodity in the world. This chapter reviews the relevant theoretical and empirical concepts on this relationship.

Theoretical review

The ordinary growth theories emphasis on principal inputs such as; capital, labour and land, while failing to identify the role of principal energy inputs like oil deposits. However, natural scientists and some ecological economists have made efforts at evolving some theories that capture the role of oil price volatility, its obtainability and volatility on economic growth (Boheman & Maxén, 2015). The Mainstream theory of economic growth suggests that production is the most significant determinant of growth of any economy, and production in some way requires energy resources. According to Nkomo (2006) the aforementioned theory categorises capital, labour and land as principal factors of production, in the production process.

Ishmael et al (2017) stated that determining the marginal product of oil as an energy resource is beneficial in determining economic growth, thus, this theory reflects in one part its capacity to do work, cleanliness, amenability to storage, flexibility of use, safety and the cost of conversion. Moreover, the Mainstream theory also refers to other attributes such as the form of capital, labour and/or materials used in the aggregation. They further

added that, the theory estimates the ideal price to be paid for crude oil as one that should be proportional to its marginal product.

The impact of the theoretical assumptions for the correlation between oil prices and output is through short-term mechanics. According to Akinsola and Odhiambo (2017) if the factors of production are not fully exploited in an economy, theoretically, output might change simultaneously with an increase in oil prices, due to a greater capital placement and more hours worked. They further concurred that, in the basic Keynesian model of aggregate demand and supply, the aggregate supply curve is flat, which corresponds to the situation where nominal prices and wages are completely inelastic and the economy has a high volume of idle factors of production: capital and labor. Accordingly, output in the Keynesian model might be determined to a greater level by changes in the aggregate supply than by fluctuations in oil prices (Aliyu, 2009).

Mileva and Stracca (2016) considered a hypothetical situation where nominal exchange rate is fixed, nominal indicators are completely rigid, the economy has a high volume of unused (or under utilised) factors of production and global oil prices are constantly rising. It is for these reasons that the increase in oil prices would correspond to the growth in aggregate income for domestic economic agents and to an increase in demand for imported as well as domestic goods. At the same time, Sadeghi (2017) concluded that, aggregate demand between those groups of goods would be dispersed depending on preferences and relative prices. Moreover the floating nominal exchange rate and rising global oil prices, the nominal exchange rate in an oil-producing economy strengthens promptly, leading to a rise in the real exchange rate, relative prices for domestic goods compared with imported goods, and aggregate demand are largely due to imported goods.

On the other hand, Gummi et al (2017) viewed fixed nominal exchange rate, whereby relative prices would not change in the short-term (assuming their rigidity) and expressively grows the demand for domestic goods which, assuming a flat supply curve, would lead to growth in the output of domestic goods. Additionally, output growth appear to the extent of unused factors of production. This effect causes a rise in the income of economic agents while also growing demand for domestic goods, consequently, providing a multiplier effect for the increasing income on output. Burakov (2017) viewed another growth mechanism in the demand for domestic goods in the short run called investor demand, which increases in the current period enabling the opportunity for transitioning to the prime level of capital in the future. He further added that, in the long run an increase in investors demand tend to lead to a more efficient deployment of production influences over a certain period.

According to the Keynesian model, a substantial rise in output is possible due to the use of production factors in the short term, although the short-term contribution from the change in worldwide oil prices to the real Gross Domestic Product might by far surpass the long-term contribution under an expansionist monetary policy. Nakale (2016) stated that the magnitude of short term variations in aggregate demand against increasing oil prices might also be highly limited due to certain time based consumption habits of households as well as due to capital alteration costs.

According to Gonzalez and Nabiyev (2009) when exporting countries increase their prices above the market price, importing countries experience three types of costs; production cost decreases because production has become more expensive, unemployment increases because of unanticipated changes in oil prices which tend to decrease economic output,

and portion of the wealth of oil consuming nations is transferred to foreign oil producers nations. High production costs thus, force producers to pass incurred costs onto consumers by charging higher prices, causing an upward pressure on the general price level.

Jawad and Niazi (2017) stated that rising oil prices have significant impacts on oil importing countries. High oil prices have a tendency of behaving in a very volatile manner. Hence, it is most likely that producers who use oil as an input in production processes would be faced with greater degrees of uncertainty. This would serve as a disincentive for investment plans, which in turn lowers the level of aggregate expenditure in the economy. Real Gross Domestic Product (RGDP) is thus likely to fall ceteris paribus (meaning, holding all other things constant), impacting adversely on the growth of the economy.

Indirectly, high oil prices spill over to other commodities through transportation costs. Higher transportation costs of commodities pushes the prices of these commodities upwards. Viewing from a consumption perspective, higher oil price increases the costs of living, and reduces the level of aggregate expenditure. Qianqian (2011) noted that it in turn lowers the level of economic activities, impacting negatively on the growth of the economy. However, Baffes (2007) argued that, higher commodity prices make production more valuable and attractive, giving producers greater incentives to produce more output.

Additionally, Roubini (2006) stated that, increased diesel and petrol prices leave individual consumers with relatively lower disposable incomes to spend on other commodities. It is so because a relatively larger portion of their incomes is leaked by high fuel costs. Furthermore, lower disposable income reduces household savings, which in turn lowers the economy's total savings. According to the neoclassical theory of economic growth, savings are important determinants of economic growth. Atkinson and Hamilton

(2003) reasoned that, savings are used to finance investment and an economy with lower saving would have a lower growth rate.

Companies that invest in mining are most likely to be skeptical about doing so when expected profits look unfavorable. Unfavorable returns, therefore, discourage exploration and construction of new mines. As stated by Sy (2014) mining is highly fuel intensive hence lower oil prices have a positive impact on the mining sector. He further noted that, this is because the sector would incur lower fuel costs, reducing its production costs, hence increasing profits relatively. For a country that is rich in minerals, promising profits encourages investment in the construction of new mines, stimulating the output levels to be generated in the sector. Mining is one of the most important sectors of the Namibian economy as it largely contributes to the country's Gross Domestic Product. As a result, higher output levels from the mining sector would thus impact greatly on the growth of the economy.

Oertzen (2010) stated that, consumers would be faced with lower fuel costs, enabling them to spend more on other commodities. Transportation costs as well as prices of commodities that are made from petroleum would be relatively lower. Aggregate demand would thus be stimulated, impacting positively on economic activities.

According to Nkomo (2006) oil related imports represent the third largest component of total imports for Namibia. Lower oil prices, therefore lower import bills ceteris paribus. This improves the economy's terms of trade. Although the impact of terms of trade on economic growth is uncertain, the most common view is that improved terms of trade have a positive impact on the growth of an economy (Bleaney & David, 2001). In order to purchase a given amount of imports, only a few goods need to be exported, in order to

finance for imports. This has a positive impact on consumption, savings and investment. However, they further argued that improved terms of trade might also affect the economy adversely due to a fall in export volumes.

Apart from the above mentioned, oil prices reduce upward inflationary pressures. Bruno and Easterly (1998) noted that growth and inflation are negatively related. Lower oil prices induce relatively lower inflation rates, impacting positively on the growth of the economy. This is referred to as the expansionary disinflation theory, the trend of economic expansion and falling inflation.

Empirical review

Empirical literature is important for comparing and contrasting the findings which helps in making well-informed decisions. Hence, several studies have been conducted on the relationship between oil prices and macroeconomic performance both in developed and developing economies. A study by Nkomo (2006) found that oil price impacts are relatively important for the Namibian economy. This is because the economy is highly dependent on oil, making it highly vulnerable to oil price changes. Kurihara (2015) studied the relationship between oil prices and economic growth in developed countries and found that oil price increases result in positive economic growth in developed economies and appreciation of each domestic currency causes the economy to grow.

Downa, Mgbame and Onobun (2015) examined the relationship between oil price volatility and the Nigerian economic growth, the study revealed that Gross Domestic Product growth increases due to high global prices in the short-run whereas, in the long-run there is a negative relationship between oil price volatility and GDP growth due to inconsistency of oil prices and lack of diversification of base productive factors. A causal

study by Bouzid (2012) on the relationship of oil prices and economic growth in Tunisia, found that, Tunisia as an oil importing country resulted that increases in oil price reduce economic growth and there is a long-run relationship between oil prices and economic growth whereby series are integrated of order one and the Granger pairwise causality showed unidirectional causality from real GDP to oil prices.

An analysis of oil price effects on the economic growth of different countries (G7 group, OPEC countries, Russia, China and India) by Ghalayini (2011) revealed that, oil price increases are negatively correlated to the economic growth of oil importing countries, and vice versa for decreases in oil prices, ceteris paribus. Regarding, oil exporting countries, the correlation is positive. A study done on Malaysia by Yusoff and Latif (2013) using the ARDL (autoregressive distributed lag) bound testing cointegration approach, found that global oil price are relevant that is, significant in explaining real Gross Domestic Product in the short-run. Liew and Balasubramaniam (2017) assessed oil price shocks and sectorial output, through the autoregressive distributed lag (ARDL) modelling approach, by examining the long run relationship among variables, and the outcomes failed to reveal any long-run relationship between the variables.

Furthermore, an investigation into the crude oil price pass-through to the macroeconomic activities of Malaysia by Alom (2015) found that, there is no long run association with positive and negative changes of real crude oil prices. An investigation on the impact of international oil price fluctuation on China's economy via Qianqian (2011) showed that, there is an existence of a long run equilibrium relationship between oil price and China's output, the consumer price index (CPI), the total amount of net exports and the monetary policy. A study on oil price volatility and economic growth in Nigeria by Okoro (2014)

found that, there is a negative relationship between oil price volatility and the level of economic growth. The study used a vector auto-regression (VAR) modelling approach.

Jimenez-Rodriguez and Sanchez (2004) evaluated the effect of oil price shocks on real economic activity of some industrialised OECD (Organisation for Economic Co-operation and Development) countries using a multivariate VAR analysis. Their study found evidence of a non-linear impact of oil prices on real gross domestic product. Oil price increases are found to have a negative impact on economic activity in all cases but Japan with oil price increases affecting UK (United Kingdom) negatively and Norway positively. A Bayesian Markov Switching-Vector Autoregressive (MS-VAR) analysis approach by Balcilar et al (2014) examined the impact of oil price on South African gross domestic product growth, found low growth state to be shorter-lived compared to the higher growth state. Another study on the relationship between oil revenues and economic growth is that carried out by Mehrara et al (2010) used threshold methods and found that the reaction of economic growth to oil revenue growth in low regimes of oil revenues is better than in high regimes of oil revenues.

Gadea et al (2016) examined the changes in the long-run relationship between oil price and the United States of America's (USA) economic growth. The study found a significant relationship in some sub-periods by carrying out a rolling analysis and also by studying the presence of structural breaks in the multivariate framework. Their study also found that the negative effect is greater at the time of large oil price increases. A study by Burakov (2017) on oil prices, economic growth and emigration found the existence of a long run relationship between oil prices, economic growth and emigration, which is

further confirmed by the transmission in form of indirect channel of oil prices' shocks on migration decisions of households.

Apergis et al (2015) investigated the dynamic relationship between oil prices and growth across the United States of America (U.S.A.) using the panel data framework. Their study showed that the long-run coefficients are found to be statistically significant across all empirical models, with positive oil prices reducing output, hence negative oil prices increasing output. The study further revealed that both in the short-run and long-run; there is unidirectional causality between aggregate oil prices and output. Gummi et al (2017) studied the relationship between oil price and economic growth in Nigeria using annual time series data for the period 1974 to 2014. The findings indicated that there is no long-run relationship among all the variables.

Aimer (2016) investigated the effects of oil price volatility on the economic sectors of Libya. The findings revealed that there is a long run relationship between oil prices and certain economic sectors such as agriculture, construction, manufacturing and transport. He further noted that increases in oil price did not significantly affect the manufacturing sector in aggregate terms like the other sectors. Ftiti et al (2016) examined the degree of interdependence between oil prices and economic activity growth for four major countries in the Organisation of the Petroleum Exporting Countries (OPEC). The study found that during the periods of fluctuations, oil price shocks in the global business cycle and financial turmoil affect the relationship between oil prices and economic growth in Organisation of the Petroleum Exporting Countries.

A study by Sadeghi (2017) assessed the impact of government size on how output and government expenditure respond to oil price shocks in twenty eight oil exporting countries

for the time period 1990 and 2016. The study revealed that if the size of the government as measured by government expenditure to non-oil price Gross Domestic Product (GDP) ratio tend to be larger, non-oil output growth in response to a positive oil price shock tends to be greater and output volatility is higher. The study further found that, an unexpected increase in oil price causes expansion in government expenditure and the bigger the government, the bigger the expansion. The empirical evidence for direct correlation between the government size and macroeconomic stability in oil exporting countries showed that, fiscal consolidation and economic diversification help to contract economic exposure to exogenous oil price shocks and decrease volatility in non-oil output (Sadeghi, 2017).

Ishmael, Matthew and Park (2017) investigated the impact of changes in crude oil prices on economic growth in Nigeria. The study revealed a positive unidirectional relationship between crude oil prices and economic growth. The value of F-statistic was found to be 5.65, which was greater than the tabulated upper bound test critic value of 2.76. Hence, the study concluded that crude oil price exert positive influence on the economic growth of Nigeria. A study by Boheman and Maxén (2015) showed that a 1% increase in the change of the oil price would increase the GDP growth rate the following year with 0.15% (OPEC) versus 0.14% (non-OPEC), subsequently a positive relationship was found between the variables. Additionally, 2.82% of the variation in the OPEC countries' growth rate is explained by oil price shocks, whilst the responding ratio for the non-OPEC countries is 2.81%.

Awunyo-Vitor, Samanhyia and Bonney (2018) examined the causal linkage between oil price change and economic growth. The results of the study revealed that there is an

inverse relationship between oil price change and economic growth in Ghana. Although, the effect of oil price change on economic growth is statistically insignificant in the long run. Another study by Yong, Fung and Yuen (2011) examined the long run relationship between oil prices and real GDP in ten sub-Saharan countries by using the Panel data for the period of 1980-2008, which indicated a strong positive relationship between positive oil price changes on economic growth in the selected oil exporting countries.

Gummi, Buhari and Muhammad (2017) investigated the relationship between oil price and economic growth in Nigeria using annual time series data for the period 1974-2014. The result showed that there is no long-run relationship among the variables. Laourari and Gasmi (2016) examined the impact of real oil revenues fluctuations on economic growth in Algeria using data from 1960 to 2015. Their study revealed that a long run relationship exists between real oil revenues, real GDP, and industrial growth in Algeria. Sanchez (2011) examined the welfare effects of rising oil prices in oil importing developing countries. The study showed that the negative impact on gross domestic product of the most recent oil price boom has been considerable in several importing countries, as high as 2% to 3% of gross domestic product per year. This effect subsequently reduces welfare by producing unemployment and higher consumer prices.

Another study by Alekhina and Yoshino (2018) reviewed the impact of world oil prices on an energy exporting economy. The results suggested that oil price fluctuations have a significant impact on the oil export of a country's real gross domestic product, consumer price index (CPI) inflation rate, interest rate, and exchange rate. An investigation on the relationship between oil price, terms of trade, growth volatility and economic growth in the gulf cooperation council (GCC) by Gazdar et al (2018) showed a positive relationship

between oil terms of trade growth volatility and economic growth. The results further indicated that the effect of oil terms of trade growth volatility on growth is reinforced by the development of Islamic financial system.

Yahia and Metwally (2007) examined the impact of fluctuations in Libyan oil exports on Libyan economic growth, the paper employed export as an engine of growth model. The cointegration analysis revealed that there is no long run relationship between Libyan oil exports and non-oil gross domestic product. In other words, the two variables do drift too far apart from each other over time. Offiong et al. (2016) also examined the impact of oil price shocks on the economic growth and development of Cross River State, Nigeria. Their study showed an insignificant relationship between the model variables and the economic growth of the state. Another study on the impact of international oil price fluctuation on China's economy by Qianqian (2011) revealed that there is a long run equilibrium between the oil price and China's output, the consumer price index, the total amount of net exports and monetary policy. They further noted that rising international oil price would cause the total amount of net exports and real output to decrease and the prices to rise.

The empirical literature reviewed above was far reaching with respect to the relationship between oil prices and economic growth both in oil importing and oil exporting countries. The earlier researchers employed ordinary least square as estimation technique with a very small sample period. On the other hand, the few studies that employed cointegration and error correction model either used Engel and Granger or Johansen and Juselius with different sample periods. Therefore, this study intended to run an autoregressive distributive lag model for Namibia over a sample size of 36 years.

CHAPTER FOUR

RESEARCH METHODS

4.1 Introduction

This chapter provides a framework on the research design, procedure and data analysis that were used in this study. It discusses the methodology used to analyse the relationship between oil price and economic growth in Namibia.

4.2 Research design

The study utilised a relation quantitative technique to work out whether or not an increase or decrease in oil prices causes an increase or a decrease in economic growth.

4.3 Procedure

The research was conducted using time series data of oil prices, real GDP per capita, inflation, terms of trade and exchange rate yielded from fiscal year of 1980 to 2016 for Namibia. The data employed was secondary information obtained from the Global Economic indicators (World Bank Data) and the Bank of Namibia.

4.4 Data analysis

The study followed Yusoff and Latif (2013), ARDL (autoregressive distributed lag) to test for long-run relationship between variables. In addition, the data was transformed into natural logarithmic. The following steps were taken. Firstly, the unit root test was used for stationarity testing. Secondly, the bound test approach to cointegration was used to test for presence of the long-run relationship. Thirdly, the ARDL test was used for error corrections of the model and to estimate the model. In summary, an econometric approach

was used for the methodology using the EViews software. The long run equation 1 is specified as follows:

$$lnRGDP_t = \beta_0 + \beta_1 lnRGDP_{t-1} + \beta_2 lnOIL_t + \beta_3 lnTOT_t + \beta_4 lnEXC_t + \beta_5 lnINF_t + \varepsilon_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

$RGDP_t$ represent a dependent variable economic growth. β_0, is the slope of the equation followed by independent variables $RGDP_{(t-1)}$, (lagged economic growth), $OIL_{(t)}$ (crude oil prices), $TOT_{(t)}$ (the price of export relative to the price of imports measured in Namibia Dollar per United State Dollar (N$/USD), $EXC_{(t)}$ (exchange rate - Nominal exchange rate measure in Namibia Dollar per United State Dollar (N$/USD), $INF_{(t)}$ (inflation rate) and ε_t represents, the error term. The optimal lag length used was 1 as per Schwarz Criteria (SC) automatic lag section from (EViews 9).

4.5 Research ethics

All sources used in this study are appropriately referenced and acknowledged through the Harvard referencing style, thus, was not written as the researcher's own work. The data information from the Bank of Namibia (BoN) ensured transparency and replicability. The data used in the study was treated with confidentiality and was not distorted, fabricated or falsified in any manner.

CHAPTER FIVE

RESULTS AND DISCUSSION

5.1 Introduction

The purpose of this study was to investigate the relationship between oil prices and economic growth in Namibia. It further examined what effect control variables such as the terms of trade, the exchange rate and inflation would have on economic growth in Namibia. Using a time-series econometric statistical package (EViews 9), the study began by conducting a unit root test to check the stationarity of data and the order of integration.

5.2 Unit root test

The data was first transformed into logarithm form to eliminate extreme variability in the variables. This was done for all the variables. In keeping with the outlined research methodology, before any estimation could be made, the variables were first tested for unit roots to avoid spurious results moving forward. The test of choice was therefore the Augmented Dickey Fuller (ADF). The null hypothesis stated that there is a presence of unit root within the data.

When testing for stationarity, if the statistical t-value (calculated) is less than the critical t-value in absolute terms than the null hypothesis is accepted. This implies that the variable has presence of unit root and that it is non-stationarity. If the statistical t-value is greater than the critical t-value in absolute terms than the null hypothesis is rejected, meaning that the variable has no unit root and is stationary. Unit roots have been tested both in levels and first differences to check if variables are integrated of order one and/or zero, which is fit for an ARDL model bound testing to cointegration.

Table 5.1: Results of unit root test

Variable	Unit Roots Augmented Dickey-Fuller (ADF)			Order of Integration
	Level	1st Difference	0.05 Critical Value	
LNOIL	-1.13	-5.46	-2.95	1
LNRGDP	-4.53		-2.95	0
LNTOT	-1.24	-5.36	-2.95	1
LNEX	-1.75	-4.38	-2.95	1
LNINF	-4.94		-2.95	0

Source: *Authors' computations of Eviews output.*

As can be inferred from table 5.1, all the variables except economic growth and inflation are non-stationary in levels. However, they became stationary after first the difference. After the unit root tests were estimated, the optimal lag length was checked.

5.2 Lag length criteria

Table 5.2: Results of the lag length criteria

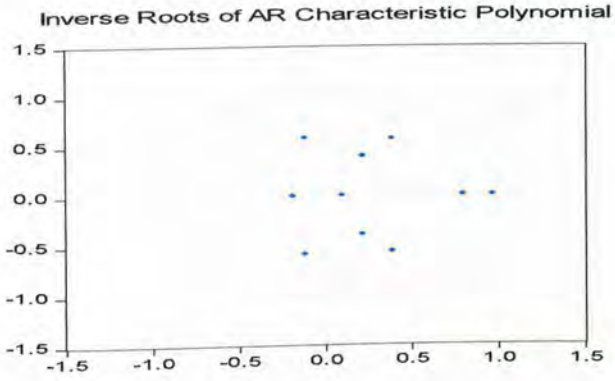
Lag	LogL	LR	FPE	AIC	SC	HQ
0	-99.54	NA	0.000322	6.15	6.37	6.23
1	4.53	171.40*	3.14e-06*	1.49*	2.85*	1.96*
2	27.64	31.26	3.88e-06	1.61	4.08	2.45
3	50.44	24.15	5.86e-06	1.74	5.33	2.96

Source: *Authors' computations using Eviews output.* ***NB:*** * indicates lag order selected by the criterion

As can be inferred from table 5.2, it is evident that the optimal lag length is 1. This conclusion was reached at as per the Schwarz information criterion (SC) and the Akaike information criterion (AIC) which are the most consistent and powerful tests among the tests undertaken (the sequential modified LR test statistic, the Final prediction error (EFE) and the Hannan-Quinn information criterion (HQ) tests). After checking the optimal lag length, a stability check and serial dependency was checked.

5.4 Stability Test

Figure 5.1: AR Roots



Source: *Eviews output*

The stability check used was that of the autoregressive (AR) roots. This was done to check if the variables fit well in the model, as if the dots (roots) were to fall out of the circle it would have indicated that the variables had issues and in turn the model would not be stable (or would have yielded spurious results). As can be seen from figure 5.1, all the dots/roots lay within the circle therefore the stability condition is met.

5.5 The Bound Test for Cointegration Analysis

The bounds test to cointegration was tested using the Wald Test. According to Narayan (2005) if the F-statistic of the Wald test is below the lower bound critical value I(0) then the null hypothesis (H_0) could not be rejected (concluding that there is no long run relationship between the variables). If it is above the upper bound critical value I(1), than the null hypothesis (H_0) is rejected (concluding that there is a long run relationship between variables). Thus, if the F-statistic falls between the two bounds than it is inconclusive and awareness of the order of the integration of the underlying variables is required before conclusive inferences could be made. The study have employed a set of

critical F values by Narayan (2005) for samples size ranging from 30 to 80, which is appropriate for the sample used (36 observations).

Table 5.3: Bounds test results for cointegration analysis

CRITICAL VALUE	Lower bound	Upper bound
10%	2.69	3.89
5%	3.28	4.63
F-statistic = 5.46, K = 4		

Source: *Author's compilation extracted from (Narayan, 2005) unrestricted intercept and no trend*

In keeping with the objectives of the study, the bounds test for cointegration was estimated. As shown in table 5.3, it was observed that the computed F-statistic lies above the upper bound at 5% and 10% level of significance, the null hypothesis can be rejected; indicating cointegration and therefore a long run relationship among the variables.

5.6 The Autoregressive Distributed Lag (ARDL) Test

As a long run relationship has been found, the study's principle objective has been met and ordinarily, an ECM model should be carried out. However, the study is principally concerned with the long run relationship. The long run model was then estimated as per the focus of the study. The model of choice was the ARDL (1, 0, 0, 0, 0) as per automatic lag selection (see figure 5.2). According, to the model of choice, the study found the ARDL (1, 0, 0, 0, 0,) model as the most appropriate with the minimum SC value of 2.74, whereby only the dependent variable (RGDP) was lagged once and the other variables where not.

Figure 5.2: Optimal model check (ARDL optimal lag selection test)

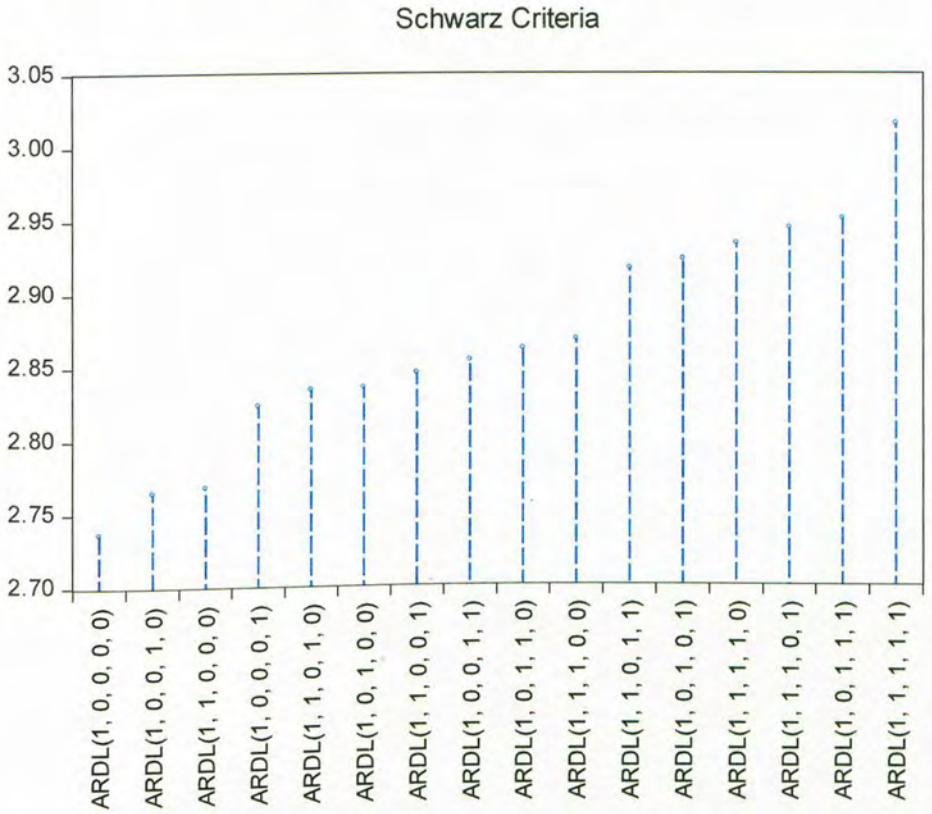


Table 5.4: ARDL test results

Dependent variable: LNRGDP (Economic growth)				
Selected Model: ARDL(1, 0, 0, 0, 0)				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
LNRGDP(-1)	0.03	0.18	0.19	0.85
LNOIL	0.38	0.34	1.11	0.27
LNTOT	-2.96	1.62	-1.82	0.08
LNEXC	0.60	0.31	1.98	0.06
LNINF	-0.31	0.17	-1.79	0.08
C	13.05	6.44	2.02	0.05
R-squared		0.35		
F-statistic		3.26		
Prob(F-statistic)		0.02		

Source: *Author's compilation of Eviews output.*

From the estimated results, the only significant variables were the terms of trade, the exchange rate and the inflation rate as their p values were less than α (at 10% level of significance). The results imply that previous levels of economic growth and the current price of crude oil have no influence on economic growth in Namibia. The result of insignificance of crude oil price was not expected given Namibia's dependency importation of oil. The implication being that even though Namibia is so dependent on oil

imports, no matter the price of oil, oil imports will not be significantly affected, especially in the long run.

Of further significance from the results, is that, while the price of oil is insignificant; the terms of trade, the exchange rate and inflation rate are significant in affecting economic growth at 10% level of significance. This is of significance in that, oil imports are part of the terms of trade. However, even with the heavy import dependence on oil, oil on its own is insignificant in affecting economic growth. It is worth noting that other imports for example, capital goods might be of significance in comparison to oil and in turn oil prices. However, it is further worth noting that as the terms of trade increases, economic growth reduces which is in line with the economic theory. Of further interest is that, the exchange rate is significant and Namibia's currency has depreciated over the period under study. This has however, not stopped or slowed down oil imports, further highlighting the insignificance of the price of oil to Namibia over the long run.

Last but not least, as alluded to earlier, the inflation rate was found to be significant. This result is important in that the inflation rate is an integral indicator of an economy's environment/changes in an economy's environment. From the results there is a negative and significant relationship between economic growth and the inflation rate. This agreeing with economic theory, as the deterioration of an economic environment/economy (or an increase in the inflation rate) would lead to a deterioration in economic growth.

The model was found to be jointly statistically significant as the probability F statistic is 0.02 and the F statistic is 3.26. However, as the probability F statistic is 0.02 (low) it is worth noting that there might be issues with the fitting of data (i.e., the independent

variables are not purely random with respect to the dependent variable) - which is expected to an extent, given the set objectives.

The R^2 is at 0.35 and the adjusted $R^2 = 0.24$ (see appendix b) are relatively low, indicating that the model does very little in explaining the variability of the response of the data around its mean. Regardless of the low R^2, the results could be interpreted and relied upon, because the study found individual significance and overall significance of the model. After the model was estimated, a check to see if the model was optimal was done. Upon the estimation, it was found that indeed the estimated model (ARDL (1, 0, 0, 0, 0) was optimal.

5.6 Diagnostic test

After the model was estimated, several diagnostic tests were estimated. The first being the Breusch-Godfrey Serial Correlation LM test. This particular test was estimated to check for serial correlation, with null hypothesis being there is: no serial correlation and the alternative hypothesis being there; is serial correlation.

Table 5.5: Serial correlation LM test results

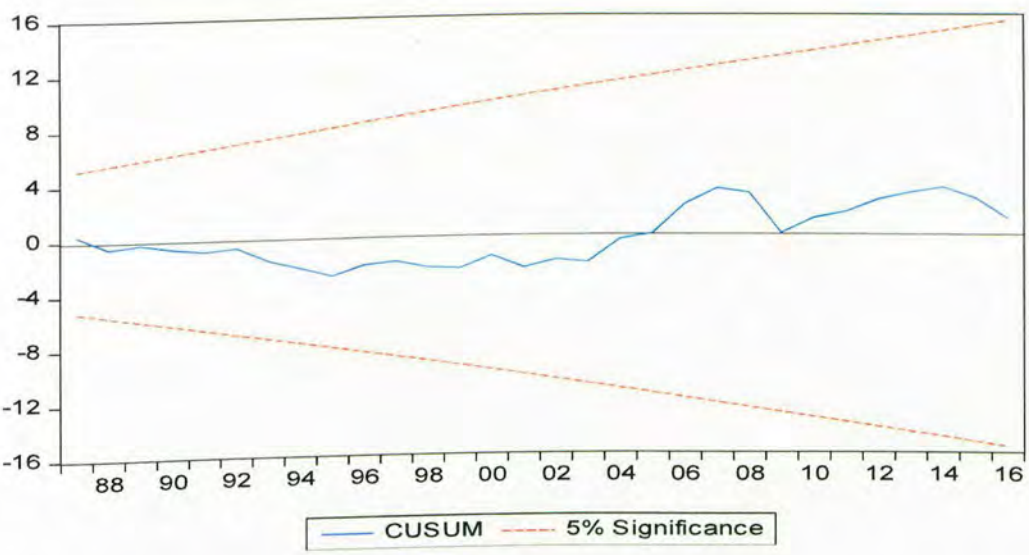
Breusch-Godfrey Serial Correlation LM Test			
F-statistic	0.35	Prob. F(2,28)	0.71
Obs*R-squared	0.88	Prob. Chi-Square(2)	0.64

Source: *Author's compilation of Eviews output.*

As the Obs*R-squared (0.88) is greater than the critical value (0.05 and even 0.10) as observed in table 5.5 therefore, the study failed to reject the null hypothesis of no serial correlation which is desirable.

The second diagnostic test was the Cumulative Sum of Recursive Residuals (CUSUM) test. This diagnostic test was estimated to check the stability of the model. As can be seen from figure 5.2, the model is stable as the line (blue line) falls within the bands at 5% significance.

Figure 5.3: Plot of Cumulative Sum of Recursive Residuals



Source: *Eviews output.*

The last diagnostic tests, was heteroskedasticity test. Heteroscedasticity is a major concern in regression analysis, as it could invalidate statistical tests while homoscedasticity is desirable. Hence, its presence was checked with the null hypothesis postulating homoscedasticity and the alternative hypothesis postulating heteroskedasticity.

Table 5.6: Heteroskedasticity test results

Heteroskedasticity Test: Breusch-Pagan-Godfrey			
F-statistic	0.68	Prob. F(5,30)	0.64
Obs*R-squared	3.67	Prob. Chi-Square(5)	0.59
Scaled explained SS	4.79	Prob. Chi-Square(5)	0.44

Source: *Author's compilation of Eviews output.*

As the P Value of the F-statistic is greater than the critical value (0.10), the study failed to reject the null hypothesis of homoscedasticity, which as mentioned earlier is desirable and helps validate the estimated model and its findings.

Table 5.7: Correlation Matrix

	COP	*RGDP*	*EXC*	*INF*	*TOT*
COP	1				
RGDP	0.29	1			
EXC	0.53	0.36	1		
INF	-0.25	-0.43	-0.33	1	
TOT	0.79	0.22	0.67	-0.23	1

Source*: Excel's output*

The above table shows the strength and direction of a linear relationship between two variables. There is a strong uphill (positive) liner relationship between COP and TOT of 0.79 which implies that as COP increase, TOT increase. Furthermore, there is a moderate positive relationship between COP and EXC (0.53) and EXC and TOT (0.67). A weak downhill (negative) relationship between (COP and INF of -025), (RGDP and INF of -0.43) and (EXC and INF of -0.33) has been found, meaning a decrease in a pair of these

variables result in the increase of the opposite. While there may be concerns of there being correlational issues amongst the variables, as the correlation coefficient values are less than + 0.8 or greater than - 0.8 concerns of correlation are put at ease as they are not considered significant to warrant alarm.

CHAPTER SIX

DISCUSSION, CONCLUSION AND RECOMMENDATIONS

6.1 Introduction

This chapter concludes the study. It provides recommendations and alludes to other perspectives that could be looked at to build on the present study.

6.2 Summary of the study and conclusion

The main objective of the study was to investigate the relationship between oil prices and economic growth in Namibia. The macroeconomic determinants used in the study include: economic growth, oil prices, terms of trade, exchange rate and inflation rate. The study employed an ARDL model. Firstly, the unit root tests were estimated and it was found that all variables except economic growth and inflation became stationary at first difference, at 5% level of significance. Thereafter, the lag length criteria and a stability check were estimated to find the conditions of the model to be estimated and the stability of the variables to be used in the model. It was then found that, the optimal lag length was 1 as per the AIC and SC test. Given that all the dots (roots) were within the circle, it was concluded that the variables to be used in the model were stable and satisfied the stability condition.

Thereafter, the bounds test for cointegration was estimated to determine if there existed a long run relationship amongst the variables. It was then found that cointegration was present as the F-statistic fell outside the upper bound of the test.

From the estimated results, the only significant variables were the terms of trade, the exchange rate and the inflation rate as their p values were less than α (at 10% level of

significance). The results implied that previous levels of economic growth and the current price of crude oil have no influence on economic growth in Namibia. The result of insignificance of crude oil price was not expected given that Namibia is heavily reliant on imported oil. This implies that no matter the price of oil, specifically in the long run, oil imports will not be significantly affected.

According to the significance from the results, is that the terms of trade and the exchange rate are significant while the oil price is not. This is with reference that, the Namibia currency has undergone considerable depreciation which is reflected in the terms of trade results although surprisingly not the oil price. This finding was not expected as the importation of crude oil makes up a considerable amount in the terms of trade, however, the results suggest the price has no effect on economic growth. Therefore, other imports might be of significance in comparison to oil and in turn oil prices.

In addition, after the model estimation, diagnostic tests were applied to check if the aforementioned issues from the estimated results would be problematic. As no issues were raised when the diagnostic tests where estimated, the study concluded that the estimates found were valid and suitable to make inferences from.

6.3 Recommendations

Although, crude oil prices are insignificant in affecting economic growth in Namibia, the challenge Namibia faces is to reduce its dependence on imported oil. At the same time, Namibia has to meet the challenge of development and economic growth. This dependency needs to be addressed through various ways, for instance, diversifying the energy sources. Capital goods that use alternative energy sources could be used, however,

a transition in its entirety is not guaranteed. Not forgetting the short term expense to be incurred in the short to medium term.

It is worth noting that fiscal tools could be used to reassure oil management. However, taxation and quotas may be redundant as the main imports of crude oil in Namibia are the government itself and gas stations. Such policies would be lost on the government who impose subsidies on crude oil, leaving the gas stations as an integral player who would largely pass costs imposed on them to the consumers. Given the dependency in the country fiscal policy, it would be of little help. However, there is also an encounter for energy policy for Namibia in terms of producing oil as well as exploiting renewables. Hence, all these likely developments should be pursued through a combination of incentives, investments, and other measures that affect choices made with the available assortment of technological possibilities and through research and development.

In conclusion, the oil costs plunge can offer a window of chance for each oil commercialism and oil mercantilism nations to begin genuine fuel rating and tax collection change. As a result of such modifications, the more grounded monetary adjust would deliver region for either expanding payment need and/or cutting distortionary charges, in this manner impartation a supported financial handle.

6.4 Further research

Learning more about the relationship between economic growth and crude oil prices in Namibia would require a shift from macro analysis to micro/sector specific analysis. This might prove more costly and could be hindered by availability of data. However, given the finding of oil prices being insignificant at a macro level, a shift to microanalysis would

further provide an understanding given Namibia's dependence on oil. By doing so, the transmission effects from respective sectors would be better understood.

REFERENCES

Aimer, N. M. (2016) The effects of Oil Price Volatility on the Economic Sectors of Libya. *International Journal of Business and Social Research*, *6*(12), 13-24.

Akinsola, F. A. & Odhiambo, N. M. (2017) Inflation and Economic Growth: A Review of the International Literature. *Comparative Economic Research*, *20*(3), 41-56.

Alekhina, V. & Yoshino, N. (2018) Impact of World Oil Prices on an Energy Exporting Economy Including Monetary Policy. *ADBI Working Paper Series*, Issue 828, 1-15.

Aliyu, S. U. (2009) Impact of Oil Price Shock and Exchange rate Volatility on Economic Growth in Nigeria: An Empirical Investigation. *International Institute of Islamic Banking and Finance*, *5*(11), 1-20.

Alom, F. (2015) An Investigation into the Crude Oil Price Pass-Through to the Macroeconomic Activities of Malaysia. *Energy Procedia*, *79*(4), 542-548.

Al-sasi, B., Taylan, O. & Demirbas, A. (2017) The Impact of Oil Price Volatility on Economic Growth. *Energy Sources, Part B: Economics, Planning, and Policy*, 12(10), 847-852.

Apergis, N., Aslan, A., Gupta, R. & Aye, G. C. (2015) The Asymmetric Effect of Oil Price on Growth Across US States. *Repository South Africa*, *3*(7), 1-27.

Atkinson, G. & Hamilton, K. (2003) Saving, Growth and the Resource Curse Hypothesis. *World Development*, *31*(11), 1793-1807.

Awerbuch, S. (1993) The Surprising Role of Risk in Utility Integrated Resource Planning. *The Electricity Journal*, *6*(3), 20-33.

Awuyo-Vitor, D., Samanhyia, S. & Bonney, E. A. (2018) Do Oil Prices Influence Economic Growth in Ghana? An Empirical Analysis. *Cogent Economics & Finance*, *6*(1), 1-14.

Baffes, J. (2007) Oil Spiils on other Commodities. *Policy Research Working Paper Series*, 32(3), 126-134.

Boheman, H. & Maxén, J. (2015) Oil Price Shocks Effect on Economic Growth: OPEC versus non-OPEC Economies. *School of Economics and Management,* 2(8), 1-41.

Balcilar, M., Eyden, R., Uwilingiye, J. & Gupta, R. (2014) The Impact of Oil Price on South African GDP Growth: A Bayesian Markov Switching-VAR analysis. *University of Pretoria: Department of Economics Working Paper Series*, *3*(70), 1-27.

Bank of Namibia. (2014*) Annual Report 2014*, Windhoek: Bank of Namibia.

Bernanke, B. S., Gertler, M. & Watson, M. (1997) Systematic Monetary Policy and the Effects of Oil Price Shocks. *Brookings Papers on Economic Activity*, 1997(1), 91-157.

Berument, H. M., Ceylan, N. B. & Dogan, N. (2010) The Imapct of Oil Price Shocks on the Economic Growth of Selected MENA Countries. *The Energy Journal, 31*(1), 149-176.

Bleaney, M. & David, G. (2001) The Impact of Terms of Trade and Real Exchange Rate Volatility on Investment and Growth in Sub-Saharan Africa. *Journal of Development Economics, 65*(2), 491-500.

Bouzid, A. (2012) The Relationship of Oil Prices and Economic Growth in Tunisia: A Vector Error Correction Model Analysis. *The Romanian Economic Journal*, *3*(43), 3-22.

Bruno, M. & Easterly, W. (1998) Inflation Crises and Long-Run Growth. *Journal of Monetary Economics, 41*(1), 3-26.

Burakov, D. (2017) Oil Prices, Economic Growth and Emigration: An Empirical Study of Transmission Channel. *International Journal of Energy Economics and Policy*, 7(1), 90-98.

Chimhangwa, K. & Haingura, P. (2015) *Low Crude Oil Prices Impact Local Economy*, Windhoek: The Villager.

Downa, P. A., Mgbame, C. O. & Onobun, S. I. (2015) Oil Price Volatility and Economic Growth. *Journal of Business Administration and Management Sciences Research*, 4(5), 98-104.

Eita, J. H., Manuel, V. & Naimhwaka, E. (2018). Macroeconomic Variables and Current Account Balance in Namibia. *Munich Personal RePEc Archive, 3*(7), 1-29.

Farhani, S. (2012) Impact of Oil Price Increases on U.S. Economic Growth: Causality Analysis and Study of the Weakening Effects in Relationship. *International Journal of Energy Economics and Policy, 2*(3), 108-122.

Foudeh, M. (2017) The Long Run Effects of Oil Prices on Economic Growth: The case of Saudi Arabia. *International Journal of Energy Economics and Policy*, 7(6), 171-192.

Ftiti, Z., Guesmi, K., Teulon, F. & Chouachi, S. (2016) Relationship Between Crude Oil Prices and Economic Growth in Selected OPEC Countries. *The Journal of Applied Business Research, 32*(1), 11-23.

Gadea, M. D., Gomez-Loscos, A. & Montanes, A. (2016) Oil Price and Economic Growth: A Long Story. *Econometrics, 4*(41), 1-28.

Gazdar, K., Hassan, K., Safa, F. & Grassa, R. (2018) Oil Price Volatility, Islamic Financial Development and Economic Growth in Gulf Cooperation Council (GCC) countries. *Borsa Istanbul Review, 8*(2), 1-10.

Ghalayini, L. (2011) The Interaction Between Oil Price and Economic Growth. *Middle Eastern Finance and Economics, 6*(13), 127-142.

Gummi, U. M., Buhari, A. I. & Muhammad, A. (2017) Oil Price Fluctuations and Economic Growth in Nigeria (Evidence from Granger Causality Test). *Australasian Journal of Social Science, 3*(1), 1-16.

Haller, A.-P. (2012) Concepts of Economic Growth and Development. Challenges of Crisis and of Knowledge. *Economy Transdisciplinary Cognition, 15*(1), 66-71.

Idrisov, G. & Polbin, A. (2015) A Theoretical Interpretation of the Oil Prices Impact on Economic Growth in Contemporary Russia. *Russian Journal of Economics*, 1(3), 257-272.

Idrisov, G. & Sinelnikov-Murylev, S. (2016) Terms of Trade and Russian Economic Development. *Russian Journal of Economics*, *2*(3), 279-301.

Ishmael, O., Matthew, T. R. & Park, I. (2017) The Impact of Changes in Crude Oil Prices on Economic Growth in Nigeria: 1986 – 2015. *Journal of Economics and Sustainable Development, 8*(12), 78-89.

Jawad, M. & Niazi, G. S. K. (2017) Imapct of Oil Price Volatility and Macroeconomic Variables Economic Growth of Pakistan. *Review of Innovation and Competitiveness, 3*(1), 49-74.

Jimenez-Rodriguez, R. & Sanchez, M. (2004) Oil Price Shocks and Real GDP Growth: Empirical Evidence for Some OECD Countries. *European Central Bank, 3*(362), 1-66.

Katali, I. (2013) *Fuel Price Revision of the Controlled Petroleum Products: Petrol and Disel,* Windhoek: Ministry of Mines and Energy.

Kitous, A. Saveyn, B. Kimon, K. Vandyck, T. Santos, L. R. & Wojtowicz, K. (2016) *Impact of Low Oil Prices on Oil Exporting Countries,* Sevilla: European Union.

Kurihara, Y. (2015) Oil Prices and Economic Growth in Developed Countries. *International Journal of Business and Social Science, 6*(11), 40-46.

Laourari, I. & Gasmi, F. (2016) The Impact of Real Oil Revenues Fluctuations on Economic Growth in Algeria: Evidence From 1960-2015 data. *Munich Personal RePEc Archive, 4*(77), 1-26.

Liew, V. K. & Balasubramaniam, A. (2017) Oil Price Shocks and Sectoral Outputs: Empirical Evidence from Malaysia. *Economics Bulletin, 37*(1), 38-47.

Manuel, V., Eita, J. H. & Naimhwaka, E. (2018) *An Empirical Analysis of the Sustainability of Namibia's Current Account,* Windhoek: Bank of Namibia.

Mehrara, M., Maki, M. & Tavakolian, H. (2010) The Relationship Between Oil Revenues and Economic Growth, Using Threshold Methods (The Case of Iran). *OPEC Energy Review, 3*(6), 65-78.

Mileva, E. & Stracca, L. (2016) *The Real Exchange Rate and Economic Growth: Revisiting the Case Using External Instruments,* European Central Bank.

Nakale, S. (2016) *Determinants of Economic Growth in Namibia*, Windhoek: National Planning Commission.

Nambinga, V. (2015) *Balance of Payments*, Windhoek: National Planning Commission.

National Planning Commission. (2018) *Status of the Namibian Economy,* Windhoek: Office of the President.

Narayan, P. K. (2005) The Saving and Investment Nexus for China: Evidence from Cointegration tests. *Applied Economics, 37*(17), 1979-1990.

Niishinda, E. & Ogbokor, C. A. (2013) Testing the Long-Run Relationship Between Export and Economic Growth: Evidence in Namibia. *Journal of Emerging Issues in Economics, Finance and Banking, 1*(5), 1-18.

Nkomo, J. (2006). The Impact of Higher Oil Prices on Southern African Countries. *Journal of Energy in Southern Africa, 17*(1), 25-32.

Oertzen, D. (2010*) Namibia National Issues Report on the Key Sector of Energy with a Focus on Mitigation,* Windhoek: Namibia Statistic Agency.

Offiong, A. I., Atsu, I. A., Ajaude, E. & Ibor, B. I. (2016) The Impact of Oil Price Shocks on the Economic Growth and Development of Cross River State, Nigeria. *International Journal of Financial Research, 7*(4), 96-104.

Ogunsola, A. J., Olofinle, G. D. & Adeyemi, P. A. (2017) Effect of Oil Price and Exchange Rate Volatility on Economic Growth in Nigeria. *International Journal of Economics, Commerce and Management, 5*(2), 312-328.

Okoro, E. G. (2014) Oil Price Volatility and Economic Growth in Nigeria: a Vector Auto-Regression (VAR) Approach. *Acta Universitatis Danubius, 10*(1), 70-82.

Oyeyemi, A. M. (2013) The Growth Implications of Oil Price Shock in Nigeria. *Journal of Emerging Trends in Economics and Management Sciences, 4*(3), 343-349.

Qianqian, Z. (2011) The Impact of International Oil Price Fluctuation on China's Economy. *Energy Procedia, 2*(5), 1360-1364.

Roubini, N. (2006) The Unsustainability of the U.S Twin Deficit. *Cato Journal, 26*(2), 343-356.

Sadeghi, A. (2017) Oil Price Shocks and Economic Growth in Oil-Exporting Countries: Does the Size of Government Matter? *IMF Working Paper, 17*(287), 1-27.

Sanchez, M. V. (2011) Welfare Effects of Rising Oil Prices in Oil Importing Developing Countries. *The Developing Economies,* 49(3), 321-346.

Sahlen, L. (2008) The Impacts of Food- and Oil Price Shocks on the Namibian Economy: The Role of Water Scarcity. *Emea Economic Studies,* 5(758), 1-41.

Schade, K. (2016) *The Two Sides of Low Oil Prices,* Windhoek: Hanns Seidel Foundation.

Sy, A. (2014) *Falling Oil Prices and the Consequences for Sub-Saharan Africa: Africa in Focus.*

Tehranchian, A. M. & Seyyedkolaee, M. A. (2017) The Impact of Oil Price Volatility on the Economic Growth in Iran: An Application of a Treshold Regression Model. *International Journal of Energy Economics and Policy, 7*(4), 165-171.

Therramus, T. & Austin, S. (2015) *Will Collapse in Oil Price Cause a Stock Market Crush?,* Windhoek: Office of the Prime Minister.

The World Bank. (2018) *World Bank Commodity Price Data (The Pink Sheet).* [Online]

Available at: http://www.data.worldbank.org.

[Accessed 03 January 2018].

Wiggill, T. (2015) *Namibia Fuel Trends and Forecast*, Windhoek: Fuel, Lubes and Oils.

Wilson, L. & Sheefeni, J. P. (2014) The Relationship Between Interest Rate and Exchange Rate in Namibia. *Journal of Emerging Issues in Economics, Finance and Banking, 3*(1), 947-961.

Yazdan, G. F., Ehsan, A. G. & Hossein, S. M. (2012) Is Cointegration Between Oil Price and Economic Growth? Case Study Iran. *Procedia- Social and Behavioral Sciences*, 62(14), 1215-1219.

Yong, P. L., Fung, N. C. & Yuen, P. (2011) *Oil Price and Economic Growth: Evidence from 10 Sub-Saharan Afican Countries,* s.l.: Universiti Tunku Abdul Rahman.

Yusoff, N. Y. & Latif, N. W. (2013) Measuring the Effects of World Oil Price Change on Economic Growth and Energy Demand in Malaysia: An ARDL Bound Testing Approach. *International Journal of Trade, Economics and Finance*, *4*(1), 29-36.

APPINDECES

APPENDIX A: TIME SERIES DATA

Years	Crude oil, Brent ($/bbl)	GDP growth (annual %)	Exchange rate (annual %)	Inflation (annual %)	Terms of trade
1980	37.89	0.31	0.78	1.05	112.23
1981	36.68	0.97	0.88	3.55	95.56
1982	33.42	-0.40	1.09	17.01	89.92
1983	29.83	-1.82	1.11	13.35	87.77
1984	28.80	-0.24	1.48	12.75	90.35
1985	27.33	0.46	2.23	23.93	107.04
1986	14.77	4.77	2.29	10.03	96.55
1987	18.34	3.55	2.04	9.43	89.81
1988	14.97	0.81	2.27	20.17	102.83
1989	18.22	1.86	2.62	15.10	103.51
1990	23.68	2.05	2.59	6.43	92.75
1991	20.07	8.17	2.76	6.00	76.06

1992	19.31	7.19	2.85	10.29	74.83
1993	17.02	-1.58	3.27	8.65	79.23
1994	15.83	1.73	3.55	20.69	88.37
1995	17.07	3.90	3.63	6.58	82.61
1996	20.65	3.19	4.30	14.95	90.40
1997	19.09	4.22	4.61	6.94	91.94
1998	12.72	3.29	5.53	8.33	95.41
1999	17.81	3.37	6.11	6.70	94.29
2000	28.27	3.49	6.94	12.34	100.00
2001	24.42	1.18	8.61	11.26	100.86
2002	24.97	4.79	10.54	10.73	101.19
2003	28.85	4.24	7.56	1.01	99.31
2004	38.30	12.27	6.46	1.90	101.29
2005	54.44	2.53	6.36	5.53	105.42
2006	65.39	7.07	6.77	9.27	129.63
2007	72.70	6.62	7.05	6.91	137.92
2008	97.64	2.65	8.26	10.91	125.08

2009	61.86	0.30	8.47	6.96	120.69
2010	79.64	6.04	7.32	3.56	124.48
2011	110.94	5.09	7.26	3.81	125.04
2012	111.97	5.06	8.21	12.88	124.31
2013	108.86	5.61	9.66	8.80	122.11
2014	98.94	6.35	10.85	6.26	123.95
2015	52.37	5.99	12.88	0.38	127.75
2016	44.05	1.08	14.71	7.91	128.91

APPENDIX B: ARDL ESTIMATION OUTPUT

Included observations: 36 after adjustments
Maximum dependent lags: 4 (Automatic selection)
Model selection method: Schwarz criterion (SIC)
Dynamic regressors (4 lags, automatic): LNOIL LNTOT LNEXC LNINF
Fixed regressors: C
Number of models evalulated: 2500
Selected Model: ARDL(1, 0, 0, 0, 0)
Note: final equation sample is larger than selection sample

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LNRGDP(-1)	0.034580	0.177803	0.194488	0.8471
LNOIL	0.378760	0.339823	1.114581	0.2739
LNTOT	-2.955503	1.622440	-1.821640	0.0785
LNEXC	0.604018	0.305327	1.978264	0.0571
LNINF	-0.311654	0.174121	-1.789875	0.0836
C	13.05180	6.437905	2.027336	0.0516

R-squared	0.351705	Mean dependent var	1.015986
Adjusted R-squared	0.243656	S.D. dependent var	0.888341
S.E. of regression	0.772573	Akaike info criterion	2.472830
Sum squared resid	17.90605	Schwarz criterion	2.736750
Log likelihood	-38.51094	Hannan-Quinn criter.	2.564945
F-statistic	3.255049	Durbin-Watson stat	1.914629
Prob(F-statistic)	0.018235		

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