CRUDE OIL'S EFFECT ON SOUTH SUDAN'S ECONOMY (1990-2020)

BY

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THIS RESEARCH PROJECT IS SUBMITTED TO THE DEPARTMENT OF ECONOMICS AND DEVELOPMENT STUDIES IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE AWARD OF THE DEGREE OF MASTER OF ARTS IN ECONOMICS OF THE UNIVERSITY OF NAIROBI

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DECLARATION

Without lifting from the works of others, I wrote this research paper, and do confirm that no part of it has been submitted elsewhere for the award of degree.

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As the University supervisor, I have approved this submitted research for examination.

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DEDICATION

I bestow this study to my father, ABRAHAM DHIEU CHOL MAJOK, and mother, REV. DARUKA ABUK THON MAYEN, my wife, ELIZABETH NYANLANG DENG LUAL, and my siblings for their unconditional love. They have been very inspirational and the epitome of hope in my life and gave me the courage and determination to come this far.

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ABBREVIATIONS

GDP: Growth Domestic Product.

SSP: South Sudanese Pounds.

IDA: Industrial Development Authority.

FDC: Finance and Development Commission.

OPEC: Organization of the Petroleum Exporting Countries.

BoSS: Bank of South Sudan.

BP: British Petroleum.

MTOE: Millions of Tons

FOB: Free on Board.

VAR: Vector Autoregressive.

ARDL: Autoregressive Distributed.

P-value: Probability Value.

VIF: Variance Inflation Factors.

ADF: Augmented Dickey–Fuller test

VECM: Vector Error Correlation Model.

VAR: Vector Autoregressive.

NBS: National Bureau of Statistics

DEFINITION OF TERMS

Gross Domestic Product means the measurement of a national economic performance and action within a year.

Gross National Product GNP refers to the economic measure rummage-sale to weigh a country's growth.

Inflation refers to the deterioration of buying power of a given currency over time, leading to an increase in the cost of living.

Security refers to a financial asset that has economic value that can be purchased, sold, or traded.

Fiscal Policy refers to the situation where governments spends and taxes the country's economic performance and on us as individuals.

Law of Supply and Demand is a theory which enlighten the interactions between the sellers and buyers over the exchange of goods, service, or resource.

Free Market is a commercial term used when there is less or no government interference.

ABSTRACT

This research was preoccupied with crude oil's effect on South Sudan's economy, both in the long- and the immediate term. That is, it analyzed crude oil's effect on growth. The ARDL model, an advanced data analysis tool that uses the diagnostic tests of Dickey-Fuller (ADF), Johansen test of integration, VAR, and VECM, has been used in this study. According to the study's findings, the non-oil sector contributed 12.35% of the GDP growth rate, while crude oil generated 63.55% of it. The GDP growth rate had been adversely affected by the annual inflationary rate and official exchange rates by 11.95% and 1.64%, respectively. International trade made for 1.89% of the GDP growth rate. While other factors like as corruption, conflict, and illiteracy have also prevented the GDP from growing by 3.17%. The study's conclusions are consistent with the literature, which claims that over 98.1% of South Sudan's national revenues and 99.8% of its total exports come from crude oil. By keeping a closer eye on citizens' wellbeing over time using historical data, the policy implications for crude oil offer knowledge for decision-makers, scholars, researchers, partners, and investors in solving business problems that influence the economy's health.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Research

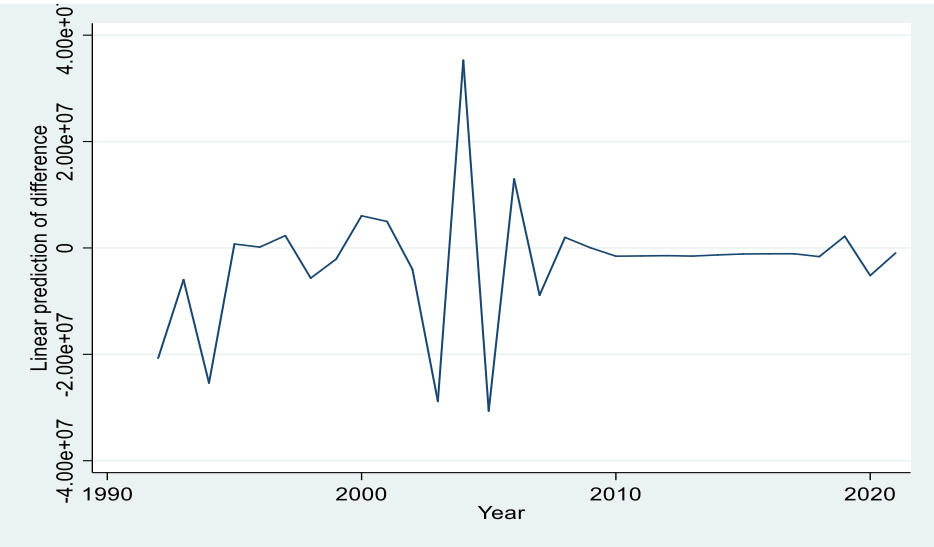
Fuels like gasoline, diesel, and kerosene produced from crude oil are utilized both domestically and for commercial purposes. South Sudan has an abundance of crude oil, which accounts for 99.8% of exports and 98.1% of profits (Toro Nishiuchi, 2013). However, because crude oil is a finite resource, the country's sustainable economic development is still in peril given the chance that oil resources would run out by 2040. (Toro Nishiuchi, 2013). Due to the excessive budgeted expenditures on military equipment and machinery during the civil wars, South Sudan is in financial crisis. The nation depends solely on the price of one commodity, crude oil. When prices increase, the nation benefits greatly, but when they decline, its income decreases. Venezuela's economy collapsed due to the same factor despite having a variety of tourist-drawing natural resources (Opaluwa, 2011).

It is an unavoidable fact that during times of war, nations spend a disproportionate amount of their budgets on war-related costs and neglect other crucial initiatives such as trade, industrialization, and investments in the financial markets. The worse aspect of this circumstance was how divided the South Sudanese were after achieving their independence in 2011 (Umeh, 2012)! South Sudan trades with China, Malaysia and Egypt and it has a huge challenge of being a landlocked country, and it depends on Sudan's port when exporting its crude oil through a pipeline that runs through refineries to Port Sudan at the Red Sea where the shipping facilities are situated. And South Sudan's economy remained connected to Sudan's, thanks to the existing oil infrastructure (Tiede, 2013).

1.1.1 Percentage of crude oil in GDP for Sudan and South Sudan

Crude oil extraction began in the 1980s in the then-Sudan, although it has occasionally been hampered by the protracted civil wars that have raged for decades (NBS, 2017). The percentage of crude oil produced in South Sudan and Sudan from 1990 to 2020 is shown below.

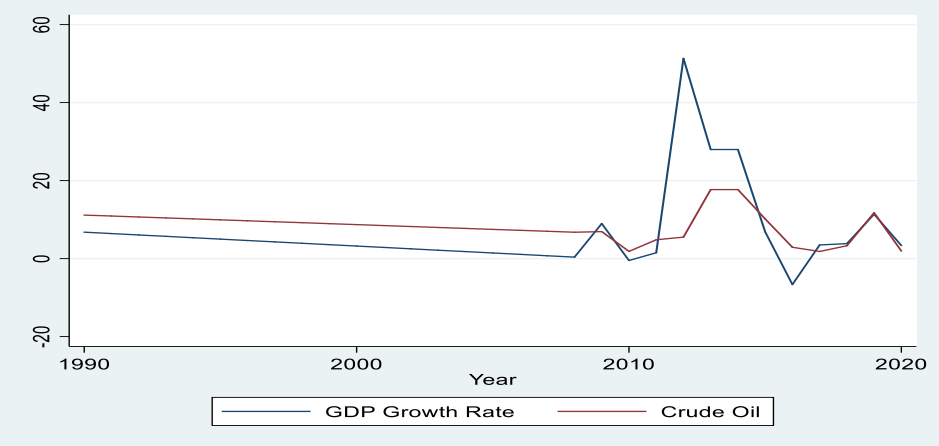
Figure 1: The trend of crude oil in GDP for Sudan and South Sudan



Source: National Bureau of Statistics (NBS)

Figure 1.1 above, the value added from crude oil sectors is seen to be on an increasing trend over the study period from 1990 to 2020.

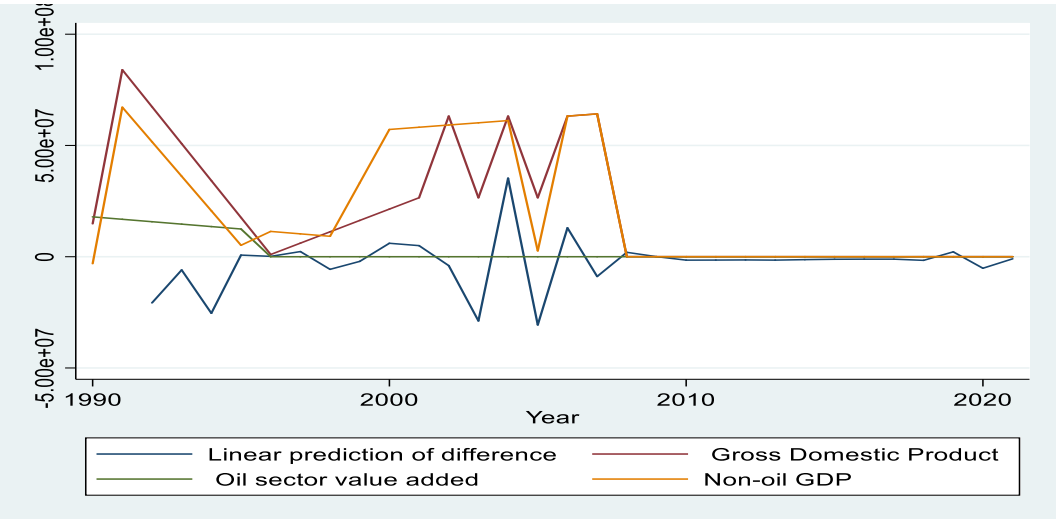
Figure 2:GDP Growth Rate and Crude Oil in Sudan and South Sudan



Source: Bank of South Sudan (BoSS)

Over the period 1990-2020, the oil sector-to-Growth Domestic Product (GDP) ratio and economic growth in South Sudan moved in tandem. GDP growth declined before picking up in 2016 and declining in 2019, Oil-to-GDP ratio remained stable over the period 2014 to 2020

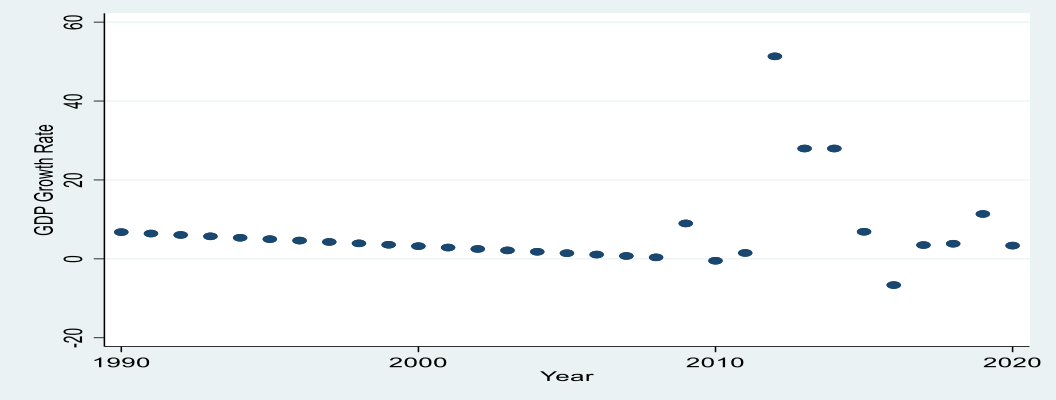
Figure 3:Two Way line Prediction



Source: Bank of South Sudan (BoSS)

Because of the political unrest that has impeded the production of crude oil in Sudan and South Sudan, forecasts for GDP, oil revenues, and non-oil revenues have been inconsistent from 1990 to 2005.

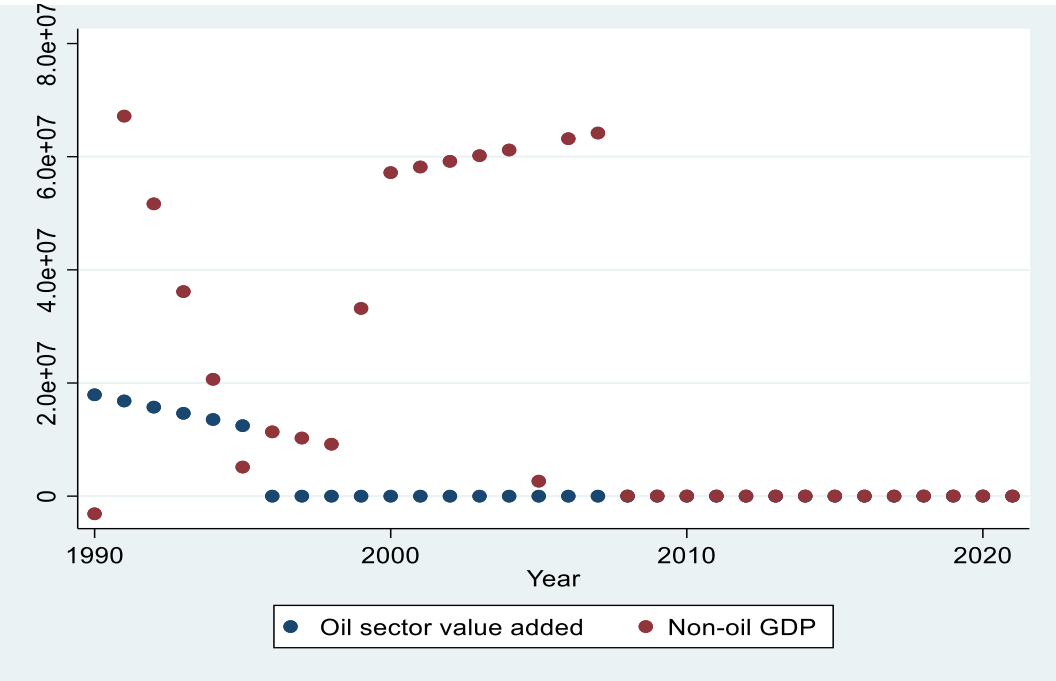
Figure 4:Two ways scatter Plot for oil



Source: Bank of South Sudan (BoSS)

Due to the destruction of the oil facilities in Rupkona and Thar-Jiath in the 1990s and 2000s, the value added for the oil sector drastically decreased.

Figure 5:Two Ways Scatter for Core GDP Components



Source: Bank of South Sudan (BoSS)

Conflict and other factors derailed the stability of non-oil and oil GDP in South Sudan.

1.2 Statement of the Problem

South Sudan has a plenty of crude oil, but only foreign oil companies with the backing of the ruling class are exploring it. South Sudan has a sectoral economy since crude oil accounts for 98% of its budgets and 99% of its revenues. Agriculture, services, manufacturing, and trade are all development sectors, but none of them have undergone diversification. The residents' condition of living is also appalling.

1.3 Research Questions

i. To what extent is South Sudan's economy shaped by crude oil?

ii. Are there oil-growth dynamics in the long- and short-run?

1.4 General objective

i. The general objective of this research was to analyze crude oil's effect on South Sudan's economy.

1.5 Specific objectives

i. To analyze crude oil's effect on South Sudan's growth.

ii. To analyze oil-growth dynamics in the near and the far term in South Sudan, and

iii. To suggest policy recommendations.

1.6 Significance of the Research

This research was inevitable since it firmly established the facts on how crude oil affects South Sudan's economic development. The research analyzed the dynamics of growth and oil in the short- and the long-run in South Sudan. And the information will be useful for solving business problems for decision-makers in government, academia, research, partners, and investors.

1.7 Organization of the Research

The chapters that follow capture the literature which comes after this introductory chapter. The third chapter examines the theoretical framework, empirical framework, model definition, term definition, variable definition, and diagnostic tests. The analysis and results are examined in the fourth chapter while the summary, conclusion, and suggestions are captured in the fifth chapter.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

Here, the theoretical and empirical literature are carefully analyzed, followed by an overview. The chapter builds on the empirical and theoretical frameworks on the outcome of crude oil's effect on South Sudan's economy. Moreover, the literature aims to find out what other factor boost the economic growth in South Sudan.

2.1 Theoretical Literature

This study's theoretical foundation is derived from the classical theory of production, which considers output level as arising from land, labor, capital, and technological advancement given a pool of entrepreneurial abilities (Karl, 1997). Corruption spreads from the oil production phase to government civil workers based on hidden name bonuses that contribute to the oil curse. (Bernanke et al., 1997) defined revenue channels as systematic and expected reactions by monetary authorities to crude oil price shocks, which tend to exacerbate recessionary pressures in the economy and, as a result, induce recessions that might be averted at higher inflation costs by holding interest rates constant.

Such an increase in values lowers administrative provision curriculum, which benefits agricultural revenue (Hanson et al., 1993). South Sudan has a large agricultural area rich for agriculture if nourishment may reduce the country's over-reliance on challenging oversight business as it will boost exporting and stabilize the accounts. South Sudan has a large agricultural field that is wealthy for agriculture if nutrition can alleviate the country's over-reliance on challenging oversight business by increasing liquor exporting and stabilizing the accounts.

This research is drawn from the classical production theory whereby aggregate output arises from land, labor, capital, and technical progress given the pool of entrepreneurial abilities (Karl, 1997). Punitive corruption cannot, however, be ignored since it soils production activities while rendering quality service delivery a pipe dream in South Sudan. (Bernanke et al., 1997) portrayed revenue channels as systematic and expected reactions by monetary authorities to crude oil price shocks that tend to raise recessionary pressures in the economy and, therefore, produce recessions that might be averted at greater costs of inflation by maintaining the interest rate constant. Such an expansion in values lower administration provision curricula, helpful effect on farm income. South Sudan has a bulky agricultural land rich for agriculture if nourishment can ease the country's over-reliance on difficult overview business as it will booze exportation and stabilize the accounts

The neoclassical growth model produced output functions using labor and capital as inputs (Williams, 2011). The theoretical backdrop for this study is the production function, which argues that total output arises from land, labor, capital, and technological innovation given a pool of commercial capacity. The study's key result is that states participate in activities when the perceived and actual net benefits surpass the drawbacks of not doing so. As a result, a country will extract and export oil if the net benefits outweigh the costs. As a result, a country can accumulate a certain amount of oil resources even if doing so exposes other economic sectors. Because of uncontrolled oil production and exports, one common illustration of the "Dutch plague" is the rise of the oil sector at the expense of other businesses such as manufacturing and agriculture. A country like South Sudan risks seeing aggregate demand collapse, consumer sector deflator rise, and actual revenue shrink. These constraints, along with the lack of an effective cost-benefit supernumerary, necessitated this investigation to investigate if the prevalent notion, as stated by Hamilton in 1983, that variances in the oil sector had a different influence on a net benefit, was correct.

This Theory holds that internal influences, rather than external ones, drive growth. Even if every country has issues, and periods of conflict or hardship are typical, a stable party-political organization is one that can weather these events while producing significant societal dissatisfaction and preserving the stability of these conditions. The effectiveness of a party-political system to handle a crisis is determined by how a select few respond to calamities (Manera, 2008). People must be happy with how their leaders address issues and the answers they provide to prevent the erasure of orders and administrative organizations/interventions. Political conti-nuity failure is associated with rebellions, aggression, and public viciousness (Sala-i-Martin, 2003).

The classical theory is based on self-adjusting, laissez-faire economics. Classical economists believe that market forces such as supply, and demand continuously steer and control the economy in order to reach natural equilibrium. Investigators have connected crude oil market volatility to energy security and recognized it as a danger to a stable energy supply (Naveed, 2010). In comparison to other energy categories, oil is the principal energy source that is depleted the most. Crude oil is also required for the development of other energy sources such as geothermal and hydroelectric power. Consequently, an expansive oil sector chokes the expansion of other sectors, and hence limits output potential (Pundo, et al 2012).

According to the study, the crude oil industry revolution impacts all nations, but to varied degrees based on their level of development. Developed, undeveloped, and transition nations all have an impact on developing countries. Another idea that relates the oil sector to inflation is the long run and short run inflation theory, which originated in Bernanke's works (Gertler at al 1997). According to the theory, the relationship between monetary policy and inflation is not constant.

In light of these circumstances, as well as the lack of a genuine cost-beneficial substitute available, this study sought to investigate whether the standard theory, as broad-cast by (Hamilton, 1983), that oil sector fluctuations have

an opposing effect on a net oil importation country's macroeconomic presentation holds for South Sudan (Arriola, 2009).GDP growth, real exchange rate, and inflation level are the endogenic variables utilized as alternatives for macroeconomic exposition. Research by (Marquize 1986) that is utilized as a standard informs the outstanding of factors.

2.2 Empirical literature

The autoregressive distributed lag model in Nigeria for the 1982-2018 period by Musa et al. 2019 suggested that growth, in the short- and the long-run, significantly rose in exchange rate and crude oil price. Thus, governments could take advantage of exchange rates by diversifying the economy. This would additionally cutdown on overreliance on the oil sector. In China, Wen et al (2018)'s vector autoregressive model suggested that worldwide crude oil price shocks generally have a beneficial short-term impact on inflation and growth. For the period 2001-2017, ARDL estimates in Rostin et al (2019) suggested that Indonesia's crude oil price affected interest rates and inflation both in the short- and the long-run. In particular, interest rates declined in oil price. For the period 1971-2018 in Nigeria, the factor augmented vector autoregressive (FAVAR) in Adebisi et al suggested that crude oil has a favorable and considerable influence on economic expansion. Additionally, it was shown that crude oil revenue has the power to spur economic expansion.

In Adeleye et al (2015), net export and the balance of payments are used as stand-ins for international commerce with growth being proxied by gross domestic product. The authors use regression in the study and a co-integration analysis technique to determine the long-term link between economic success and global commerce, using error correction modeling tools. According to the study, Nigeria has a monocultural economy, with no real assistance from other sectors like manufacturing, agriculture, or the industrial/manufacturing sector.

Mishchenko et al (2018) examines how inflation affects economic expansion in 158 countries. According to the study, the authors find out that 6.0% inflation rate was found to be the inflation rate at

which the global economy's economic growth rate began to fall or slow down between 2010 and 2017. Based on empirical studies for the years 1996 to 2017, the threshold for inflation in Ukraine was set at 4.51% due to the inverse link between the inflation rate and real GDP growth rates.

In 20 Asian countries for the 2007-2018 period, the robust standard error and fixed effects estimates in Yang et al (2020) suggested that economic development declined in inflation. In Cambodia, Sokang (2018) showed that growth rose in foreign direct investment for the 2006-2016 period. ARDL cointegration technique in Tahir et al (2020) suggested that for the 1976-2018 period, all inflows significantly raised Pakistan's growth. In 62 non-low-income countries, the dynamic panel threshold model in Osei and Kim (2020) suggested that growth rose in FDI although FDI's impact faded off when private credit rose for the years 1987-2016. This finding holds up under a variety of econometric approaches, sub-samples, interaction studies, and financial development indicators. In India, the non-linear autoregressive distributed lag (NARDL) in Kundan and Narayan (2020) suggested that for the 1996-2018 period, long-run growth rose in financial development but declined in exchange rate. According to the study then a fall in the exchange rate boosts the economic growth in India.

For the 1975-2018 period in Ethiopia, the two-regime threshold autoregressive (TAR) estimates in Tenaw and Demeke (2020) suggested that, in contrast to its non-food equivalent, the food sector's inflation has become more erratic, less consistent, and a major contributor to overall inflation, according to our first studies. Additionally, the research suggested a 9-10% inflation threshold. For example, the 10% barrier for food inflation and the 8% criterion for non-food inflation. Our findings unequivocally support the consequences of inflation over the threshold levels on growth in every situation. Growth rises in institutional quality. The impact of institutional quality on a nation's ability to attract foreign direct investments is examined by Hayat (2019). For 104 countries, the GMM estimates in Hayat (2019) suggested that institutional quality and FDI fostered growth. When endogeneity is controlled for while using individual

institutional quality measures, the results are reliable and consistent. In 49 developing countries for the period 2001- 2013, Eggoh et al. (2019) identifies new quantitative research on whether overseas remittances enhance economic growth. The estimates in Eggoh et al (2019) suggested that although remittances have a considerable beneficial effect on impoverished countries' economic growth FDI and aid can be ignored. Nguedie (2018) examines the link between corruption, investment, and growth for a sample of 110 countries from 2006 to 2016. The panel smooth transition regression (PSTR) suggested that the investment-growth relationship was non-linear and was dependent on the extent of corruption, with a smooth transition between the two extreme regimes. The author considers economic growth to be the dependent variable, with investment, inflation, and the interest rate as explanatory factors. According to the findings, the negative consequences of corruption on economic growth via investment are stronger in high-corruption nations than in low-corruption countries.

In South Sudan, while using secondary data, Renzi (2021) utilizes secret information. The findings suggested South Sudan's underutilization of FDI. The findings also suggested that poverty impeded growth with FDI doing little to salve the sinking boat. The author advises South Sudan to develop a desirable economic climate in order to draw in more international investment. In East Africa, the ARDL estimates in Litali (2022) were difficult to interpret over the period 2001-2020. Even then, heteroskedasticity test was used to quantify variation, while the autocorrelation test was utilized to assess stability. In 22 sub-Saharan Africa countries, the pooled mean group/ ARDL estimates in Ayenew (2021) suggested that, for the 1988-2019 period, foreign direct investment increases long-term economic growth. As a result, Sub-Saharan African governments should prioritize obtaining foreign direct investment. Within the East African Community for the 1989-2017 period, Irakoze and Yu (2020)'s vector error correction model suggested cointegration. Moreover, the estimates suggested that with the exemption of Burundi, human capital and GDP cause FDI in the short run. In Sudan, the ARDL estimates in Elfaki et al (2018) suggested

that, for the 1984-2014 period, cointegration existed. In the long run, the estimates suggested growth declining in energy use. In the short run, the effect of energy consumption was varied. Elfaki et al (2018) argued that changes in oil output and the secession of southern Sudan, which is considered the primary source of petroleum resources, led to the variability. For the 1993-2017 period in 45 sub-Saharan African countries, Jena and Sethi (2020)'s PDOLS, FMOLS, and Johansen-Fisher panel cointegration test suggested that growth was shaped by stable prices in the short- and the long-run. In Nigeria for the period 1970-2009, Ogbonna and Ebimobowei (2012)'s OLS estimates suggested that GDP rose in petroleum money.

In co-integration models, most literatures stated that crude oil is dependent on economic development after oil extraction in a politically stable environment, establishing rises in per capita GDP and savings during oil booms (Yang, 2008). As in the examples of Norway and Libya, administration situations resolve crude oil-related policies that promote residents' wellbeing (Manera, 2008). The greatest features of a good state are the leadership and people in power, but in South Sudan, corruption is widespread, anywhere the cream of the crop banks huge sums of money in their offshore accounts. According to (Mideksa, 2012), petroleum donations accounted for 20% of the rise in per capita income in Norway from 1974 to 2012. According to (Marquize, 1986), oil subdivision risk for a non-OPEC emerging nation like South Sudan includes: a decrease in aggregate demand, real income reduction, and a rise in the CPI.

2.3 Overview of the Literature

(Ogbonna and Ebimobowei 2012) indicated positive correlations between Nigeria's growth and crude oil revenue. And several literatures have presented the oil as a curse (Shambayati, 1994), however, authors nevertheless, established a negative association between growth and crude oil revenue; many authors have agreed that countries that have crude oil have high levels of economic growth rate, this is the case of Nigeria, Libya, Angola, Saudi Arabia, Qatar which improve the institutions or provide public services (Diamond, 2008). However, several studies demonstrate that over reliance on crude oil resources is associated with weak institutions of governance and most importantly, the neglect to diversify, leading to slower economic prosperity (Robertson, 2008).

2.4 Research Gap

The gap this paper fills comes from the previous studies; first, apart from analyzing the crude oil in South Sudan, this study digs deep the South Sudanese GDP growth rate, which was missing from previous studies. Secondly, unlike other studies which only used VECM and VAR models, this study uses ARDL model to determine and predict both short-term and long-term relationships between variables. The neglection of other development sectors is a typical example is the Dutch disease effects whereby unmonitored oil extraction and oil exportation leads to crude oil sector development in the expense of other sectors, say manufacturing, services, trade, and agriculture. As suggested by (Shambayati, 1994) that oil is a curse is not the case in this regard, it's only the elites who take advantage over unskilled human resources and weak institutions.

CHAPTER THREE

METHODOLOGY

3.0 Introduction

Here, this research examines theoretical framework, empirical model, model estimation techniques, and the time series econometric issues.

3.1 Theoretical Model

The theoretical basis of this research is drawn from the production function whereby aggregate output: $y_t = A_t y_t(l_t, k_t)$.technical progress given the pool of entrepreneurial abilities. In literature, the land is often categorized as a form of capital. In the Leontief paradox, for instance, the land was considered part and parcel of capital. Accordingly, for simplicity, this logic is advanced in fusing land into capital.

The basis oil producing country engages in an exploration perceived as real net benefits of engaging in it outweigh of not engaging in the activity (Robertson, 2008). Consequently, a country extracts net exports of crude oil, and in doing so, yields higher net benefits than refraining. At the macro-level, the decision to extract crude oil is determined separately from the decision on how much crude oil to export. Additionally, these two decisions are independent of whether oil extraction is purely for domestic use (e.g., in domestic industries) or for the foreign market (i.e., exportation). Crude oil exploitation is, nevertheless, the central government's exclusive mandate (Douglas, 1928).

Consequently, macro-level analysis is inevitable in grasping a better understanding of the oil dynamics. At the macro-level, decisions are assumed to be made by government bureaucrats or politicians with limited, to no, community participation. Based on this, oil is extracted without a carefully clear-cut

cost-benefit analysis. We assume that policymakers are short-sighted and are only in the business of maximizing their short-term self-interests.

It is, thus, possible for a country to exploit oil resources even when doing so jeopardizes other sectors of the economy (Solow 1956). Following the theoretical framework is then given by: $y_t = A_t y_t(l_t, k_t)$.

Where at time t, output y is explained by labor force (which is assumed to equal the population) and the stock of physical capital k. It is assumed that technological progress A is Hicks' neutral. Additional assumptions restrict that the technology in the constant returns to scale form, that diffusion of innovation follows A, and that human capital, social capital, institutional quality, infrastructure, and natural resources are given oil and all other energy sources are assumed to be intermediate inputs that fuel or enable production to take place (Swan 1956).

During the industrial revolution, for instance, the discovery of coal pushed forward the industrial development agenda which has been argued to quadruple globally following the discovery and exploitation of oil. Another breakthrough to this agenda was electricity. A significant turn is, however, present. Although oil is assumed to be middle input, it is also a final product. That is, oil drilling companies fuel drillers using oil and in turn use drillers to extract crude oil (Ross, 2003).

3.2 Empirical Model

The research intends to estimate a log-linear model considering that growth in most variables in the model such as in the manufacturing sector, services, trade, agricultural sector can be estimated in terms of percentages. A log linearized model allows the interpretation of the coefficients in terms of percentages.

3.3 Model Specification

The production function is written in standard notation as follows including inflation and other control variables as inputs alongside labor, technology, and capital:

$Y = fA\ (L, K)$ ……... (1)

Moving from equation (1), the production function is further written in Cobb Douglas production as below:

$LogY = AL^{\beta}K^{\alpha}$..... (2)

Equation (2) is therefore modified to:

$GDP_t = \beta_0 + \beta_1 O_t + \beta_2 NO_t + \beta_3 INF_t + \beta_4 ExC_t + \beta_5 FDI_t + \beta_6 GCF_t + \beta_7 EXP_t + \varepsilon_t$ … … … … (3)

Where GDP is GDP growth rate which is dependent, while O is oil, which is measured as a rate, NO is non- Oil, INF is a rate of inflation, ExC, FDI is t, GCF i , and EXP stands for net exports are explanatories.

Table 1: Definition of variables, measurement and apriori expectations

Variable	Description	Measurement	A priori expectation
GDP	Gross Domestic Growth rate	Measured as a rate all over the years	Dependent variable
O	Oil	Percentage of oil contributing to the growth	+ve
NO	Non-Oil	Percentage of the contribution of the other sectors such as agriculture to the GDP	+ve
INF	Inflation rate	This is the consumer price index	-ve

ExC	Exchange rate	Domestic currency per US Dollar, Period average (IFS)	-ve
FDI	Foreign direct investment	The total foreign investments received by south sudan measured as a percentage	+ve
GCF	Gross capital formation	Measured as a percentage of the total investment	+ve
EXP	Net exports	Exports- imports	+ve

Source: author

3.5 Diagnostic tests

Due to the huge nature and the lengthy time of time series data, according to Wooldridge it is best advised that it is subjected to various diagnostic tests. This includes unit root testing of data, autocorrelation, heteroskedasticity, co-integration test for long-run equilibrium, Granger causality to check for any causal relationships amongst the variables. Furthermore, at the initial stages the estimation of the OLS model will be necessary to check for the model fit.

3.5.1 Estimation test

The model takes the form:

$$\gamma = \alpha + \beta X + U$$

Where γ=GDP, X comprises of the explanatory variables in the model, β=estimation coefficient while α=intercept.

3.5.2 Normality Test

The null hypothesis implies that the residuals are approximately normal.

3.5.3 Stationarity Test

The Augmented Dickey Fuller test is the most preferred method in checking for the existence of the unit root despite the existence of other tests. Besides the ADF test we also have the Kwiatkowski-Phillips-Schmidt-Shin test (KPSS) test.

3.5.4 Lag Length Selection

This was necessary since the research adopted VECM, VAR, and ARDL.

3.5.5 Johansen Test of Co-integration

In some cases, some variables might be no stationary at some point. Co-integration occurs when variables have long run relationship between them. Economic variables might drift apart from one another in the immediate term while converging in the long-term. The Johansen cointegration technique will be used for this test.

3.5.6 VECM

VECM assesses the model's general goodness of fit. It accounts for variations in the explained variable as an outcome of changes in the explanatory variables.

3.5.7 ARDL

ARDL model is an advanced research tool for predicting economic model for time series. For a time, series data to be analyzed, especially for a large period of study, the variables involved in the study should have relationships. The ARDL approach was developed by Persearn et al (1996) to check for the association between the variables. This made it possible for progress with research to analyze variables in the long run. This approach is outstanding in its own way. The ARDL approach stands at the following advantages over the previous cointegration tests. The approach provides reliable results regardless of the sample sizes.

3.5.8 Granger causality

This is used to check for causality between a variable to another. The test analyses the extent to which past values change of one variable will account for other variables latter variation (granger 1986).The granger rule states that for there to be a causal relationship ,the probability value should lie between 0 and 0.05.

3.5.9 Heteroskedasticity

This arises when error variance is non-constant. This in turn needs to be checked and corrected. In testing for the heteroskedasticity, a common test that is used are the Breusch-Pagan test. If the Breusch Pagan results in a small enough p value, some corrective measures should be undertaken.

3.6 Data Source

This research's data was obtained from the Bank of South Sudan, the World Bank, and the South National Bureau of Statistics.

CHAPTER FOUR

RESULTS AND DISCUSSIONS

4.0 Introduction

Here, two key analyses are documented, namely, the descriptive analyses and regression analysis, which is followed by diagnostics, and a discussion of core results. In the study, Stata 15 was used in analyzing. In addition, the chapter covers descriptive statistics, estimation tests, diagnostic test, and their findings.

4.1 Descriptive statistics

The table below provides guidelines with a summary on the properties of the data variables. The mean suggested that since 1990-2020, the GDP growth rate has been at an average of 9.67%.However ,the minimum growth rate was -46.1% in 1990 while the highest growth rate was experienced in the year 2020 at 32.6%. On average crude oil contributed 15.04% to the GDP growth rate. The minimum exchange rate for the time was -107.4% while the highest recorded was 385.3%. Gross capital formation recorded a minimum of -58.34% with a maximum of 74.71%. Foreign direct investment recorded the highest percent of 460.6 vfor the time.

```
. summarize
```

Variable	Obs	Mean	Std. Dev.	Min	Max
year	31	2005	9.092121	1990	2020
gdpgrowthr~e	31	9.667742	16.12448	-46.1	32.6
crudeoil	31	15.03548	18.71154	-53.2	41.6
nonoil	31	-12.37419	25.78502	-56.6	88.8
inflationr~e	31	-9.896774	10.78457	-26.2	15.5
exchangerate	31	17.97419	91.52748	-107.4	385.3
grosscapit~n	31	12.41839	36.7174	-58.34	74.71
foreigndir~s	31	193.2477	151.6137	-8.9	460.6
netexports	31	284.3113	232.2419	2.09	681

Source: Stata output.

4.2 OLS regression

The very first approach in the study was to carry out the OLS regression to establish the kind of impact the explanatory variables are having on the dependent variable.This checks the effect of oil , non-oil products , exchange rate, net exports, inflation, gross capital formation on the GDP growth rate.

```
. reg gdpgrowthrate crudeoil nonoil inflationrate exchangerate grosscapitalformation foreigndirectinvestmentinflows netexports
```

Source	SS	df	MS	Number of obs	=	31
				F(7, 23)	=	215.56
Model	7682.85922	7	1097.55132	Prob > F	=	0.0000
Residual	117.108261	23	5.09166353	R-squared	=	0.9850
				Adj R-squared	=	0.9804
Total	7799.96748	30	259.998916	Root MSE	=	2.2565

gdpgrowthrate	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
crudeoil	.6355081	.0770399	8.25	0.000	.476139	.7948773
nonoil	.123575	.0434905	2.84	0.009	.0336079	.213542
inflationrate	-.1195158	.1624033	-0.74	0.469	-.4554726	.216441
exchangerate	-.0164227	.007383	-2.22	0.036	-.0316956	-.0011499
grosscapitalformation	.0026672	.0125338	0.21	0.833	-.0232609	.0285953
foreigndirectinvestmentinflows	-.0077919	.0342635	-0.23	0.822	-.0786713	.0630875
netexports	.0189945	.0233746	0.81	0.425	-.0293595	.0673485
_cons	-3.17363	.9814503	-3.23	0.004	-5.203915	-1.143346

The results indicate that 98.5% of the variance in GDP growth rate is explained by the crude oil, non-oil, inflation rate, exchange rate, gross capital formation, foreign direct investment, and net exports.the prob>F value indicate that all the coeffecients in the model are different from zero.The results suggest that crude oil, non-oil products, gross capital formation and net exports positively influence the GDP growth rate while inflation rate , exchange rate and the foreign direct investment negatively affects the GDP growth rate. Crude oil was highly statistically significant at 1%, non-oil sector at 5%, while the exchange rate was statistically significant at the 10%.

A unit increase in crude oil increases the GDP growth rate by 0.6355081%. A unit Increase in non - oil increases the GDP growth rate by 0.123575%. A unit Increase in inflation rate reduces the GDP growth rate by 0.1195158%. A unit increase in gross capital formation increases the GDP growth rate by

0.0026672%. A unit increase in official exchange rate decreases GDP growth rate by 0.0164227%. A unit increase in net export increases the GDP growth rate by 0.0189945%. A unit increase in foreign direct investment net inflow decreases the GDP growth rate by 0.0077919%.

4.3 Serial correlation

The result indicated that there is no autocorrelation amongst the variables for the time. It the value of the Durbin Watson is close to 2 then there is no serial correlation and if it deviates much away from 2 towards 0 then there is presence of autocorrelation.

```
Durbin-Watson d-statistic(  8,    31) =   2.20395
```

4.4 Correlation matrix

```
. corr gdpgrowthrate crudeoil nonoil inflationrate exchangerate grosscapitalformation foreigndirectinvestmentinflows netexports
(obs=31)
```

	gdpgro~e	crudeoil	nonoil	inflat~e	exchan~e	grossc~n	foreig~s	netexp~s
gdpgrowthr~e	1.0000							
crudeoil	0.9824	1.0000						
nonoil	-0.0731	-0.1214	1.0000					
inflationr~e	-0.7248	-0.7644	0.6712	1.0000				
exchangerate	-0.5239	-0.4435	0.2578	0.3813	1.0000			
grosscapit~n	-0.1729	-0.1858	0.0783	0.1899	0.1750	1.0000		
foreigndir~s	0.8347	0.8332	-0.5306	-0.8960	-0.5885	-0.0939	1.0000	
netexports	0.8420	0.8358	-0.5220	-0.8958	-0.6151	-0.1200	0.9958	1.0000

From the results, the correlation matrix shows that crude oil, foreign direct investment, and net exports have a positive relationship with the GDP growth rate. Non-oil sector, inflation rate, exchange rate, and the gross capital formation have negative relationship with the GDP growth rate. For instance, crude oil has a 98.24% relationship with the increase in the GDP growth rate. However, inflation rate derails the GDP growth rate by a higher magnitude of 72.48% followed by the exchange rate at 52.39%. The relationship between Foreign direct investment had a 83.47% relationship with the GDP growth rate.

4.5 Unit root test

In testing for the stationarity in the variables, the Argument Dickey Fuller test is applied. If the Variable tends not to be stationary at the o level the first difference is executed.

Variable	t-statistic	10% C-L	Decision	Level
GDP growth rate	-4.138	-2.624	Stationary	0
Crude oil	-4.555	-2.624	Stationary	0
Non oil	-4.164	-2.624	Stationary	0
Inflation	-6.060	-2.625	Stationary	First difference
Exchange rate	-2.637	-2.624	Stationary	0
Gross capital formation	-2.919	-2.624	Stationary	0
FDI	-4.944	-1.314	stationary	First difference
Net exports	0.620	-1.318	Non stationary	2

4.6 Lag selection

Lag selection is critical prior to cointegration since utilizing too many delays might result in loss of degrees of freedom, multicollinearity, and serial correlation in the disturbance. The most appropriate method for determining the optimal lag is to use the selection criterion with the lowest values from the different selection criteria, which include FPE, AIC, HQIC, LR, and SBIC, as shown below. In the case of conflicting results between AIC, HQIC and SBIC you should rely mostly on HQIC and SBIC

```
Selection-order criteria
Sample:  1994 - 2020                        Number of obs      =        27
```

lag	LL	LR	df	p	FPE	AIC	HQIC	SBIC
0	-789.234				6.1e+15	59.0544	59.1685	59.4383
1	-379.8	818.87	64	0.000	58423.3	33.4666	34.4942	36.9222
2	84.8916	929.38	64	0.000	3.6e-08	3.78581	5.72668	10.313
3	3132.01	6094.2	64	0.000	5.e-100*	-217.186	-214.332	-207.587
4	4701.04	3138*	64	0.000	.	-332.225*	-329.142*	-321.858*

```
Endogenous:  gdpgrowthrate crudeoil nonoil inflationrate exchangerate
             grosscapitalformation foreigndirectinvestmentinflows
             netexports
 Exogenous:  _cons
```

In the table above, the results indicate that our optimal lag is 4. However, the Akaike information criterion (AIC) was selected because it has the smallest value -332.225* at lags (4) as indicated by '*' in the output.

4.6 Cointegration test

Prior to this, the identification of the optimal lag length is necessary. Due to the differences in the stationarity at different levels, i.e at level and at the first difference , the appropriate The ARDL bound cointegration test was used in the study, where the conclusion is that there is no cointegration and the alternative hypothesis is that the null hypothesis is not rejected.

Cointegrating equations

Equation	Parms	chi2	P>chi2
_ce1	7	5.38e+07	0.0000

Identification: beta is exactly identified

Johansen normalization restriction imposed

beta	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
_ce1						
gdpgrowthrate	1	.	.	.	.	.
crudeoil	6.401067	.0118834	538.66	0.000	6.377776	6.424358
nonoil	2.161026	.0004846	4459.83	0.000	2.160076	2.161976
inflationrate	-.543868	.0055676	-97.68	0.000	-.5547802	-.5329557
exchangerate	.0004345	.0002206	1.97	0.049	2.08e-06	.0008668
grosscapitalformation	.0016939	.00013	13.03	0.000	.0014391	.0019486
foreigndirectinvestmentinflows	.1601398	.0006752	237.18	0.000	.1588165	.1614631
netexports	-.487066	.0004784	-1018.11	0.000	-.4880037	-.4861284
_cons	-47.24203	.	.	.	.	.

From our model specification $GDP_t = \beta_0 + \beta_1 O_t + \beta_2 NO_t + \beta_3 INF_t + \beta_4 ExC_t + \beta_5 GCF_t + \beta_6 EXP_t + \varepsilon_t$, we can come up with the equation: $GDP_t = 6.401067O_t + 2.161026NO_t - 0.543868INF_t + 0.0016939GCF_t + 0.0004345ExC_t - 0.487066EXP_t - 47.24203 + \varepsilon_t$

From the statistics above, the Johansen normalization restriction is imposed on values that support the rejection of the null hypothesis that implied there are no co-integrating relations among the variables. It was shown that all the variables have impacted the GDP growth rate, except the foreign direct investment whose statistical values and figures were not captured precisely.

```
. egranger gdpgrowthrate crudeoil nonoil inflationrate exchangerate grosscapitalformation foreigndire
> ctinvestmentinflows netexports, lags (2)regress

Augmented Engle-Granger test for cointegration        N (1st step)  =        31
Number of lags    = 2                                 N (test)      =        28
```

	Test Statistic	1% Critical Value	5% Critical Value	10% Critical Value
Z(t)	-4.743	-6.961	-6.018	-5.568

Critical values from MacKinnon (1990, 2010)

Engle-Granger 1st-step regression

gdpgrowthrate	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
crudeoil	.6355081	.0770399	8.25	0.000	.476139	.7948773
nonoil	.123575	.0434905	2.84	0.009	.0336079	.213542
inflationrate	-.1195158	.1624033	-0.74	0.469	-.4554726	.216441
exchangerate	-.0164227	.007383	-2.22	0.036	-.0316956	-.0011499
grosscapitalformation	.0026672	.0125338	0.21	0.833	-.0232609	.0285953
foreigndirectinvestmentinflows	-.0077919	.0342635	-0.23	0.822	-.0786713	.0630875
netexports	.0189945	.0233746	0.81	0.425	-.0293595	.0673485
_cons	-3.17363	.9814503	-3.23	0.004	-5.203915	-1.143346

Engle-Granger test regression

D._egresid	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
_egresid						
L1.	-1.524243	.3213754	-4.74	0.000	-2.186128	-.8623577
LD.	.4523365	.2519946	1.80	0.085	-.0666561	.971329
L2D.	.4079605	.1659017	2.46	0.021	.0662796	.7496415

```
. vecrank gdpgrowthrate crudeoil nonoil inflationrate exchangerate grosscapitalformation foreigndirec
> tinvestmentinflows netexports

                    Johansen tests for cointegration
Trend: constant                                      Number of obs =       29
Sample:  1992 - 2020                                       Lags =       2
```

maximum rank	parms	LL	eigenvalue	trace statistic	5% critical value
0	72	-635.18211	.	1023.1062	156.00
1	87	-424.89745	1.00000	602.5369	124.24
2	100	-314.55754	0.99950	381.8571	94.15
3	111	-236.81909	0.99531	226.3802	68.52
4	120	-168.39247	0.99108	89.5270	47.21
5	127	-144.50871	0.80740	41.7594	29.68
6	132	-133.45045	0.53357	19.6429	15.41
7	135	-124.12781	0.47426	0.9977*	3.76
8	136	-123.62899	0.03382		

There is a deterministic trend in the cointegration VECM .The eigenvalue shown on the last line is used to compute the trace statistics in the lines above it. The decision rule under the trace statistic is

that the null hypothesis is that the cointegration is less than or equal to 1 while the alternative hypothesis is that the co integration is greater than 1.

4.7 Vector Error-Correction Model

```
Vector error-correction model

Sample:  1992 - 2021                            Number of obs     =         30
                                                AIC               =   149.6973
Log likelihood =  -2176.46                      HQIC              =   150.7283
Det(Sigma_ml)  =  2.44e+54                      SBIC              =   152.9201

Equation             Parms      RMSE     R-sq      chi2     P>chi2
------------------------------------------------------------------
D_grossdomesti~t         9    1.9e+07   0.3681  12.23374   0.2005
D_oilsectorval~d         9    2.6e+06   0.0945   2.19157   0.9881
D_nonoilgdp              9    2.2e+07   0.2309  6.304432   0.7091
D_fixedcapital~n         9    1.6e+06   0.0245  .5271949   1.0000
D_inflationrate          9     96.256   0.2803  8.178077   0.5163
D_officialexch~e         9    1.74825   0.9930  399.4804   0.0000
D_netexport              9    .062064   1.0000  69715.38   0.0000
------------------------------------------------------------------
```

VECM corrects and adjusts the errors of variables didn't fit with the model. The outlies were captured, removed, and corrected within the data for a best fit alignment. In the end, test statistics variables were non-stationary. The variables were ready for predicting efficient economic model deal for addressing internal and external shocks.

```
. var gdpgrowthrate crudeoil nonoil inflationrate exchangerate grosscapitalformation foreigndirectinv
> estmentinflows netexports

Vector autoregression

Sample:  1992 - 2020                            Number of obs     =         29
Log likelihood =   -123.629                     AIC               =   17.90545
FPE            =   .0324842                     HQIC              =   19.91365
Det(Sigma_ml)  =   6.97e-07                     SBIC              =   24.31759

Equation             Parms      RMSE     R-sq      chi2     P>chi2
------------------------------------------------------------------
gdpgrowthrate           17    .412492   0.9996  65073.96   0.0000
crudeoil                17    .900216   0.9983  16945.98   0.0000
nonoil                  17    1.15684   0.9979  13771.05   0.0000
inflationrate           17    .810042   0.9968  8970.808   0.0000
exchangerate            17    50.5232   0.8760  204.9092   0.0000
grosscapitalfo~n        17    38.7018   0.5161  30.92816   0.0137
foreigndirecti~s        17    .890601   1.0000  1876162    0.0000
netexports              17    4.12323   0.9999  205793.4   0.0000
------------------------------------------------------------------
```

It has been seen from the above table that AIC gave the lowest value -32.91405 and all endogenous variables were dependent on the lagged values of the other variables.

4.8 Short run and long run effect

```
. ardl gdpgrowthrate, lags (3) ec aic

ARDL(3) regression

Sample:     1993 -     2020                 Number of obs     =         28
                                            R-squared         =     0.7734
                                            Adj R-squared     =     0.7451
Log likelihood = -55.226905                 Root MSE          =     1.8786
```

D. gdpgrowthrate	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
ADJ gdpgrowthrate L1.	-.0134449	.0313143	-0.43	0.671	-.0780745	.0511847
SR gdpgrowthrate LD.	.2584964	.0953106	2.71	0.012	.0617849	.4552079
L2D.	-.2351711	.032314	-7.28	0.000	-.3018638	-.1684784
_cons	1.656583	.47904	3.46	0.002	.6678933	2.645273

```
. ardl crudeoil, lags (2) ec aic

ARDL(2) regression

Sample:     1992 -     2020                 Number of obs     =         29
                                            R-squared         =     0.6796
                                            Adj R-squared     =     0.6550
Log likelihood = -69.596404                 Root MSE          =     2.8166
```

D.crudeoil	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
ADJ crudeoil L1.	.0352868	.0398505	0.89	0.384	-.0466271	.1172007
SR crudeoil LD.	-.2877646	.0387497	-7.43	0.000	-.3674158	-.2081134
_cons	1.169159	.8358455	1.40	0.174	-.548946	2.887264

The adjusted coefficient of -0.7132147 in short-run effects the perturbation of the dependent variable of crude oil and it rapidly return to a stability equilibrium unlike the adjusted coefficient of -0.6044641 in the long run. From the table above, the crude oil gives effects to the GDP growth rate in

the long run compared to the case of short run. With the log likelihood of -75.669134 which causes shock in the short run, inflation rate back to what they deem satisfactory. Long run adjustment has a log likelihood of -107.75606 is a regulation rule of the money supply to shrink any potential long-run inflationary effects from the crude oil sector shock.

4.9 Selection-order Criteria

```
. varsoc gdpgrowthrate crudeoil nonoil inflationrate exchangerate grosscapitalformation foreigndirect
> investmentinflows netexports

   Selection-order criteria
   Sample:  1994 - 2020                        Number of obs      =        27
```

lag	LL	LR	df	p	FPE	AIC	HQIC	SBIC
0	-789.234				6.1e+15	59.0544	59.1685	59.4383
1	-379.8	818.87	64	0.000	58423.3	33.4666	34.4942	36.9222
2	84.8916	929.38	64	0.000	3.6e-08	3.78581	5.72668	10.313
3	3132.01	6094.2	64	0.000	5.e-100*	-217.186	-214.332	-207.587
4	4701.04	3138*	64	0.000	.	-332.225*	-329.142*	-321.858*

```
   Endogenous:  gdpgrowthrate crudeoil nonoil inflationrate exchangerate
                grosscapitalformation foreigndirectinvestmentinflows
                netexports
    Exogenous:  _cons
```

The order criterion for Akaike information criterion (AIC) was selected because it has the smallest value (lag 3) compared to (HQIC) method, (SBIC) method, and (LR) which have the highest values.

DISCUSSION OF THE FINDINGS

This study aimed at investigating the effect of crude oil on economic growth in South Sudan. The empirical findings on the outcome of crude oil on economic progress in South Sudan were tied to the summary statistics, regression, and diagnostic tests. The results suggest that Crude oil is leading national export that generate foreign reserves with an average mean of 15.04%. The mean suggested that since 1990-2020, the GDP growth rate has been at an average of 9.67%. However, the minimum growth rate was -46.1% in 1990 while the highest growth rate was experienced in the year 2020 at 32.6%. On average crude oil contributed 15.04% to the GDP growth rate. The minimum exchange rate for the time period was -107.4% while the highest recorded was 385.3%. Gross capital formation recorded a minimum of -58.34% with a maximum of 74.71%. Foreign direct investment recorded the highest percent of 460.6 for the period. A unit rise in gross capital formation increases the growth rate by 0.26%. A unit rise in exchange rate decreases the growth rate by 1.64%. A 1% rise in net export increases the growth rate by 1.89%. A unit rise in foreign direct investment net inflow increases the growth rate by 0.77%. A unit rise in other factors, while keeping crude oil, non-oil, inflation rate, exchange rate, gross capital formation, net export, and foreign direct investment constant, leads to a decrease in GDP growth rate by 3.17%.

In Nigeria Musa et al. (2019) investigated the impact of crude oil price and currency rate on economic development using an autoregressive distributed lag model. The results demonstrated that the exchange rate and crude oil price had both significant and positive long- and short-term effects on economic growth. This research supports Musa et al partly whereby, the results in this study indicate that both crude oil and exchange rate were significant. However crude oil had a positive impact on economic growth while exchange rate had a negative impact. On the contrary, Rostin et al. in (2019) uses ARDL and finds out that in Indonesia crude oil has no effect on the economic growth. According to Wen et al.

(2018), empirical findings show that worldwide crude oil price shocks generally have a beneficial short-term impact on China's growth and inflation, but the long-term impact appears to be diverse.

The result in this study supports Adebisi et al in examining the impact of crude oil revenue on economic growth in Nigeria using Factor Augmented Vector Autoregressive (FAVAR) approach. The findings indicated that crude oil has a favorable and considerable influence on economic growth. However, concerning the exchange rate impact on the economic growth of South Sudan, the results indicate that the exchange rate negatively affected economic growth. This study contradicts with the Nigerian study by Musa et al. (2019) whereby the authors results suggested that exchange rate positively influenced the economic growth in Nigeria.

According to Yang et al. (2020), foreign direct investment, capital formation, inflation influenced the economic growth in the Asian countries. This paper therefore agrees with the authors as the results suggest that inflation negatively influences the economic growth in South Sudan. In addition, the research revealed that while inflation is inversely connected with economic development, FDI, capital creation, money supply, and trade openness are all favorably correlated with economic growth. However this paper contradicts with Ayenew (2021), Yang et al. (2020) and Sokang (2018) findings whereby foreign direct investments positively affect economic growth, in the South Sudan case the results indicate that FDI negatively influences economic growth.

Elfaki et al. (2018) findings suggested that long-term energy use has a detrimental influence on economic growth. In contrast, in the short run, energy consumption has varied effects on economic growth, which may be linked to changes in oil output and the secession of southern Sudan, which is considered the primary source of petroleum resources.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter presents a summary of the findings, conclusions, and a discussion on the recommendations.

5.2 Summary of the results

Crude oil contributes 63.55% of the GDP growth rate in the South Sudanese economy and it is the major sector that contribute bigly to economic growth and development. The non-oil sectors of manufacturing, services, agriculture, and trade contributes 12.35% of the GDP growth rate. Besides the annual inflationary rate and official exchange rates impact the GDP growth rate by 11.95% and 1.64% respectively. And the growth gross capital formation increases the GDP growth rate by 0.26.%

South Sudan's net export and investment net inflows stands at 1.89% and 0.77% respectively, however, the country is to diversity her economy to earn foreign reserves through export and minimization the import of luxury automobiles. Other factors of corruption, war, illiteracy, weak institutional negatively impact the GDP growth rate by 3.17%. "A war once described as being fought over scarce resources is now being waged for the total control over abundant oil reserves" (Johnson 2007).

Furthermore, this study shows all the other productive sectors are neglected and yet they are significantly associated with one another, therefore, policy formulation and strategic decision by the government is required for a better citizen's welfare and wellbeing.

5.3 Conclusion

According to this report, the non-oil sector accounts for 12.35% of the GDP growth rate in South Sudan whereas crude oil accounts for 63.55% of it. The government must make strategic decisions and develop policies to expand the non-oil economy because it has been neglected. However, the annual floating inflation rate of 11.95% and the exchange rates at 1.64% against the GDP growth rate were not controlled by fiscal or monetary regulation restrictions. The postestimation tests of VAR, VECM, Johansen test for cointegration, and ARDL have identified both the long-run and the short-run effect of crude oil on economic growth in Sudan as portrayed by test statistics and trends. VECM has identified the existence of long-run and short-run relationships among the sectors, whereas Johansen procedure of co-integration analysis has also identified the existence of long-run and short-run effect. South Sudan has neither engaged in trade with the region nor the rest of the world, but given that her annual exports are only 1.89%, the nation needs to diversify her economy to generate enough foreign reserves through the export of excess agricultural products and reduce its reliance on imports of high-end vehicles. Other factors including war, illiteracy, and underdeveloped institutions have also had a negative 3.17% influence on GDP growth rate. The ownership of large oil supplies is the object of a conflict that was formerly said to be fought over finite resources (Johnson 2007).

5.4 Recommendations

The government should establish some robust legislation for generating enough non-oil revenues such as accountability and transparency over oil and non-oil income. Revenue-generating institutions like Revenue Authority, Audit Chamber, and Ministry of trade and industry are to ensure that laws on diversification. From the study results, some of the recommendations that could be considered include: The National Oil Company, NilePet needs to be capacitated so that it has the same capacity with the other international oil companies exploring and drilling the oil resource and upgrade the net export of 1.89%. Secondly, there is a need for

diversification of non-oil sector to increase the GDP growth rate of 12.35% in the sectors of agriculture, service, trade, and manufacturing. In addition, there is a need for a policy support on matters related with other factors of war, corruption and illiteracy that contribute 3.17% of GDP growth rate within South Sudan by upgrading legal, financial, and institutional framework for long run investments

Through economic diversification, South Sudan can export more goods instead of being an importing country, the construction of refinery at Thar-jiath must be completed to supply oil product within South Sudan and export the surplus of crude oil to the neighboring counties. The government must invest in money and stock markets to reduce the high inflationary rates, and feasibility studies are to be carried out on the structure and nature of the existing oil pipelines in the Sudan because of mistrust and accountability concerns that led to the 2012 oil shutdown.

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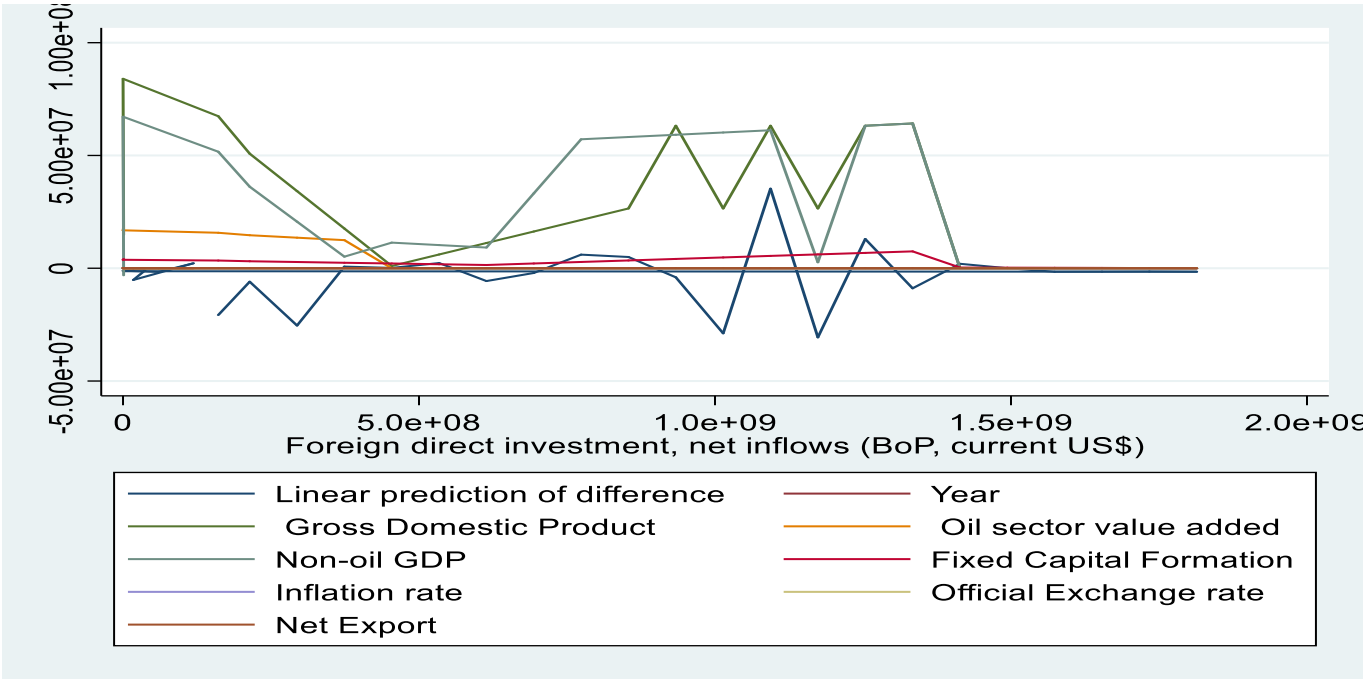
ANNEX: SUDAN AND SOUTH SUDAN OIL FIELDS

CONSORTIUMS OF OIL COMPANIES

Country	Consortium or subsidiary	Company	Company country of origin	Share (percentage)
South Sudan	Greater Pioneer Operating Company (GPOC)	CNPC	China	40.0%
		Petronas	Malaysia	30.0%
		ONGC	India	25.0%
		Nilepet	South Sudan	5.0%
	Dar Petroleum Operating Company (DPOC)	CNPC	China	41.0%
		Petronas	Malaysia	40.0%
		Nilepet	South Sudan	8.0%
		Sinopec	China	6.0%
		Tri-ocean Energy	Egypt	5.0%
	Sudd Petroleum Operating Company (SPOC)	Petronas	Malaysia	67.8%
		ONGC	India	24.2%
		Nilepet	South Sudan	8.0%
Sudan	Greater Nile Petroleum Operating Company (GNPOC)	CNPC	China	40.0%
		Petronas	Malaysia	30.0%
		ONGC	India	25.0%
		Sudapet	Sudan	5.0%
	Petro Energy	CNPC	China	95.0%
		Sudapet	Sudan	5.0%
	Star Oil	Ansan Wikfs	Yemen	66.0%
		Sudapet	Sudan	34.0%

Data source: Global Energy Monitor, Fitch Solutions Country Risk & Industry Research, Energy Capital & Power, Small Arms Survey

GDP AND VARIABLES TWO-WAY LINE



ALL VARIABLES TWO-WAY LINE