PMRC
Policy Monitoring and Research Centre

UNDERSTANDING THE IMPACT OF OIL PRICES

ON ECONOMIC GROWTH IN ZAMBIA

Energy Working Paper No. 1

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Abbreviations

ADF	Augmented Dickey Fuller
AIC	Akaike Information Criterion
ARDL	Autoregressive Distributed Lag
BCOP	Brent Crude Oil Prices
BP	British Petroleum
ECM	Error Correction Model
EG	Economic Growth
ERB	Energy Regulation Board
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
IR	Inflation Rate
MENA	Middle East and North Africa
OECD	Organisation for Economic Co-operation and Development
OLS	Ordinary Least Squares
RIR	Real Interest Rates
TAZAMA	Tanzania Zambia Mafuta
VAR	Vector Autoregression
ZDA	Zambia Development Agency

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Executive Summary

The study assessed the impact of oil prices on economic growth in Zambia using time series data from 1990 to 2020. The variables used in the study included; Foreign Direct Investment (FDI) and Real Interest Rate (RIR) from the World Bank Indicators and Knoema, Brent crude oil and inflation rate from British Petroleum (BP) and Bank of Zambia and macro-trends respectively. Augmented Dickey-Fuller (ADF) was used to determine the stationarity of variables. The bounds test for Co-integration was conducted whilst the model was estimated using Autoregressive Distributed Lag (ARDL) approach supported by the relevant post-estimation diagnostic tests. The estimated model revealed that, on average, there is a negative insignificant relationship between oil prices and economic growth in the long run. This entails that although oil prices are negatively related to economic growth, it does not affect economic growth outcomes in Zambia in the long run.

The estimated model also revealed that, on average, a 1% rise in FDI positively impacts economic growth by 3.82%, while inflation rate and real interest rate are negatively related to economic growth but have an insignificant impact in Zambia in the long run. Post-estimation diagnostic tests indicate that the model was stable and had no omitted variables.

1.0 Introduction

The Energy sector is a critical driver of sustainable economic growth. Zambia is predominantly self-sufficient in its energy sources except for petroleum products (ZDA, 2013). According to a report by the Lusaka Times (2021), the Minister of Energy then, Honourable Mathew Nkhuwa, stated that the country imports all its petroleum products and spends about US$1.2 billion annually to meet its national consumption. As a net importer, Zambia is a price taker and thus, vulnerable to oil price fluctuations. Generally, theoretical literature records indicate that the impact of oil price fluctuations on economic growth depends on a country's sectoral composition, institutional structures, and macroeconomic policies.

US$1.2 BILLION
spent on Petroleum Products annually by Zambian Government

According to Vitor et al. (2018), employed descriptive statistics, Unit root test, Johansen cointegration test and Granger causality test to analyse the data and the results of the study revealed that there exists an inverse relationship between oil price change and economic growth in Ghana. However, the effect of oil price change on economic growth was statistically insignificant in the long run.

Jimenez-Rodrigues and Sanchez (2004) examined the impact of oil price shocks on economic growth in Organisation for Economic Co-operation and Development (OECD) nations. Employing Vector Autoregression (VAR) and Granger causality analyses, it was established that the relationship between oil price shocks and macroeconomic variables were significant. They anticipated different findings from net oil import-dependent and net oil exporter countries on the assumption that oil price changes affect net oil importing countries' real economic activities twofold. Firstly, a reduction in oil prices tends to positively influence the balance of payment and terms of trade. Secondly, an increase in oil tends to affect a steep

decline in income. On the demand side and supply side effect front, a decline in oil prices results in high disposable income. Consequently it raises the demand for other products, particularly products with high-income elasticity. From the supply side effect, because oil is among the prime inputs of production, a price rise in it translates into higher costs of production and thus, higher prices of commodities and constricted growth. Similarly, the opposite is also true for net oil exporting countries. As anticipated, according to linear and non-linear models, the findings reviewed that most oil-importing countries' economic growth (output) was negatively affected by an increase in oil prices.

Tweneboah and Adam (2008) employed a vector error correction model to investigate the long and short-run links between global crude oil prices and Ghanaian 25 monetary policy. According to their findings, a long-run relationship exists between oil price, domestic price level, GDP, exchange rate, and interest rate. Further, they concluded that oil price has a positive effect on price level but a negative impact on output. Similarly, Canta (2014) also found that oil price fluctuations had a negative impact on economic growth both in the long run and in the short term in Ghana.

In the Middle East and North Africa (MENA) region, Simohammed et al. (2015) investigated the impact of oil prices on various macroeconomic variables, including economic growth rate. Employing a panel Autoregressive Distributed Lag (ARDL) model, the results suggested that a short-run relationship exists between oil prices and economic growth.

A different approach in the form of a Vector Autoregressive (VAR) model was also used in 16 MENA countries to explore the effects of oil prices on output (Berument et al. 2010). The results revealed that oil prices had a positive but statistically insignificant relationship.

Aliyu (2009) explored the effect of oil prices on real macroeconomic variables in Nigeria using both linear and non-linear models. The results indicated a non-symmetric relationship between oil prices and real GDP, with an increase in oil prices having a huge impact compared to the effect of a decrease in the oil prices on real GDP.

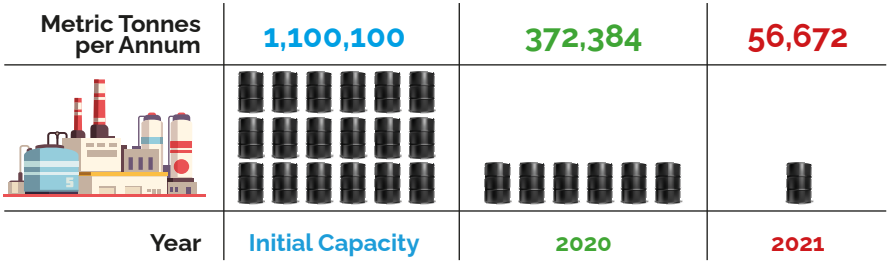
Frimpong and Oteng-Abayie (2010) investigated the effect of inflation on economic growth in Ghana for the period 1960 to 2008. They found a statistically insignificant relationship between the two variables. On the other hand, Nell (2000) used the Vector Autoregressive (VAR) technique to examine whether inflation was detrimental to economic growth or not. Similarly time series data from 1960 to 1999 was used and results suggested that single-digit and double-digit inflation may be beneficial to and limit economic growth, respectively.

According to Zhang (2001), economic growth emanates from FDI because it highly improves the skills of workers and in addition, brings together the know-how in production and management methods. Similarly, other studies have also shown a complementary relationship between FDI and human capital on the host country's economic growth. For instance, a study by Borensztein et al. (1998) found a positive link between the basic skill of workers and infrastructure development.

A study by D'Adda and Scorcu (1997) found a negative relationship between real rates of return and economic growth for 20 industrialised countries by using average interest rates on long-term government bonds for the period 1965 – 1994. Orr et al. (1995) reported a significant positive correlation between the rate of return on physical capital and inflation rates. In their study titled 'The Determinant of Real Long-term Interest Rates', they used real interest rates and panel data for 17 countries.

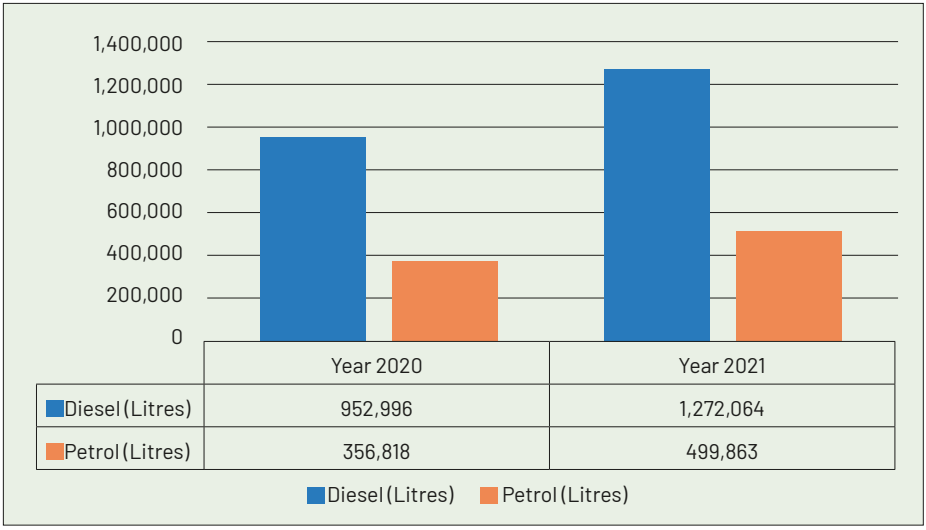
1.1 Background to Petroleum Sector Transition

Before the suspension of oil refinery operations in Zambia, a large stock of Crude Oil was imported into the country through the Tanzania Zambia Mafuta (TAZAMA) pipeline and refined at the Indeni Oil Refinery. The refined products were then offloaded at the Ndola Oil Terminal, where Oil Marketing companies distributed them to retailers and commercial customers for monetary gains.



At full capacity, the Indeni oil refinery was designed with a throughput of 1.1 million metric tonnes (MT) per annum. However, over the years, wear and tear, as well as design constraints, limited the plant's operations to 850, 000 MT per annum. In 2020, the plant's rate of production decreased to 372,384 MT per annum before decreasing further to 56,672 MT per annum in 2021 against 1.2 to 1.3 MT per annum national demand. Riding on these inefficiencies, the Government embarked on an ambitious economic recovery plan which included restructuring the petroleum subsector. Among other measures, a 100 percent importation of finished petroleum products was proposed. Consequently, operations at the Indeni oil refinery plant were suspended and placed under care and maintenance (ERB report, 2021).

Figure 1: Importation of Finished Petroleum (2020-2021



Source: *Authors' own Compilation from Energy Regulation Board (ERB) Statistics*

Nevertheless, over the last decades, global oil prices have been fluctuating, causing uncertainties in most import-dependent countries, inclusive of Zambia. Major shifts in oil prices can be traced when Iran cut its production levels and terminated contracts with US companies raising oil prices from $13 per barrel to $34 between 1979 and 1980. The next major shock came in 1990 following the Kuwait invasion by Iraq. The United Nations enforced a ban on trade with Iraq and Kuwait, which increased oil prices from $15 per barrel in July 1990 to $42 in October. During this period, the Zambian economy decelerated from a growth rate of 6.8% in 1988 to -0.48% in 1990 (Macrotrends, 1990-2020).

Other disruptive shocks occurred in 2005-2008 and 2010-2014. The former was due to the economic growth in China and India, which increased demand for oil, while the latter was generated by the impacts of Arab Spring pro-democracy protests in the Middle East and North Africa, combined with conflict in Iraq and international sanctions that Western nations placed on Iran to slow its nuclear weapons program. Together, these events pushed oil prices above $100 per barrel for four years. Similarly, during this period, the Zambian economy transitioned from a growth rate of 7.42% in 2005 to 7.7 % in 2008, while in 2010, it declined from a growth rate of 10.30% to 4.70% in 2014 (Macrotrends, 1990-2020).

The most recent shocks occurred during the peak of the global COVID-19 pandemic and the Russia-Ukraine war. The former inculcated a combination of falling demand, rising supply, and diminishing storage space which resulted in the price of crude oil failing to record lows. For instance, daily oil prices for the international benchmark Brent crude declined below $23 a barrel, the lowest since November 2002, while the American benchmark West Texas Intermediate (WTI) dropped to negative $40 a barrel. The latter include sanctions by Western countries on Russia which is the third largest oil producer and counter-sanctions by Russia, which hampered global supply, causing prices to skyrocket. In March 2022, the oil price on the international market reached a 14-year high to trade at around $135 a barrel. During this period, the economy of Zambia declined from a 4.4% growth rate in 2018 to 1.44% in 2019 before sliding into a recession (-2.79%) in 2020 and later rebounding to a 3.75% positive growth rate in 2021 (Macrotrends, 1990-2020).

1.2 Objectives of the Study

Specifically, the study aimed at achieving the following objectives:

	To determine the impact of oil prices on economic growth in Zambia.
	To establish the relationship between oil prices and GDP growth rate in Zambia.
	To assess the effect of the inflation rate on economic growth in Zambia.
	To examine the relationship between Foreign Direct Investment and economic growth in Zambia
	To determine the effect of Real Interest Rate on economic growth in Zambia.

2.0 Methodology

This section describes the research methodology used in the analysis. It presents the steps through which data collection methodology, measurement of variables, as well as estimation of the model was carried out.

2.1 Data Collection and Sample Size

Annual time series data for the period 1990 to 2020 from the Bank of Zambia, British Petroleum, World Bank, Knoema, Zambia Statistics Agency and Macrotrends was used in the analysis. The higher the sample size, the more accurate results are because sample statistics come closer to the actual population parameter (Bhattacheerjee, 2012), and a total of 31 observations used in this analysis were commendable to yield desired statistical inferences.

Table 1: Description of Variables

Variable	Description	Proxy
EG	Economic Growth	GDP growth rate
BCOP	Brent Crude Oil Prices	Crude oil prices from British Petroleum
FDI	Foreign Direct Investment	FDI net inflows
IR	Inflation rate	Consumer Price Index
RIR	Real Interest Rate	Nominal interest rate adjusted for the rate of inflation

2.2 Empirical Model Specification

The first step in conducting this analysis was to determine the stationarity of the variables used. Based on the results of the augmented dickey-fuller test, it was decided that the analysis would employ Autoregressive Distributed Lag (ARDL) to estimate the impact of world oil prices on economic growth in Zambia. Given the function below;

$$EGt = f\ (OPt \dots\dots\dots\dots\dots\dots, X) \qquad (1)$$

Where Economic Growth (EG) at time t is a function of oil prices and other factors affecting economic growth represented by X. Fitting the variables used in the analysis into the function above leads to the following equation.

$$EGt = \alpha_0 + \alpha_1 BCOPt + \alpha_2 FDIt + \alpha_3 IRt + \alpha_4 RIRt + \varepsilon_t \qquad (2)$$

In order to estimate equation 2, the function is linearized using log-linear functional form, as stated below.

$$lnEGt = \beta_1 + \beta_2 lnBCOPt + \beta_3 ln\mathrm{FDIt} + \beta_4 ln\mathrm{IR} + \beta_5 ln\mathrm{RIR} + \mu_t$$

where t (t=1, 2.....,T) denotes time period.

EGt – Economic Growth at time t

$BCOPt$ – Brent Crude Oil Prices at time t

$FDIt$ – Foreign Direct Investment at time t

IRt – Inflation Rate at time t

$RIRt$ – Real Interest Rate at time t

$\beta 1$ – intercept term

$\beta 2 - \beta 5$ - Elasticity coefficients of respective variables.

μ_t - Error term

3.0 Results and Discussion

The following graphs illustrate trends in the variables used in the study from 1990 to 2020.

Figure 2: The Relationship Between Economic Growth in Zambia and Brent Crude Oil Price (1990-2020)

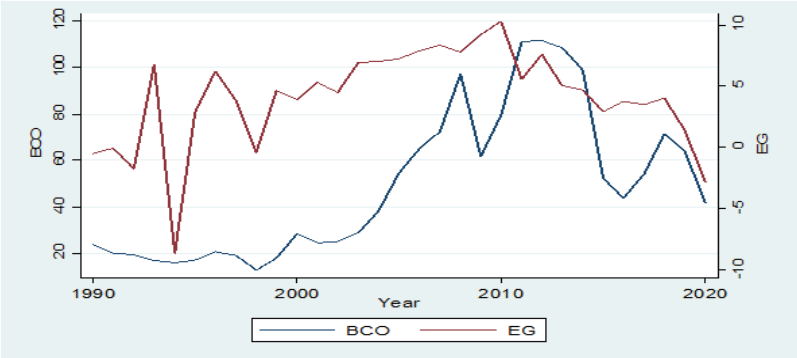


Figure 3: FDI in Zambia (1990-2020)

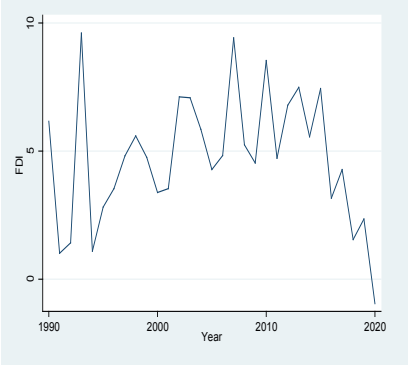


Figure 4: Inflation Rate in Zambia (1990-2020)

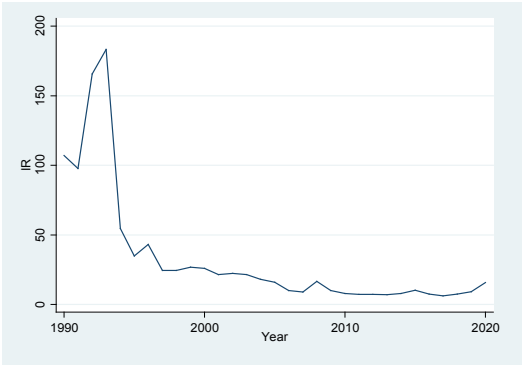


Figure 5: Real Interest Rate in Zambia (1990-2020)

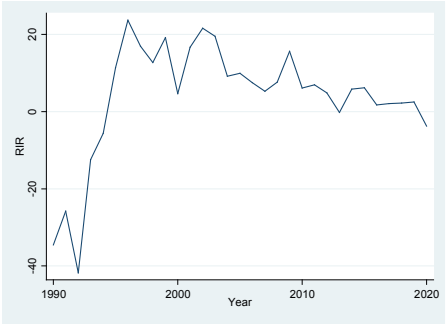
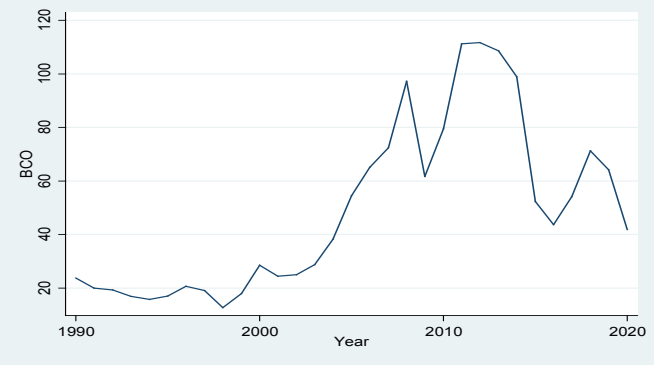


Figure 6: Economic Growth in Zambia (1990-2020)

Figure 7: Average Brent crude oil prices (1990 - 2020)



Descriptive Statistics

As alluded to in the methodology, the analysis used time series data for the period 1990 to 2020 to analyze the impact of oil prices on economic growth. The variables are rounded off to three decimal places from the initial findings as shown in table 2.

Table 2: Descriptive Statistics

Variables	Observations	Mean	Standard Deviation	Minimum	Maximum
EG	31	4.110	3.994	-8.625	10.3
BCOP	31	48.937	31.921	12.72	111.67
FDI	31	4.742	2.537	-0.954	9.605
IR	31	33.081	44.778	6.1	183.3
RIR	31	3.735	15.052	-41.790	23.670

Note: The results are taken before using Logarithm of variables.

Unit Root Test

Before applying the Autoregressive Distributed Lag (ARDL) bound test, it is important to check the unit root of each variable (Pesaran et al. 2001). Unit root helps to establish stationarity and non-stationarity or order of integration of variables used (Wooldridge, 2019). According to Gujarati and Porter (2009), based on the Ordinary Least Squares (OLS) estimation, the non-stationarity of variables could lead to spurious results and hence the need to carry out a stationarity test. To estimate the ARDL bounds test for cointegration and model, all the variables must be stationary at I(0), I(1), or both. This analysis employed the Augmented Dickey-Fuller (ADF) test to examine if variables were stationary at level or they had to be differenced to be stationary. The table below shows that economic growth and foreign direct investment are stationary at the level hence, integrated of order zero, I(0) while Brent crude oil prices, inflation rate and real interest rates are stationary at the order I(1). Economic growth is stationary at a 10% critical level with a test statistic of -3.359, while foreign direct investment is stationary at both 5% (-4.145) and 10% critical values.

Table 3: Unit Root Test

ADF Test at Level				ADF Test at First Difference			
Variables	P-Value	ADF-Statistic	Critical Value	P-Value	ADF-Statistic	Critical Value	Order of Integration
LnEG	0.0572	-3.359*	-3.228	0.0000	-10.005	-3.230	I(0)
LnBCOP	0.8603	-1.402	-3.580	0.0014	-4.529**	-3.584	I(1)
LnFDI	0.0054	- 4.145**	-3.580	0.0000	-9.087	-3.584	I(0)
LnIR	0.3994	-2.363	-3.580	0.0001	-5.110**	-3.584	I(1)
LnRIR	0.3461	-2.464	-3.580	0.0000	-6.860**	-3.584	I(1)

Note: (*) means statistically significant at 10% and (**) means statistically significant at 5%

Lag Selection Criteria

The next step taken after testing for the stationarity of variables was to select the appropriate lag order of variables. This stage is critical in preparing for the ARDL bound test for checking the existence of Co-integration among variables (Pesaran et al. 2001). In selecting the appropriate lag order, the analysis employed the optimal lag order of the Vector Autoregression (VAR) model.

Table 4: Lag Selection Criteria

Lag	LogL	LR	Df	P	FPE	AIC	HQIC	SBIC
0	-427.482	NA	NA	NA	5.6×10^{7}	32.0356	32.107	32.2756
1	-369.935	115.09	25	0.000	5.2×10^{6}	29.6248	30.053	31.0647
2	-334.515	70.84	25	0.000	3.0×10^{6}	28.853	29.6379	31.4927
3	-287.248	94.534	25	0.000	1.1×10^{6}	27.2036	28.3453	31.0431
4	-191.961	190.58*	25	0.000	33763.2 *	21.9971*	23.4944*	27.0364*

Note: LR, df, P, FPE, AIC, HQIC, and SBIC represent modified LR test statistic, degree of freedom, probability, final prediction error, Akaike information criterion, Hennan-Quinn information criterion, Swarz-Bayesian information criterion respectively and (*) represents the criterion selecting the lag order.

It can be observed in the table that the entire lag selection criteria for employing the ARDL bounds test for the cointegration model give better results at lag 4 as compared to lag 1, 2 and 3. Throughout the analysis, the Akaike Information Criterion (AIC) was used to run models such as the ARDL bounds test for cointegration and the long-run ARDL model.

Results of ARDL Bounds Test for Cointegration

The Engle-Granger, Philips-Ouliaris and Johansen tests are three of the most popular tests for cointegration. However, when dealing with small samples, the ARDL model is the most significant approach to determining cointegration. This is one of the advantages of using the ARDL bounds test over Johansen (Gujarati, 2009). ARDL bounds test is applied to confirm the presence of cointegration to detect long-run and short-run relations that exist between variables (Pesaran et al. 2001). The null hypothesis of this test is stated as follows:

H_0: no levels of relationship

The decision rule is given in two parts for this test. The first part is that accept the null hypothesis if the computed F-statistic is less than the critical value at any of 1%, 5% and 10% significant levels for the lower bound, I(0) regressors (Pesaran et al. 2001). Alternatively, reject the null hypothesis if the computed F-statistic is greater than the critical value at any of the significant levels for the upper bound, I(1) regressors and this confirms the presence of cointegration or a long-run relationship exists among the variables (Pesaran et al. 2001).

Table 5: Results of ARDL Bounds Test for Cointegration

Significance level	Critical values for the bounds test		F-statistic
	I(0)	I(1)	
1%	3.74	5.06	7.819
5%	2.86	4.01	7.819
10%	2.45	3.52	7.819

The computed F-statistic is greater than critical values for all lower-bound and upper-bound regressors. Therefore, the null hypothesis is rejected on both parts of the decision rule, confirming the presence of cointegration and conducting long-run ARDL.

Short-run and Long-run/Error correction model (ECM) results

Both short-run and long-run parameters are estimated after verifying the existence of short-run and long-run relationships between variables (Stock et al. 2018). Concerning the ECM suggested by Pesaran et al. (2001), the following ECM was estimated.

$$\Delta lnEGt = \alpha 0 + \sum^{n}_{k=1} \alpha_1 \Delta lnEG_{t-k} + \sum^{n}_{k=1} \alpha_2 \Delta lnBCO_{t-k} + \sum^{n}_{k=1} \alpha_3 \Delta lnFDI_{t-k} + \sum^{n}_{k=1} \alpha_4 \Delta lnIR_{t-k} + \sum^{n}_{k=1} \alpha_5 \Delta lnRIR_{t-k} + \Phi ECM_{t-1} + \varepsilon_t$$

Table 6: Short-run Results

Variable	Coefficient	t-statistic	Standard error	p-value
LnBCOP	0.1570175	5.64	0.0278225	0.000**
LnFDI	-1.918918	-5.36	0.3577493	0.001**
LnIR	0.1005842	3.15	0.0319664	0.014**
LnRIR	0.2718018	3.84	0.0707813	0.005**
Constant	-1.885793	-0.87	2164151	0.409
R-squared	0.9828			
Adjusted	0.9418			
R-squared	1.1167			
Root MSE	-25.281782			
Log-likelihood				

(**) means statistically significant at 5%

In the short-run, a 1% rise in Brent crude oil prices will lead to a 0.16% increase in economic growth on average. Inflation and real exchange rates will lead to 0.10% and 0.27% increase in economic growth, given a 1% increase on average, respectively. Foreign direct investment, on the other hand, has a negative effect on economic growth on average in the short run.

Long-run (Error Correction Model) Results

After discovering the presence of cointegration in the model, the Error Correction Model (ECM) was used to correct the cointegration that was present in the model. According to Levendis (2018), the error correction term shows the speed of adjustment from short-run to long-run (speed of adjustment in long-run equilibrium after short-run shocks).

Table 7: Long-run (Error Correction Model) Results

Variables	Coefficient	Standard error	t-statistic	p-value
LnBCOP	-0.1398294	0.1049403	-1.33	0.219
LnFDI	3.823366	1.671921	2.29	0.052*
LnIR	-0.130067	0.089126	-1.46	0.183
LnRIR	-0.222734	0.2540277	-0.88	0.406
ECM (-1)	-0.5874584	0.2716238	-2.16	0.063*

(*) means statistically significant at 10%

The ECM) is valid because the error correction term is negative, less than 1 and statistically significant at 10% (Levendis, 2018). The adjustment coefficient of -0.5874584 suggests that the rate of correction of short-run disequilibrium in the long-run is 0.59% or any deviation from the short-run equilibrium between variables and economic growth can be adjusted and recovered each year at 0.59% in the long run (Martin et al. 2012). A negative relationship between economic growth and crude oil prices, in the long run, was discovered, although it was not statistically significant. This entails that although crude oil plays a key role in Zambia, it doesn't influence economic outcomes in the long run. Therefore, an increase in the price of crude oil will result in a reduction in economic growth in Zambia. On one hand, a rise in both inflation and real interest rates has a negative insignificant impact on the economy of Zambia in the long run. On the other hand, foreign direct investment has a positive significant impact on Zambia's economy. As FDI and technological transfer increase from outside the country to Zambia, the economy grows.

Diagnostic Tests

Post-estimation diagnostics are important to verify how authentic results are (Wooldridge, 2015). This analysis used the Cumulative Sum of the Squares of Recursive Residuals (CUSUMQ) for Stability, Variance Inflation Factor (VIF) for Multicollinearity, Breusch-Pagan for Heteroscedasticity, Breusch-Godfrey LM test for Autocorrelation and Ramsey RESET test for omitted variables.

Table 8: Diagnostic Tests

Diagnostic	Test	t-statistic	p-value
Autocorrelation	Breusch-Godfrey	= 1.491	0.2220
Heteroscedasticity	Breusch-Pagan	=0.14	0.7056
Model specification	Ramsey RESET	F (3,5) = 0.55	0.6704
Multicollinearity	Mean VIF	VIF-15.21	

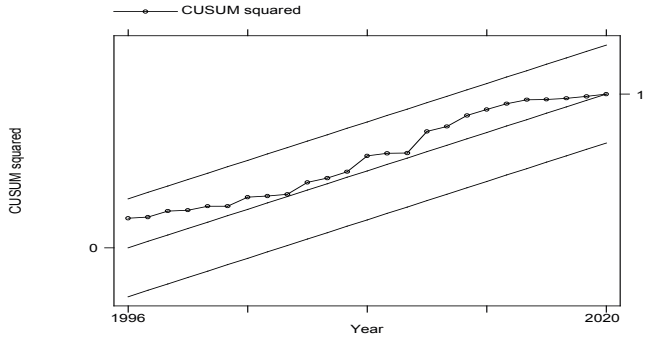
Note: A Durbin-Watson d-statistic of 2.31 was obtained, indicating a negative auto-correlation

The model had no omitted variables because the probability value of 0.6704 was greater than the 5% critical value. Breusch-Godfrey test confirmed the absence of autocorrelation with a P-value of 0.2220 and heteroscedasticity was absent as well from the model. The model, however, suffered from multicollinearity with a mean VIF of 15.21

Model Stability

The results of the CUSUMQ test for model stability also indicated that the model was stable, as shown below.

Figure 8: Model Stability



The plot is within the confidence interval critical bands and hence the model is stable.

Policy Recommendations

Given the established insignificant negative relationship between oil prices and economic growth in Zambia, the following are some of the policy recommendations proposed to stabilise prices for petroleum products.

- PMRC urges the Government to continue pursuing measures aimed at reducing the fuel import bill and price fluctuation vulnerability through the incorporation of biofuels and coal-conversion technologies, for instance, ethanol production for blending with petrol.

- Cassava being a prima input in ethanol production, the Government is urged to address issues of low cassava productivity through extending special extension services to farmers on sustainable cassava production, including planting techniques, fertilizer application, and pest and disease management.

- Before operationalization of the ethanol blending productions at the Indeni Oil refinery, PMRC urges the Government to adhere to international benchmark standards of safety, reliability, security, efficiency and the acceptable environmental and social impacts of energy production, transportation, distribution, supply and use.

- The Government is urged to implement a deliberate policy on the transportation of petroleum products which should include Oil marketing companies allocating a certain percentage of the total petroleum carriage to railway transportation. This will be necessary for reducing the wear and tear of public roads, which has culminated in additional costs for the state.

- With the conversion of the TAZAMA pipeline into a finished petroleum product carrier, PMRC urges the Government to establish and implement sensitive but firm strategies to deal with theft and vandalism of infrastructure to minimise losses.

- A stable macroeconomic environment is a strong base for scaled-up economic growth. Therefore, PMRC urges the Government to remain versatile in handling of macro fundamentals such as inflation, and interest rates among others.

- Strategic oil reserves play a crucial role in oil market dynamics. While notable progress has been made in the construction of Government-owned fuel depots, particularly in Lusaka and Chipata, it has not tallied to levels that can insulate the country in times of acute supply dynamics as observed during the oil shocks engineered by the Russia-Ukraine conflict. PMRC, therefore, urges the Government to expedite the construction of oil depots around the country.

Conclusion

The main objective of this study was to determine the impact of oil prices on economic growth in Zambia. The study utilized annual-time series data for the period of 1990 to 2020. Post-estimation tests were carried out for all variables that were satisfied except the model that suffered from multicollinearity with a VIF of more than 10. The Stationarity Test was also conducted using the Augmented Dickey-Fuller test and the model employed in this study was the Autoregressive Distributed Lag (ARDL) estimation technique. Unit Root Test results suggested that economic growth and foreign direct investment are integrated of order zero, I(0) whereas oil prices, inflation and real interest rates are integrated of one, I(1). The results of the ARDL model revealed that oil prices are negatively related to economic growth but does not influence economic outcomes in Zambia in the long run. Oteng-Abayie (2010), found similar results in their study of oil prices influence on economic growth in Ghana.

ARDL bounds test for the Co-integration technique was used to examine level relationships (Long-run relationships among variables). The results of the Co-integration test showed that over the period 1990 to 2020, Co-integration existed. Hence, an Error Correction Model (ECM) was conducted to correct the disequilibrium that was present. It was discovered that oil prices have a negative impact on economic growth in Zambia. Results of the CUSUMQ Test stability and Ramsey RESET confirmed the stability of the model and no omission of variables in the model, respectively.

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