An Exploratory Review of Oil Price and Economic Growth in Five Oil-Importing Middle-Income Countries in SSA

Motunrayo Akinsola[1], Nicholas Odhiambo[2]

Abstract: Objective: This study examines the dynamics of oil price and economic growth in five middle-income oil-importing countries in sub-Saharan Africa, namely Botswana, Kenya, Mauritius, Namibia and South Africa. Prior Work: Little work has been done to accentuate the energy policies, especially in the oil-importing SSA countries, given that fluctuations in oil prices affect consumption, investment and economic growth. Approach: This study uses an exploratory approach. This study also employs data from the World Development Index (WDI), the International Energy Agency (IEA) and British Petroleum (BP) for graphical descriptive analysis of the energy sources, oil price and economic growth for each country.Results: The study finds that energy sources in the selected countries are divergent. While Botswana has an almost equal share of oil and coal as its major energy sources, South Africa's main energy source is coal and Namibia and Mauritius depends mostly on oil for their energy needs. Kenya depends highly on biofuel for its energy needs. The effect of oil price, therefore, varies depending on the share of oil in the energy mix for each country. Value: A comprehensive review of the energy sources and strategy for each country are explored with a specific focus on the oil price-economic growth dynamics.

Keywords: oil price; economic growth; country-based literature; oil-importing countries; SSA

JEL Classification: E44; O16; E52

1. Introduction

Economic growth has been divergent in African countries, even though the sub-Saharan African (SSA) region has been expansive in its growth prospect. World Development Indicators (2009) noted that SSA growth was at par with global trends for the first time in 30 years in 2008. However, despite considerable increases in the economic growth of the SSA region, individual countries have failed to sustain their economies. One of the reasons is that global growth has been volatile since 2010, with a decrease in the GDP growth rate from 4.3 percent in 2010 to 2.4 percent in 2016 (WDI, 2018). Growth has also been volatile, especially in resource-rich countries due to commodity price movements. Moreover, lower economic activities have decreased GDP growth rates. The SSA region is highly dependent on primary commodity exports, which makes it vulnerable to trade shocks since its manufacturing and service sectors are still underdeveloped (Muhanji & Ojah, 2011). Therefore, global economic shocks are transmitted into the SSA region through trade. One of the most important sources of trade shocks is fluctuations in the price of crude oil.

Volatility in the oil price occurs during periods of high or low oil prices and can be as a result of various occurrences in the oil market. The oil price volatility in the 1980s corresponds to the oil glut in

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the mid-1980s. The 1990/1991 oil shock, however, was due to a reduction in supply following Iraq's invasion of Kuwait, while the oil price fluctuations in the late 1990s are associated with the East Asian crisis. Reduced oil production from Venezuela and Iraq in 2003 and the global financial crisis of 2008 contributed to oil price shocks during the period. Therefore, SSA has to deal with the uncertainties pertaining to oil price movements, which affect consumption and investment (Ferderer, 1997). Kose and Riezman (2013) showed that trade shocks account for almost 50 percent of the variation in aggregate output for African countries, 80 percent in aggregate consumption and 86 percent in investment. Deaton and Miller (1995) and Muhanji and Ojah (2011) also found similar results where commodity price and trade shocks increased fiscal and current account deficit and external debt for SSA.

Moreover, countries in SSA have some characteristics that increase their levels of vulnerability to oil price shocks. Firstly, most SSA countries, including oil exporters, import refined petroleum due to weak and inadequate refineries in the region. Therefore, as oil price increases, oil import bills increase. Secondly, the prices of other primary commodity exports are positively correlated with the oil price. Hence, an increase in oil price improves non-oil trade balance through real exchange rate depreciation and higher commodity exports (Bodenstein et al., 2011). This is exacerbated, especially if the increase in oil price is due to a boom in the global economy. Thirdly, SSA is one of the least integrated markets in the world. A low level of integration implies that SSA countries cannot share international risks during oil price shocks. Also, vulnerable countries with low foreign reserves tend to face more significant non-oil trade fluctuations (Bodenstein et al., 2011). When compared to other regions in the world, Africa is still underdeveloped in the global market space. However, African countries' income and consumption have increased over the years due to an increase in the demand for natural resources. The region is also one of the least diversified regions. Therefore, oil price shocks affect revenue due to the less diversified nature of African economies.

High oil prices affect oil-importing countries through effects on fiscal balance, external balances, inflation and exchange rate. Increased oil prices improve the external and fiscal balances of oil exporters. However, the external and fiscal balance of oil-importing countries in SSA may worsen due to an oil price increase. Even with a well-developed financial market and a more diversified economy than most SSA countries, South Africa is still vulnerable to oil price shocks. Higher oil prices affect inflation-targeting policies and increase interest rates, which can be detrimental to economic growth. This is because a higher interest rate will affect the real sector of the economy, which is a significant driver of economic growth in any country. Regardless of the increasing importance of oil in the global economy and the increased effects of oil price fluctuations in SSA countries, there is still a dearth of literature on the effect of oil price on oil-importing countries in SSA. Most previous studies focused on developed economies.

This paper evaluates the oil price-economic growth dynamics in five middle-income oil-importing sub-Saharan African countries, namely Botswana, Kenya, Mauritius, Namibia and South Africa. This study highlights the trend of oil price and economic growth in these countries during 1980-2017. This paper presents a country based literature on oil price-growth relationship in five middle-income oil-importing countries in sub-Saharan Africa (SSA).

2. Individual Country Review of Oil Price and Economic Growth

2.1. Botswana

Botswana is a middle-income country with a real GDP growth of 4.3 percent in 2016 (WDI, 2017). As one of the world's most impoverished countries at independence in 1966, Botswana has grown to be one of the fastest-growing economies in the world with an average of 5 percent annual GDP growth (WDI, 2018). With a relatively small population of over two million, the economy has been characterized with good governance, prudent economic management and a stable political environment. It shares a border with Zambia, Namibia, Zimbabwe and South Africa. However, in 2015, the economy contracted by 1.7 percent due to low demand for diamond exports, drought and water and electricity shortages. The expansion of other non-mining sectors such as transportation and communication, construction and tourism increased the country's prospect of recovery from the setback in 2015. The country is mainly dependent on diamond exports and agriculture. The inflation rate fell to 4.4 percent in 2014 from its initial value of 5.9 percent in 2013. It further decreased to 3.1 percent in 2015 and 3.8 percent in 2016 (WDI, 2017). Since the country is landlocked, Botswana depends on imports from neighbouring countries, especially South Africa, to meet its domestic demand. The Botswana economy, therefore, is closely tied and vulnerable to South Africa's economic situation and fluctuations.

Botswana has been remarkable for its rapid economic growth, political stability and fiscal and monetary management policies. The major driver of economic growth is its buoyant mining sector. Botswana is the second-largest producer of diamonds in the world. The country is classified as an upper-middle-income country with a GDP per capita of $7 523.22 in 2017. The GDP per capita in Botswana is the third highest in SSA after Mauritius with $10 186.05 and South Africa with $7 524.51 (WDI, 2018). The structural stability of the country helped to reverse the slowdown in economic growth during the financial crisis in the 2008/2009 financial year. However, economic growth slowed down during the global financial crisis due to the fall in the demand for diamonds. Commodity prices generally declined during this period. Botswana has been able to recover, recording significant economic growth compared to most SSA countries, even though the mining sector is still vulnerable due to the fall in commodity prices. Economic diversification is crucial to reduce over-reliance on the mining sector for sustainable economic growth prospects. Figure 1 compares the growth rate of Botswana with the growth rate of SSA.

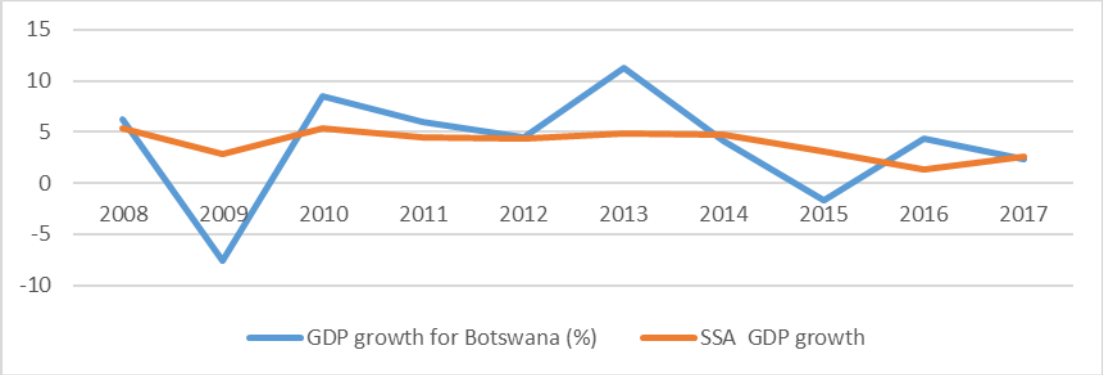

Figure 1. GDP Growth Rate Comparison between Botswana and SSA
Source: Author's computation using data from WDI, 2018.

Figure 1 shows that Botswana's GDP growth rate has been higher for most of the years under review.

Economic growth increased as a result of the recovery of the diamond trade. The services- and agricultural sector also attracted investments after recovering from the drought. Botswana's fiscal policy has been expansionary while controlling for a moderate inflation rate. Significant setbacks were recorded in 2009 and 2015, which followed a major decline in commodity prices during the global financial crisis in 2008 and the commodity price shocks in 2014. The growth rate of Botswana increased from 4.46% in 2012 to 11.34% in 2013 due to the boom in the mining sector, particularly in diamonds. The production of diamonds contributed 24.5% of the GDP. The commodity price shocks weakened the growth rate of Botswana from 11.34% in 2013 to 4.15% in 2014 and further down to a negative value of 1.70% in 2015. Recent GDP growth rates of 4.32% in 2016 and 2.36% in 2017 shows a slight recovery from the figures recorded during the 2014/2015 financial year. The natural resources markets are becoming competitive as a result of new players from new mines and new exploration deposits. The long-term demand for natural resources, especially polished diamonds, in the global market is declining. Heavy dependence on mining exports increases the market risks for Botswana.

The Effect of Oil Prices in Botswana

Access to energy sources for growth and development is an important Millennium Development Goal in Africa. Energy sources in Botswana include crude oil-related products and coal. The largest consumer of electricity is mining and the transport sector is the second (Department of Energy Affairs, 2007). Paraffin, a by-product of crude oil, is also largely consumed by households in Botswana. The volatility of oil prices affects the import bill of Botswana. Therefore, fluctuations in oil prices affect the trade balance of the country (UNDP, 2012). The cost from increased imports bill is mostly passed to consumers, which increases the cost of production inputs and makes sectors of the economy less profitable. During oil volatility, insufficient supply delays infrastructural and investment projects that could boost economic growth. Therefore, coordination and integration between the private and public sector can ensure a sustainable and reliable energy supply. Figure 2 depicts the total primary energy supply by source for Botswana.

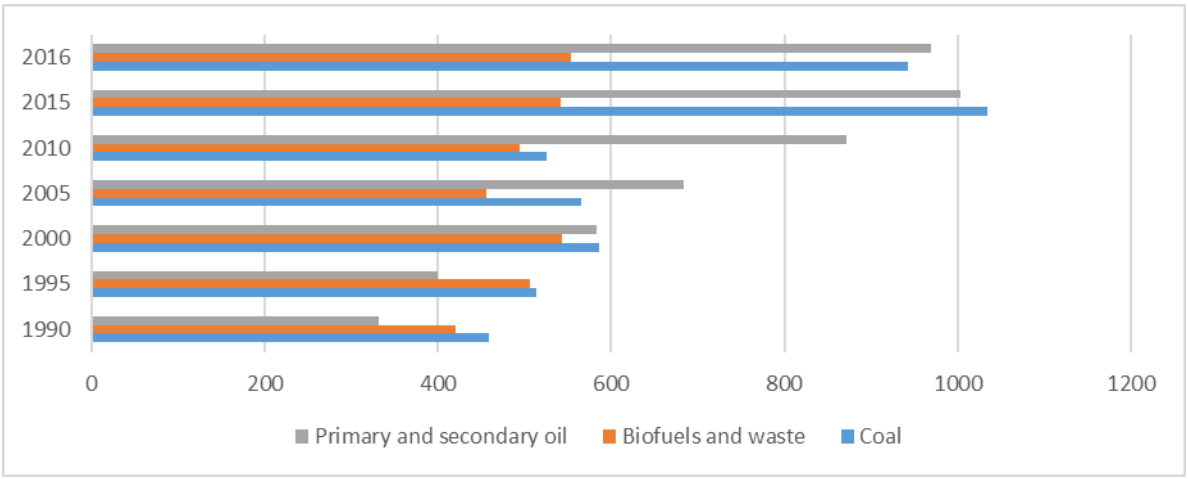

Figure 2. Total Primary Energy Supply (TPES) by Source - Botswana

Source: Author's computation using data from International Energy Agency, 2018.

Figure 2 shows that oil price has increased over the years and has more than tripled from 1990 to 2016.

The major energy sources in Botswana are coal and oil, and considerable efforts have been made

towards reducing the use of biofuel. The biofuel was the second-largest source of energy after coal from 1990 to 1995 and oil was the lowest. By 2005, oil surpassed biofuel and coal and continued to dominate the energy supply of Botswana until 2015. Botswana mostly relies on imported oil from or through South Africa for its energy needs. A high level of consumption of petroleum products poses economic challenges for Botswana (UNDP, 2012). The level of consumption of petroleum products represents a significant energy challenge for Botswana, which affects the trade balance of the country. Oil price volatility impacts significantly on the import bill of the country (UNDP, 2012). Institutional factors such as ineffective public transport, lack of infrastructure and irregular human settlement contribute to the high consumption of petroleum products (UNDP, 2012).

2.2. Kenya

Kenya is a middle-income country in the East African region. It is regarded as a leading economy in the region due to its large economic hub and financial sector development compared to other countries in the region. Economic growth in Kenya has been volatile since 1970. Kenya achieved significant growth in the 1970s and 1980s compared to other SSA countries. From an average annual growth rate of 4.1% between 1975 and 1985, the average economic growth increased to 5.7% from 1985 to 1989. In the 1990s, however, economic growth declined and reached a historically low rate of -0.8% in 1992 from 1.4% the previous year. Economic growth recovered considerably to 0.4% in 1993, 2.6% in 1994 and 4.4% in 1995 (World Bank, 2018). Before the global economic meltdown of 2007/08, the economic growth rate in Kenya was 6%. The country was however, vulnerable to global market uncertainties and was affected negatively by the crisis. The economic growth rate declined to 0.2% in 2008, but made a quick recovery to 8.4% by 2010 (World Bank, 2018).

The average economic growth between 2014 and 2016 was commendable at 5.6%, with real GDP growth at 5.7% and 5.9% in 2016 and 2017 respectively when compared to other countries in SSA. Kenya became one of the fastest-growing economies in the SSA. Low international oil prices, infrastructural development, improvement in the tourism sector, inflows from remittances and stable macroeconomic conditions contributed majorly to the real GDP growth rate achieved during this period (World Bank, 2018c). Economic growth in Kenya fell from 5.9% in 2016 to 4.9% in 2017 due to setbacks from adverse weather conditions, political conditions with a prolonged election period and an unfavourable interest rate (AEO, 2018). However, with growth in the small, medium and micro enterprises (SMMEs) and an increase in infrastructural investment, ICT growth and tourism development, the economy grew to 5.7% by the first quarter of 2018. Recovery in weather conditions mainly contributed to economic growth with growth in agricultural production. Figure 3 shows the comparison of the GDP growth rate of Kenya with the growth rate of SSA (AEO, 2019).

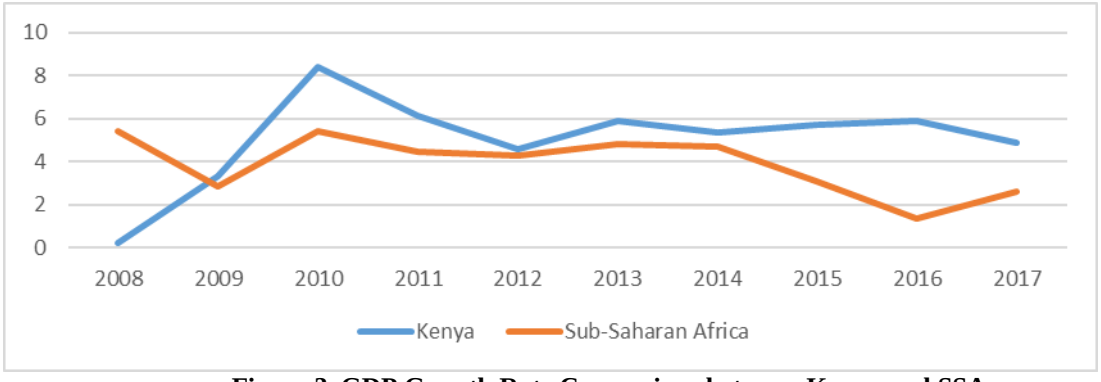

Figure 3. GDP Growth Rate Comparison between Kenya and SSA

Source: Author's computation using data from WDI, 2018.

The Effect of Oil Prices in Kenya

Energy sources in Kenya are mainly from biomass. However, the oil demand has increased over the years, as shown in Figure 4. Kenya is a developing and net oil-importing country. It relies heavily on oil to increase national output. Therefore, a shift in global oil prices has implications for the macroeconomic parameters of the economy. Even though heightened efforts have been made to increase the overall energy mix sources away from crude oil, the proportion and production of other energy sources are still deficient. The country is still highly dependent on oil importation for its oil needs. Therefore, changes in oil prices have an extensive effect on the macroeconomic stance in Kenya, which includes inflationary pressures, the volatility of the exchange rate and trade balance. With the discovery of oil and prospects of the commercial exploration of oil, Kenya's pursuit of being an oil exporter to buffer crude oil prices during oil price volatility in the global market has increased (AEO, 2019). Figure 4 shows the primary energy supply of Kenya by energy sources.

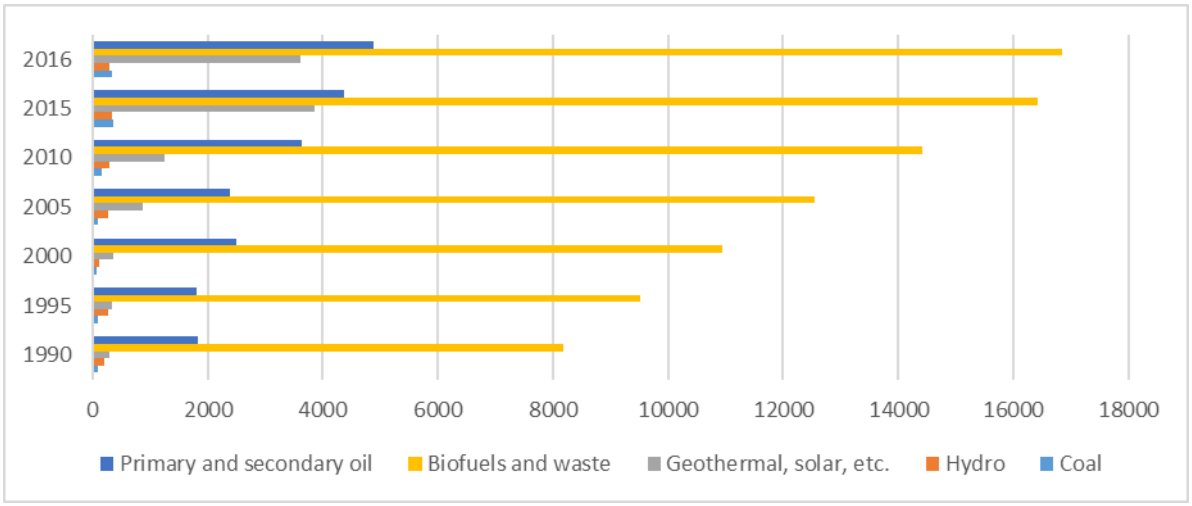

Figure 4. Total Primary Energy Supply (TPES) by Source - Kenya

Source: Author's computation using data from IEA, 2018.

Over the past three decades, Kenya's oil demand has increased by more than 100% from 39,000 barrels per day in 1986 to 94,000 barrels per day in 2015. Figure 4 shows that unlike most middle-income countries studied in this paper, Kenya mostly relies on biofuels for most of its energy needs, with oil as the second-largest energy supplier. Kenya mostly imports its crude oil from the United Arab Emirates. The country had one of the largest refineries in East Africa, but it was shut down in 2016 due to the refinery operating below capacity.

2.3. Mauritius

Mauritius is a volcanic island in the Indian Ocean in the southern region of Africa. It is classified as a middle-income country with a GDP growth of 3.6% in 2016 and 3.4% in 2015. Political stability, sound macroeconomic management and government resilience in promoting industrialisation have contributed to sustainable economic growth in the country and have also increased the competitiveness of the economy in the global market (African Economic Outlook, 2017). Even though economic growth was driven by the information and communications technology (ICT) and financial and insurance sectors, which grew by 6.3% and 5.6% in 2015 and 2016, respectively, the fall in global oil and food prices during the period also contributed to the increase in GDP growth. The inflation rate

also decreased from 3.2% in 2014 to 1.3% in 2015 and further dropped to 1.02% in 2016 despite a moderate increase in global oil prices (WDI, 2017). Food prices dropped by 27.3% of the Consumer Price Index (CPI) basket, while transports dropped by 15% of the CPI as a result of lower international oil prices. The overall current account deficit improved by 3.9% of the GDP in 2016 and external reserves increased to 4.9 billion USD – an equivalent of 8.4 months import cover in 2016. Export earnings also grew from 3.5% in 2015 to 4.7% of the GDP in 2016.

Mauritius has developed from a monocrop economy to a well-diversified economy following its success in textile, tourism and the development of the Export-Processing Zone (EPZ) (AEO, 2019). This has transformed Mauritius from a labour-intensive economy to a capital-intensive economy through remarkable growth in the textile and clothing industry. Its economy also diversified into the service and manufacturing sectors. This has increased its openness to trade and has sustained economic growth successfully (Subramanian and Roy, 2003; Sacerdotal et al. 2005; Frankel 2010; Tang et al. 2019). Mauritius is classified as a middle-income country with a GDP growth of 3.6% in 2016 and 3.4% in 2015 (WDI, 2018). Despite being a small country that is vulnerable to external shocks and terms of trade shocks, Mauritius has been able to achieve holistic and sustainable economic growth owing to political stability, sound macroeconomic management and government resilience in promoting industrialisation in the country. This has also increased the competitiveness of the economy in the global market (African Economic Outlook, 2017).

According to the World Bank Competitiveness report and the World Economic Forum Africa Competitiveness Report, Mauritius has continuously been ranked as the most competitive country in Africa since the 2000s. Mauritius has also topped the Ibrahim Index of African Governance (IIAG) in the past few years. Tang et al. (2019) believed that structural diversification, strong institutions, more receptive openness to trade, and public and private partnerships have been responsible for the success of Mauritian development. Figure 5 shows the comparison of the GDP growth rate of Mauritius with the GDP growth rate of SSA.

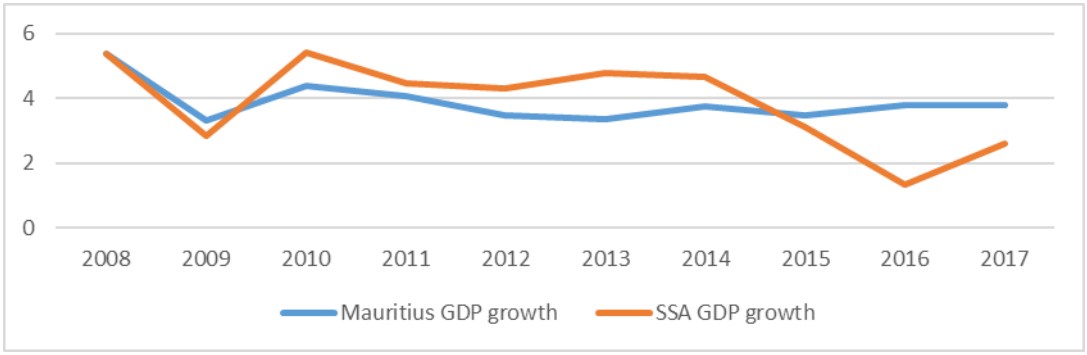

Figure 5. GDP Growth Rate Comparison between Mauritius and SSA
Source: Author's computation using data from WDI, 2018

The Effect of Oil Prices in Mauritius

The reliance of Mauritius on imported goods exposes the country to oil price volatility, which has an impact on inflation and the macroeconomics of the country. However, negative spillover from global economic downturns has remained a key obstacle to Mauritian economic growth owing to its reliance on imported goods. During 2015 and 2016, terms of trade were favourable due to declining commodity prices. Terms of trade increased from 103.2% in 2015 to 119.6 in 2016. The decline in oil especially contracted Mauritius' trade deficit. This was due to an increase in the export price index by 3.5% during this period and the import price index decreased by 10.7% (Bank of Mauritius Annual

Report, 2018). The decline in the oil price contributed significantly to the favourable terms of trade during the period. When the oil price was excluded, the terms of trade increased by 6.2% and 3.0% when other commodity prices were also excluded. However, when all prices were included, terms of trade increased by 15.9% (Bank of Mauritius Annual Report, 2018). The vulnerability and inability to influence international oil prices pose risks for Mauritius because the import bill increases when oil price increases and are transmitted to the increase in domestic prices. Figure 6 shows the total energy supply by sources in Mauritius.

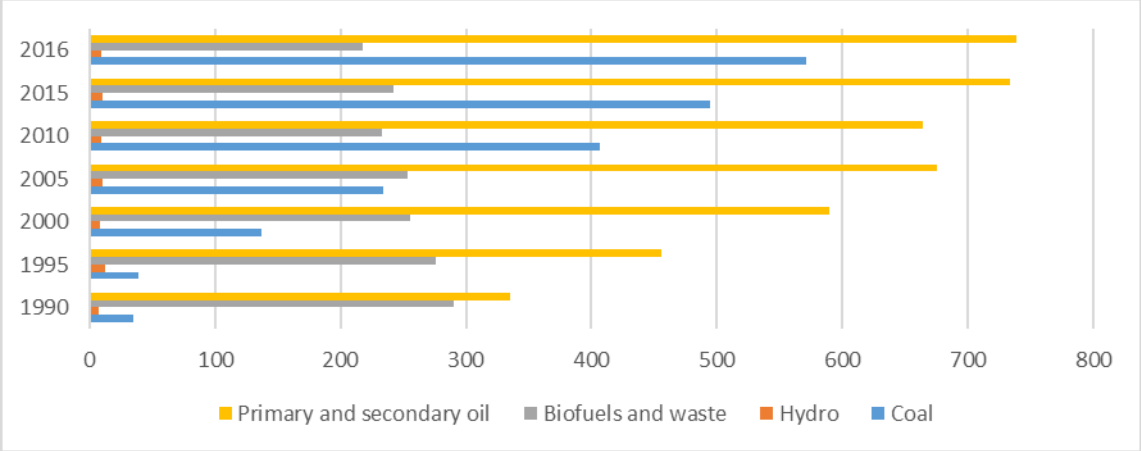

Figure 6. Total Primary Energy Supply (TPES) by source - Mauritius
Source: Author's computation using data from IEA, 2018.

Figure 6 depicts that Mauritius mostly relies on oil for its energy needs. The citizens do not use biofuels for their cooking needs in their homes (WEO Biomass Database, 2016).

2.4. Namibia

Namibia is a middle-income country with a GDP growth rate of -0.77% in 2017 (WDI, 2018). The GDP growth rate was 4.8% in 2010, which was a commendable growth from the global financial crisis of 2008/2009. The mainstay of Namibia's economy is mining and agriculture. South Africa and the European Union are the major export destinations for Namibia. Angola, Canada and the United States are other important trading partners of Namibia.

The economy has been experiencing a downward GDP growth trend since 2015, from a growth rate of 6.4% in 2014 to 6% in 2015 and 0.70% in 2016 due to low demand and inflation (WDI, 2018). External trading partners, particularly Angola, an oil-exporter, affected Namibia's growth projection as the oil price decreased due to low demand for mining and agricultural products from Angola increasing Namibia's vulnerability to the oil price shock (AEO, 2017). Due to lower oil prices, Namibia's exports to Angola declined from 4.1 billion Namibian dollars in 2014 to 2.6 billion Namibian dollars in 2015 (AEO, 2017). Figure 7 shows the comparison of the GDP growth rate of Namibia with the GDP growth rate of SSA.

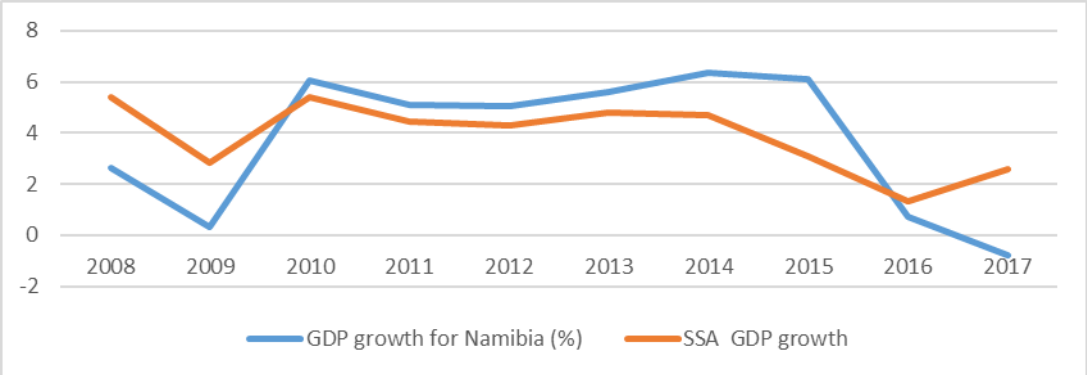

Figure 7. Comparison of GDP Growth of Namibia with SSA
Source: WDI, 2018

Figure 7 depicts that the economic growth performance of Namibia was affected by the 2008/2009 global financial crisis. However, it recovered with a commendable 6.04% growth rate from 0.30% in 2009. However, the country went into a recession with a negative growth rate of 0.77% by 2017. Furthermore, the economy, similar to its other Southern Africa counterparts, is also closely tied to the South African economy, with the Namibian dollar pegged to the South African Rand. An increase in uncertainties in the South African economy – for instance, low growth and credit ratings in South Africa – are likely to increase exchange rate volatility and the inflation rate in Namibia. Besides, the persistent drought and adverse weather conditions experienced in the Southern Africa region constitute a significant risk to growth in the agricultural sector. Risks to the Namibian economy include low commodity prices, which may lead to a slump in the country's terms of trade and increased pressure on the current account balance and international reserves. Namibia is, therefore, continuously susceptible to exogenous external shocks and macroeconomic conditions as it is a commodity-driven economy (Namibia relies heavily on commodity export earnings from mineral resources such as gold, diamond, copper, zinc, etc). Mineral resources contribute 50% of foreign exchange earnings to the economy. However, due to lower global growth and demand, commodity prices have fallen, thereby reducing export earnings from primary commodities (AEO, 2018).

Namibia recorded steady growth with average GDP growth of 5.6% between 2010 and 2016. This was due to large government expenditure and booming commodity prices. However, recently, the real GDP growth decreased by 0.9% in 2017 and 0.1% (estimated) in 2018 due to a decrease in government revenue and consequently reducing public expenditure. Weak growth from trading partners also had a contagion effect on Namibia (AEO, 2018).

The Effect of Oil Prices in Namibia

Energy demand from oil imports has increased significantly in Namibia since 2014. Fuel imports as a percentage of merchandise import increased significantly from 6.4% in 2014 to 14.9% in 2015 and decreased to 10.6% in 2017 (WDI, 2018). Due to lower international oil prices, the oil import bill of Namibia decreased. Therefore, there was a significant increase in oil imports because of the fall in the oil price in 2014. Figure 8 presents the total primary energy supply by sources in Namibia.

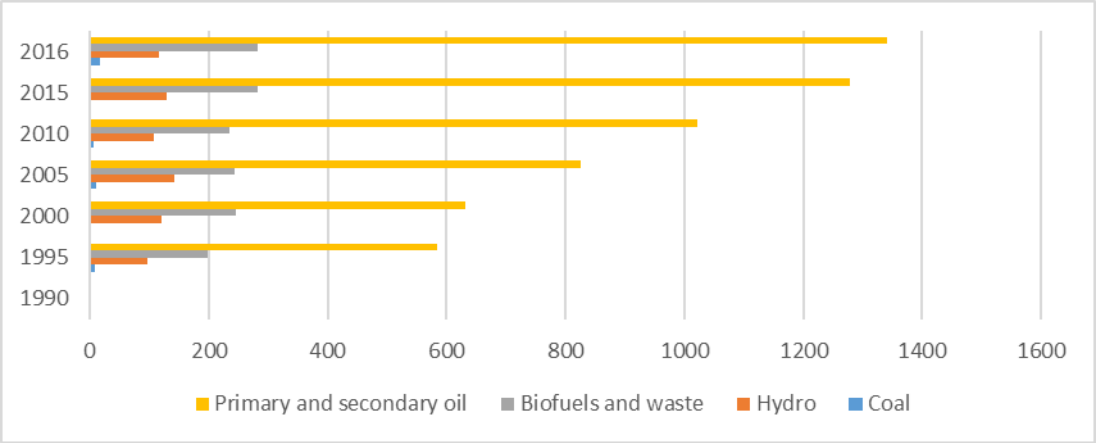

Figure 8. Total Primary Energy Supply (TPES) by source -Namibia
Source: International Energy Agency, 2018.

Figure 8 shows that similar to most of the middle-income countries in this study, biomass is also not the major source of energy supply in Namibia. The country relies majorly on oil for most of its energy needs. However, there is still a high demand for biofuels as it is the second-largest energy source in Namibia. This is because there is a significant environmental invasion from redundant wood, limited land cultivation and pasture. Therefore, the conversion of the redundant wood into biomass energy was paramount in Namibia (Renewable Energy and Energy Efficiency Partnership, 2014).

2.5. South Africa

South Africa is classified as an upper-middle-income country with a real GDP of US$419 billion in 2016, which was approximately 25% of the total GDP of the SSA region (WDI, 2017). The country has a vast supply of natural resources with well-developed financial, energy, legal, communication and transport sectors. Regarding the financial sector, the country has been ranked as one of the top 20 in the world according to the Global Competitive Index (GCI) in the 2015/2016 financial year (World Bank, 2017). The most significant sector of the economy is mining. The country also has the most developed financial and manufacturing sectors in Africa and reasonably developed agriculture, tourism and energy sectors. South Africa has the largest economy in Africa after Nigeria. However, the country ranks higher than Nigeria in per capita income and as the seventh in Africa (UNDP, 2018). Figure 9 compares the GDP growth rate trends in South Africa with SSA.

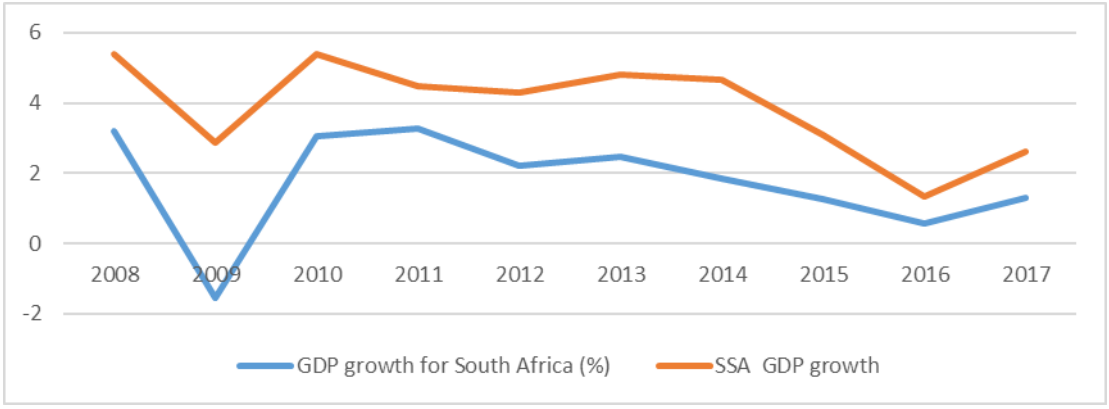

Figure 9. GDP growth comparison of South Africa and SSA
Source: WDI, 2018

Figure 9 shows that GDP growth has been declining in South Africa. After recovery from the global financial crisis that caused a major decline in growth from 5.36% in 2007 to 3.19% in 2008 and a further decline to -1.53% in 2009, the GDP growth improved to 3.04% in 2010. However, the fall in commodity prices had a negative effect on economic growth with a reduction from 2.49% in 2013 to 1.85% in 2014. It further declined to 0.57% in 2016 and 0.8% in 2018 (WDI, 2019).

The Effects of Oil Prices in South Africa

South Africa is a net oil-importing country and consumes the second-largest amount of oil products in Africa. Crude oil provides about 17% of South Africa's primary energy needs and approximately 70% of its liquid fuels are refined from crude oil, majorly consumed by the transport sector, while coal takes a chunk share of approximately 70%, used majorly for electricity generation (Ziramba, 2010). Although South Africa presently has proven oil reserves of 15 million barrels, 95% of crude oil consumption is met through imports (Pradhan and Mbohwa, 2014). An estimate of 66% of its crude oil consumption is being imported from the Middle East, Saudi Arabia and Iran, and 34% from African countries such as Angola and Nigeria (Department of Energy, 2018). South Africa is also vulnerable to oil price shocks. Higher oil prices affect its inflation-targeting policies and increase interest rates, which may be detrimental to economic growth. This is because a higher interest rate may affect investment in the real sector of the economy negatively, which is considered a significant driver of economic growth in any country. During apartheid, the South African energy policy was characterised by international boycotts and embargoes to discourage the apartheid regime (SANEA, 2003). The oil market was, therefore, controlled by requirements to secure energy supplies despite the boycotts and oil embargo. As a result, a large stock of oil was kept in coal mines that are no longer in use and in underground containers (SANEA, 2003). However, since the end of apartheid in 1994, efficient energy policy has been encouraged to achieve social equity and economic efficiency. The country strives to achieve a balance between energy demand and supply, a secured supply of energy through diversification, the efficient utilisation of energy sources and environmental preservation. The energy policy of South Africa also includes an increase in economic growth in South Africa through the sustainable availability of energy sources at affordable prices. South Africa has a limited amount of proven oil reserves and has to rely on oil imports to meets its growing oil demand. Fluctuations in oil prices, political instability in regions of major oil-producing countries and limited proven oil reserves have a significant impact on the oil imports of South Africa (Amusa, Wabiri and Chetty, 2008). Figure 10 shows the primary energy supply of South Africa by energy sources.

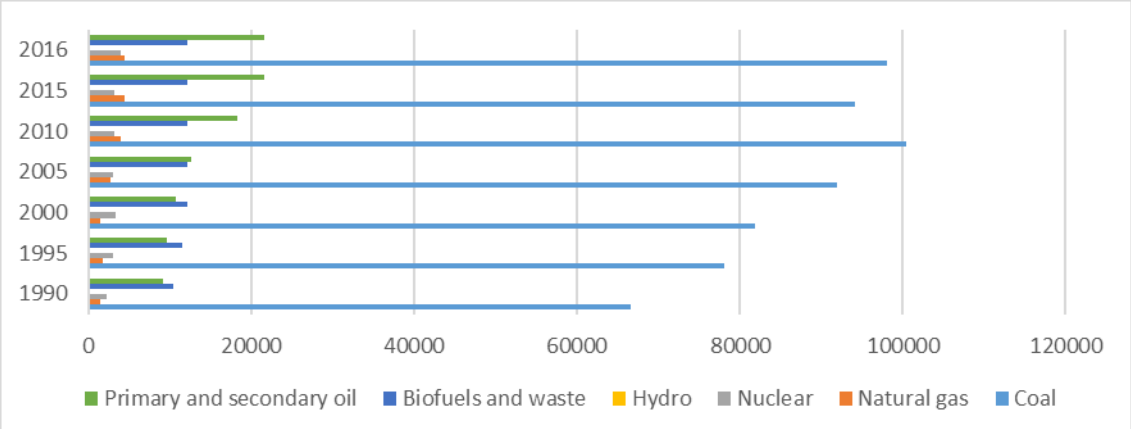

Figure 10. Total Primary Energy Supply (TPES) by source –South Africa
Source: IEA, 2018

Figure 10 shows that coal is the highest contributor to energy supply in South Africa due to the enormous coal reserve in the country. However, oil supply has been growing and serves as the second-highest contributor to energy supply. The South African economy, unlike low-income countries, uses less biomass as an energy source. Urban households rely on electricity for household cooking compared to most low-income countries in SSA that rely on firewood and charcoal forms of biomass energy. Electricity is mostly generated from coal and imported oil is used mostly in the transport, industrial and manufacturing sectors. The efficient use of oil is determined by an oil dependence ratio.

Amusa et al. (2008) stated that oil dependency in South Africa can be measured as "oil self-sufficiency", "the share of oil in energy consumption", "the share of energy in GDP" and "per capita oil consumption". The authors defined oil self-sufficiency as the oil production of a country minus consumption as a ratio of its total consumption. An index of -1 shows that a country is completely dependent on oil imports, while a positive index shows that a country is to some extent self-sufficient in oil production. The range of share of oil in total energy consumption is between 0 and 1, with 1 indicating that a country only uses oil as its energy source and zero indicating that a country does not use oil as its energy source. Even though South Africa is rich in coal use as an energy source, the country still depends on crude oil imports and consumes more oil products compared to other sources of energy, as shown in Figure 10. Therefore, South Africa is also vulnerable, similar to other SSA countries, to oil price fluctuations and supply distortions. Amusa et al. (2008) also calculated South Africa's self-sufficiency in oil and the share of oil in energy consumption. They found that South Africa ranges between 0.5 and 0.6 in oil self-sufficiency and between 0.19 and 0.21 in the share of oil in energy consumption. This means that South Africa is relatively stable in the use of crude oil. Moreover, energy intensity in South Africa was 8.699 in 2015, which is considered relatively stable when compared to other SSA countries. Energy intensity measures how much energy is used to produce a unit of economic output (WDI, 2018).

Furthermore, as economic growth increases in South Africa, oil demand also increases. This is evident in the increase in total crude oil consumption from 16.7 million tonnes in 1990 to 26.7 million tonnes and 28.8 million tonnes in 2010 and 2017, respectively (BP Statistical Review of World Energy, 2018). The country is heavily dependent on the Middle East, Angola and Nigeria for its oil imports. African countries supply approximately 48% of the crude oil requirements for South Africa (Department of Energy Annual Report, 2018). Therefore, South Africa is vulnerable to oil supply shocks from these countries. The country is the largest primary energy consumer in Africa and consumed 25% of the total oil consumption in Africa (AEO, 2019). South Africa also prides itself in the ability to generate sufficient energy for domestic and foreign capital investment. Therefore, efficient crude oil supply becomes paramount for South Africa.

3. Conclusion

This paper is an exploratory review of the dynamics of oil price and economic growth in five middle-income oil-importing countries in sub-Saharan Africa, namely Botswana, Kenya, Mauritius, Namibia and South Africa. The energy sources, as well as the effect of the oil price on economic growth, are highlighted for each country. The study found that energy sources in middle-income countries are not uniform. While Botswana has an almost equal share of oil and coal as its major energy sources, South Africa's main energy source is coal and Namibia and Mauritius mostly depend on oil for their energy needs. Kenya depends highly on biofuel for its energy needs. However, South Africa is the largest oil

importer as it also serves as an oil exporter to most of its Southern African neighbouring countries. The effect of the oil price, therefore, varies depending on the level of oil in the energy mix of individual countries. The response of an individual country to changes in the oil price differs in magnitude and direction. Hence, understanding the structure of each economy in terms of oil price dynamics and economic growth provides more insight into investigating the oil price-GDP relationship. Therefore, the effect of the oil price on economic growth and policy formulation differs due to the share of oil in the energy mix of each country. However, the oil demand is growing in Africa, as shown in the total primary energy supply by source figures for each country.

References

African Economic Outlook (2017). Ethiopia. ADB/OECD/UNDP, Cote d'Ivoire.

African Economic Outlook (2018). African Development Bank, Cote d'Ivoire.

African Economic Outlook (2019). African Development Bank, Cote d'Ivoire.

Amusa, H.; Wabiri, N. & Chetty, K. (2008). *Application of a multi-criteria integrated portfolio model for quantifying South Africa's crude oil import risk* (No. 108).

Bank of Mauritius (2018). *Annual Report*.

Bodenstein, M.; Erceg, C.J. & Guerrieri, L. (2011). Oil shocks and external adjustment. *Journal of International Economics*, 83(2), pp. 168-184.

British Petroleum (BP) (2018). *Statistical Review of World Energy*, 67th Edition.

Deaton, A. & Miller, R.I. (1995). *International commodity prices, macroeconomic performance, and politics in Sub-Saharan Africa*. Princeton, NJ: International Finance Section, Department of Economics, Princeton University.

Department of Energy Affairs (2007). *Energy Statistical Bulletin - 2007*. Gaborone: Department of Energy Affairs

Department of Energy (2018). *Annual Report*. South Africa.

Ferderer, J.P. (1996). Oil price volatility and the macroeconomy. *Journal of Macroeconomics*, 18(1), pp. 1-26.

Frankel, J. A. (2010). *Mauritius: African success story*. School of Government, Harvard University. http://web.hks.harvard.edu/publications/workingpapers/citation.aspx?PubId=7410.

Kose, M. A. & Riezman, R. (2013). Trade shocks and macroeconomic fluctuations in Africa. *International Trade Agreements and Political Economy*, pp. 369-394.

Muhanji, S. & Ojah, K. (2011). External shocks and persistence of external debt in open vulnerable economies: The case of Africa. *Economic Modelling*, 28(4), pp. 1615-1628.

Pradhan, A. & Mbohwa, C. (2014). Development of biofuels in South Africa: Challenges and opportunities. *Renewable and Sustainable Energy Reviews*, 39, pp. 1089-1100.

Renewable Energy and Energy Efficiency Partnership (2014). Namibia. https://www.reeep.org/namibia-2014.

Sacerdoti, E. G.; El-Masry, P. K. & Yao, Y. (2005). *Mauritius: Challenges of sustained growth*. Washington, DC: International Monetary Fund.

Subramanian, A. & Roy, D. (2003). Who can explain the Mauritian Miracle: Meade, Romer, Sachs or Rodrik. In D. Rodrik (Ed.). *Search of prosperity*. Princeton: Princeton University Press.

Tang, V.; Shaw. T & Holden, M (2019) *Development and Sustainable Growth of Mauritius: Contemporary African Political economy*. Palgrave Macmillan. Switzerland.

UNDP (2012). *Energy Policy Brief*: Reflecting on the Challenges of Attaining a Green Economy for Botswana.

UNDP (2018). *Human Development Index and its components*. www.hdr.undp.org/en/composite/HDI.

WEO (2016). *World Economic Outlook Biomass database*. International Monetary Fund.

WDI (2008). *World Development Indicators*. World Bank.

WDI (2017). *World Development Indicators*. World Bank.

WDI (2018). *World Development Indicators*. World Bank.

World Bank (2017). *Doing Business 2017*. Washington, DC: The World Bank.

Ziramba, E. (2010). Price and income elasticities of crude oil import demand in South Africa: A cointegration analysis. *Energy Policy*, 38(12), pp. 7844-7849.