

**Czech University of Life Science Prague**

**Faculty of Economics and Management**

**Department of Economics**



**Bachelor Thesis**

**Economics Analysis of Crude Oil in Cameroon**

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## BACHELOR THESIS ASSIGNMENT

Carine Odile Ngo Ntamack

Business Administration

Thesis title

**Economic Analysis of Crude Oil in Cameroon**

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### Objectives of thesis

The main goal of this thesis is the analysis of Cameroon's position in the global hydrocarbon demand and supply system then, the current situation of the Cameroonian oil industry.

In Cameroon crude oil contribution remains significant in state income and represents one of the major state contributors. For better understand the Cameroon crude oil market,

We will consider some key factors:

Cameroon crude oil production, cost of production of crude oil, trade of crude oil. We will base our evaluation first on the world crude oil global market (history, cost of production, demand, and suppliers), then we will estimate the quantity of Crude Oil mined in Cameroon and its impact on the economic growth.

This project will find the relationship between Cameroon crude oil production and economic Growth and figure out economics and environmental issues.

The second objective is to analyse crude oil production, price and GDP in Cameroon annually from 2006-2016 by using a statistical approach.

### Methodology

To fulfill all the task, some Research in mining companies in Cameroon such as SNH, SONARA will be made. some knowledge in economics and statistics will be applied.

First part will be theoretical (introduction, objectives, methodology, literature review) and the second part will be analytical (presentation of results and comments).

We will use a statistical approach to analyse data (Cameroon crude oil total production, cost of production of crude oil and Cameroon GDP), three methods will be applied:

- Correlation analysis;
- Regression analysis;
- Time series analysis

We will use secondary data from the years 2006 to 2016 to fulfill all the tasks, then we will present results and comments.

## **The proposed extent of the thesis**

40 pages

## **Keywords**

Crude oil, Cameroon, exploitation, economic analysis, GDP, economic growth.

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## **Recommended information sources**

- C. Djiofack, L. Omgba. Oil depletion and development in Cameroon: A critical appraisal of the permanent income hypothesis. Energy, 2011
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- T Nguyen, et al. On the definition of exergy efficiencies for petroleum systems: Application to offshore oil and gas processing. Energy, 2014.

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## Declaration

I hereby declare that I am the sole author of this thesis Entitles Economic Analysis of Crude Oil in Cameroon, under the supervision of Ing. Petr Procházka, Ph.D., MSc. The used literature and sources are stated in the attached list of reference.

In Prague,

.....

Carine Odile Ngo Ntamack

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# **Economics Analysis of Crude Oil in Cameroon**

## **Ekonomická analýza ropy v Kamerunu**

## **Summary**

Cameroon is the 13<sup>th</sup> biggest producer of oil in Africa and 52<sup>nd</sup> worldwide. The Cameroonian crude oil production is evaluated to be around 81,000 barrels of oil per day. In 2016, The oil production rises to 150,000 BPD due to the opening of some new refinery and the expansion of crude oil exploitation.

This research will be focusing on the evaluation of the Cameroonian's Crude Oil market during the following period of 2006 to 2016 by identifying the main actors, by evaluating crude oil sector in Cameroon (Management, development perspectives) to access to its impact in Cameroon Economy Growth.

This paper examines the causality relationship between crude oil production and Cameroon economic growth. We applied the statistical approach method during 2006-2016 and we included Cameroon total production as dependent variable and price and GDP as independents variables.

We will further analyse the world global market of crude oil (history, cost of production, demand and suppliers), then we will present the Cameroonian crude oil market.

## **Keywords**

Crude oil, exploitation, economic analysis, GDP, economic growth.

## **Abstrakt:**

Kamerun je třináctý největší producent ropy v Africe a dvaapadesátý na světě. Produkce kamerunské ropy se odhaduje na 81 tisíc barelů denně. V roce 2016 se zvedla na 150 tisíc barelů v důsledku otevření nové rafinerie a rozšíření těžby.

Tento výzkum se zaměřuje na zhodnocení kamerunského ropného trhu v letech 2006 až 2016. Popíše jeho hlavní hráče a celý ropný sektor v Kamerunu, jeho řízení a možnosti dalšího rozvoje. Věnuje se také vlivu ropného byznysu na růst ekonomiky Kamerunu. Tento výzkum se zaměřuje na kamerunský ropný trh, popis jeho hlavních hráčů a celého odvětví v zemi (management, možnosti rozvoje). Popíše také vliv ropy na rozvoj kamerunské ekonomiky. Dále zanalyzuje celosvětový trh s ropou, jeho historii, ceny produkce, poptávku a dodavatele. V návaznosti na to popíše kamerunský ropný trh.

## **Klíčová slova**

Ropa, těžba, ekonomická analýza, HDP, ekonomický růst



## **Abbreviations**

**GDP:** Gross Domestic Product

**BPD:** Barrels per Day

**Mb/d:** Million barrel per day

**SNH :** Société nationale camerounaise d'hydrocarbures

**SONARA :** Société nationale de raffineries

**NHC :** National Hydrocarbon Company

**SCTM :** The Société Camerounaise de transformation Métallique

**IEA:** International Energy Agency

**CC:** A Concession Contract

**PSC:** Production Sharing Contract

**USAID:** US agency for international development

**CEMAC:** The central Africa economic and monetary community

**L.P.G:** Liquefied petroleum gas

**OPEC/ OPEP:** Organization of Petroleum Exporting Countries

**BBL/D :** Barrels per day

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## Chapter 1: Introduction

### **Introduction**

A century ago, crude oil was considered as the most vital asset for our progress. Principally utilized as a fuel for the transport sector, the graded vector of the economic globalization, it was needed to improve geopolitical sectors, budgetary growth etc and notwithstanding those others crude materials, oil appears to be profitable only for a brief period and the reserves are limited overtime. (IMF, 2006). The oil fluctuations in various period lead countries to adopt others natural resources (energy sources) to maintain oil conservation policies. The world oil production started to decline after the first oil shock in 1973 which affected more underdeveloped countries than developed countries. (N.Bashiri Bemhiri, 2013). Crude Oil exploitation in Cameroon started in 1977, Later on, the National Hydrocarbons Company (NHC) was created in 1980, with the main mission to manage the interests in the crude oil sector. More so, Cameroon has experienced an oil price boom in 1979, which led to an increased in the economic growth, between 1979–1985 with an average of 7.3%. (C. Djiofack, 2011). Cameroonian Crude oil production is quite low compared others African producing countries. However, Government could deal profitable agreements in comparison with other African oil-producing countries. (Fee, 1985) Almost 65% of the total income of Cameroon is generated from crude oil exploitation which is a bit closer to Nigeria who is the leading African producer, with around 70%. (cosse, 2006). Moreover, Cameroon Crude oil production is increasing and the National Hydrocarbons Company (NHC) confirmed in June 2015 that for the first time since 2002, the national production of crude oil growth to 100,000 barrels per day mark instead of 60,000 barrels per day in the past. Since the beginning of 2014, oil production has been rising steadily, mainly due to the entry into production of new fields. (Effa, 2013).

Cameroon produced heavy oil, that may bring refining process difficult, and SONARA's infrastructures, although they are in a modernization process, do not allow to transform it in totality. The country must, therefore export its crude for a better transformation. (SONARA, 2013). Added to deficiency of oil refining, there is the problem of good management and balanced distribution of wealth, which is remaining basically in the underdeveloped countries. Oil production has a major impact on the economic growth sector in Cameroon, as well as social and geopolitical sector.

This project will find a balance between crude oil trade and economic Growth of Cameroon by analysis Cameroon oil production, by presenting the quantity of crude oil mined, and the impact of crude oil trade in economy growth, to figure out economics and environmental issues connected to crude oil exploitation.

## Chapter 2: Objectives and methodology

### 2.1 Objectives

The crude oil industry is one of the most important natural resource of the national economy, the strongest source of currency and one of the largest contributors to the state budget. Its role has become even more important in recent years of economic restructuring. As a result, this sector is attracting the attention of Western investors and companies as well as researchers.

Also known as “black gold” oil remains in recent years one of the most valuable natural resources in the world. For many countries over the world, crude oil represents the main income of the state (Saudi Arabia, Equatorial Guinea).

However, price volatility reaches those countries under a strong market dependency that gradually affect the Country GDP.

Even if Cameroonian economy is diversified, crude oil contribution remains significant in state income. For better understand the Cameroon crude oil market,

We will consider some key factors:

- Cameroon crude oil production
- Price of crude oil
- Export of crude oil
- Import of crude oil
- Invest in crude oil production
- Crude oil pollution

We will evaluate first the world global market for crude oil (history, cost of production, demand, and suppliers), then we will present the crude oil Cameroon market.

The main goal of this thesis is the analysis of Cameroon's position in the global hydrocarbon demand and supply system then, the current situation of the Cameroonian oil industry by analysing Cameroon's oil sector and its main players.

We will evaluate the quantity of Crude Oil mined in Cameroon and its impact on the economic growth. In addition to the above, Crude Oil is one of the most important natural resources in Cameroon, this project will find a balance between crude oil trade and economic Growth of Cameroon and figure out economics and environmental issues connected to crude oil exploitation.

The second objective is to study about crude oil production, price and GDP in Cameroon annually from 2006-2016 by using a statistical approach.

## **2.2. Research questions**

Economic analysis of Cameroon crude oil is based on several economic factors.

To better understand the Cameroon crude oil market, it is important to underline how the world and African oil sector are working in one hand and how Cameroon oil activities are structured to another hand.

Several questions were carried out as:

- How can the oil industry contribute to Cameroon's development and economic growth?
- How is the mining, manufacturing, and supply of Oil in Cameroon?
- What are the difficulties and problems related to Crude Oil mining?

Hypothesis:

- Price of crude oil has a negative impact on Cameroon crude oil production from 2006-2016



- Import of crude oil has a negative influence in Cameroon economic growth
- Investment in crude oil sector has a positive impact on Cameroon economic growth from 2006-2016
- The negative impact of crude oil pollution.

### **2.3. Methodology**

Some Research in mining companies in Cameroon such as SNH, SONARA will be made.

To fulfill all the tasks, some knowledge in economics and statistics will be applied.

First part will be theoretical (introduction, objectives, methodology, literature review) and the second part will be analytical (presentation of results and comments).

We will base the analysis on data period from 2006 to 2016 using the correlation analysis test, regression analysis test, and times analysis test.

This paper will analyses Cameroon crude oil sector, and explores the relationship between Economic growth and crude oil production in Cameroon.

We will use a statistical approach to analyze data (Cameroon crude oil total production, cost of production of crude oil and Cameroon GDP), three methods will be applied:

-Correlation analysis;

We will show how strong or weak are the correlation between variables Cameroon crude oil total production, price, and GDP.

-Regression analysis;

We will figure out regression equation by choosing Cameroon total production as dependent variable and price and GDP as independent variables.

-Time series analysis (Trend analysis, trend line, forecasting);

Will be used for prediction, forecasting of Cameroon total production of years 2017 to 2020.

We will use secondary data to fulfill all the tasks from null hypothesis to correlation, regression and time series analysis and then we will present results and comments.

## Chapter 3: Theoretical part

### **3.1. Analysis of World Crude Oil**

#### 3.1.1. General History of Crude oil

Edwin Drake and George Bissel in 1859, was the first to discover oil in Pennsylvania in the United States. From that period the USA has become the first oil producing and consuming country in the world. (Steen, 1959).

Later on, other areas of oil production appeared mainly in Arab countries, Romania and Venezuela, which increased the demand for oil in Europe, so, oil becomes an international resource and the oil economy is strengthened internationally and the demand in Europe increases as the world goes through a revolution because oil was a source of energy in industry and transport. Subsequently, another oil pool was discovered in the colonial countries: Algeria, Gabon, Nigeria, Cameroon... which leads African countries in world oil producers with high potential in crude oil production. (Afrimedia, 1975).

#### 3.1.2. Overview of the product

“Oil is a viscous liquid derived from petroleum, especially for use as a fuel or lubricant”. (Dictionnary, 2017)

Crude Oil is divided into two kinds of product: Primary products (liquid petrol, natural gas, and other hydrocarbons) and Secondary products (refine gas, gasoline, fuel, kerosene). (Jan Stelter, 2016)

The exploration and production of crude oil may be carried possibly at sea or on land. We can, therefore, refer to as offshore extraction and onshore extraction. Onshore extraction is carried on the continent and, despite requiring great

resources and a complex and advanced engineering is less convoluted than the establishment of an offshore platform which is practiced for example in the Gulf of Guinea.

(T Nguyen, 2014).

### 3.1.3. Crude oil and development

The oil was first used to wage war. Oil was an essential source of energy for this period in view of the World Wars (World War I) that affected Europe. In 1900s crude oil sector was limited to developing countries. Oil was essential for many purposes and nowadays oil is considered as an indispensable wealth. (OPEC, 2014). Oil is the basis of the world economy and is still the primary source of energy today, accounting for 32.9% of the world's energy and is indispensable to all economies. (Council, 2016). However, there remains the problem of the dependence that the world's great oil-producing powers managed. After the oil crisis of 1973 (Yom Kippur War) and 1979-1980 (Iranian Islamic Revolution) which propelled the price of oil by multiplying it by ten, many countries boosted their economies. (Lyndon G., 2017)

In developed countries, it is present at all levels of society: agriculture, housing, transport, etc. Oil is, therefore, a must-have wealth for both developed and underdeveloped countries. The countries that have it in their basement enjoy many benefits and enjoy this wealth.

### 3.1.3. Crude oil and Technology

The exploration and production of crude oil may be carried possibly at sea or on land. We can, therefore, refer to as offshore extraction and onshore extraction.

Onshore extraction is carried on the continent and, despite requiring great resources and a complex and advanced engineering is less convoluted than the establishment of an offshore platform which is practiced for example in the Gulf of Guinea. (T Nguyen, 2014)

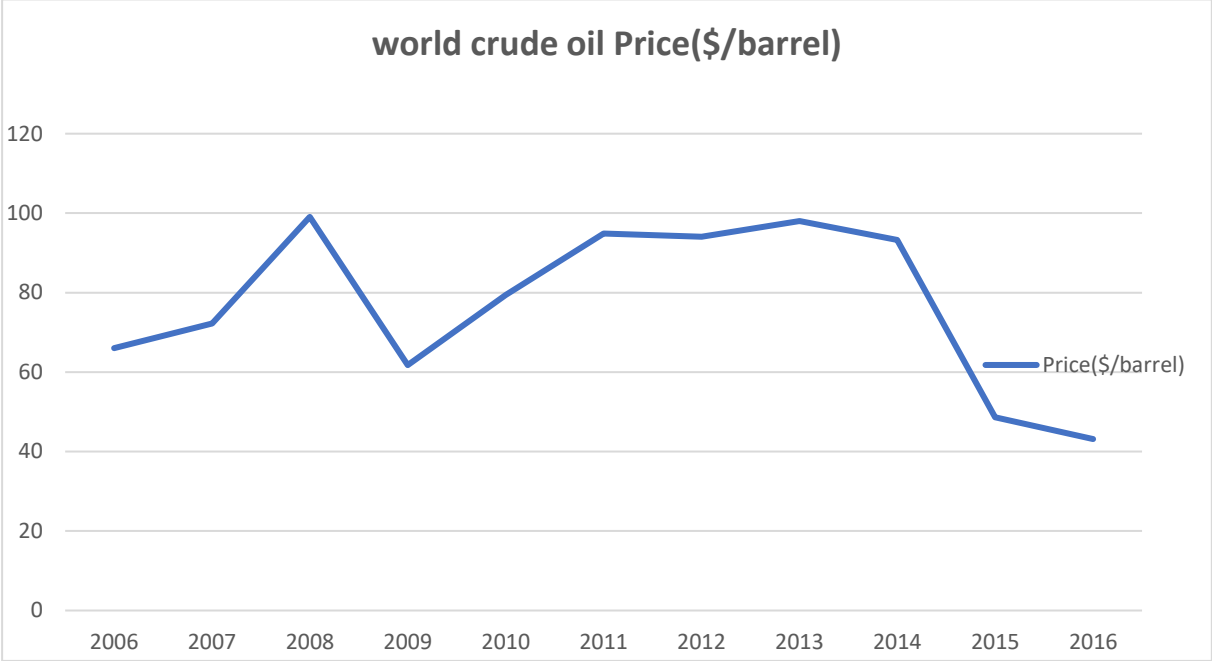
3.1.4. Crude oil world cost of production

**Table 1:** crude oil cost of production

year	Price(\$/barrel)
2006	66
2007	72.26
2008	99.06
2009	61.73
2010	79.39
2011	94.88
2012	94.05
2013	97.98
2014	93.25
2015	48.66
2016	43.15

**Source:** (Statista, 2017)

**Figure 1: World Crude Oil Price**



**Source:** Own processing from table 1

The graph showed the price volatility with fluctuations between 2011 and 2014.

After 2014 there is a price decreasing which impact on many economies and mostly in African economies.

The interaction between Supply and demand at the international market level influence the oil price forecast. The most relevant supplies are; US crude oil stocks, OPEC oil supply, and US shale oil production. (Gusev, 2017)

**3.2. World crude oil economy**

**Table 2:** Top 10 of Crude Oil producers in the world (2015)

Rank	Countries	Production	consumption	Delta
1	US	12.7	19.4	-6.7
2	Saudi Arabia	12.0	3.9	8.1
3	Russian Federation	11.0	3.1	7.9
4	Canada	4.4	2.3	2.1
5	China	4.3	12.0	-7.7
6	Iraq	4.0	0.8	3.2
7	Iran	3.9	1.9	2.0
8	United Arab Emirates	3.9	0.9	3.0
9	Kuwait	3.1	0.5	2.6
10	Venezuela	2.6	0.7	1.9

**Source:** (Rapier, 2016)

Despite the large production, the United States has a delta of -6.7, which shows that the demand for oil remains high petroleum imports then become the intermediate solution to satisfy demand.

The United States has confirmed and even strengthened its position as the world's leading oil producer with an 8.5% increase between 2014 and 2015. Behind them, the hierarchy is not changed, with Saudi Arabia in second place, whose production has grown more than Russia the world's third-largest producer. Overall, world production continues to grow faster than consumption (3.2% vs. 1.9%), which keeps pressure on the price of oil, much to the dismay of countries whose economy is based on oil revenue (Rahman, 2014)

According to (IMF, 2013) for the period 2013-2018 more than half of the world's speediest rate of developing economy will make clinched alongside Africa. For 2010 African Oil production spoke to 12,2% of the world total Crude Oil production while exports might have been indeed higher, nearly 20% of the world Crude Oil aggregate. (Godzimirsky, 2016)

### 3.2.1. World Crude Oil Demand

Worldwide oil consumption will expand more than what was expected in 2016 and will remain strong in 2017, allowing the market to return to equilibrium in the second half of the year 2017 (EIA, Reuters, 2016). We considered the data from the 4<sup>th</sup> quarter of each year. with some approximative values of demand in Mb/day.

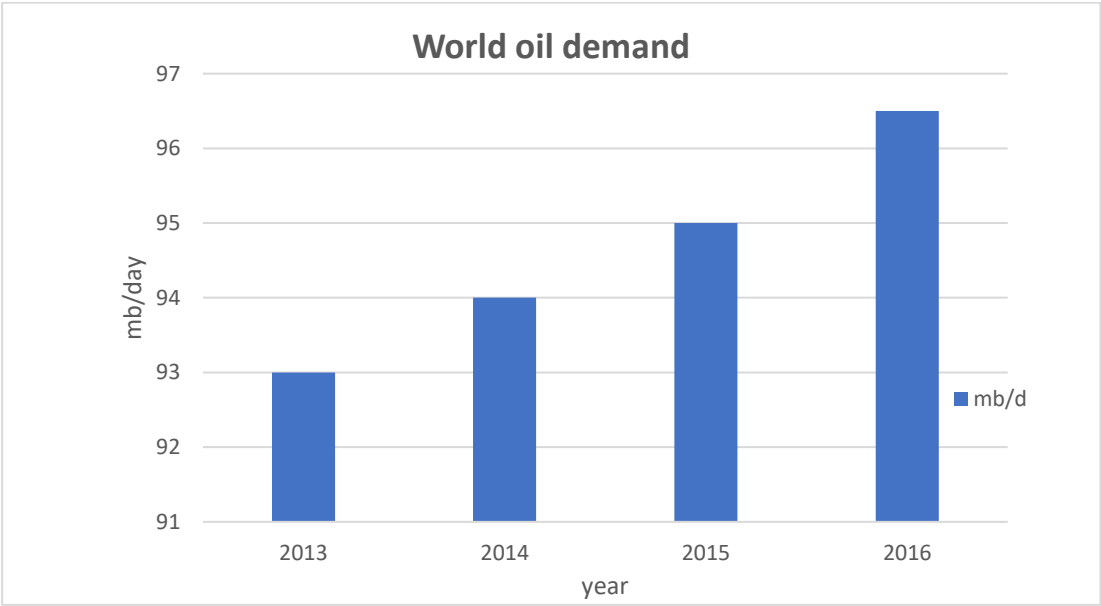
**Table 3:** world crude oil demand

Year	Demand(Mb/day)
2013	93
2014	94
2015	95
2016	96.5

**Source:** (OECD/IEA, 2015)



**Figure 2: World Oil demand**



**Source:** Own processing from table 3

This figure above shows global oil consumption between 2013 and 2016. At the international level, about 96 Mb /d of oil were consumed in 2016. According to the source, consumption includes international aviation, bunkers marine, refinery oil, and losses; fuel consumption with ethanol and biodiesel.

**3.2.2. Crude Oil and Supply**

The figure below shows global oil supply between 2013 and 2015. At the international level, about 97 Mb/d of oil were consumed in 2015. According to the source, consumption includes international aviation, bunkers marine, refinery oil, and losses; fuel consumption with ethanol and biodiesel.

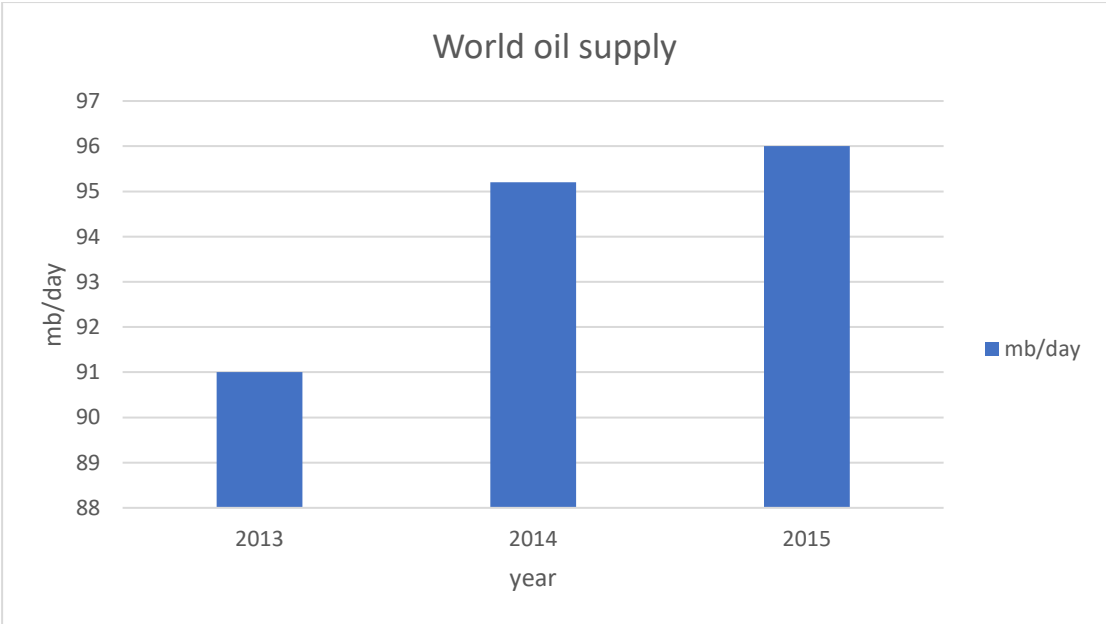
We considered the data from the 4<sup>th</sup> quarter of each year and the 3<sup>rd</sup> quarter of 2015. with some approximative values of supply in Mb/day.

**Table 4:** World crude oil supply

Year	Supply(Mb/day)
2013	91
2014	95.2
2015	96

**Source:** (OECD/IEA, 2014)

**Figure 3:** World Oil supply



**Source:** Own processing from table 4

3.2.3. Examples of 2 big crude oil leaders

3.2.3.1. The United States of America

The USA is today the second leading oil producer after Saudi Arabia. (Petroleum:An Energy Profile, 1999) and remains always in the top 5 biggest

producers of crude oil in the world. Some experts say that the shale boom is the cause of this improvement. US production is based on the exploitation of shale hydrocarbons. In addition, technical progress has led to the construction of exceptional boreholes and wells for better oil exploitation. (Dougher, 2014)

Geopolitically, the United States has considerably reduced its dependence on the Arab oil-producing countries by reducing their imports, so they lose their place as the first oil-importing countries to the detriment of China, which now occupies the first rank. (Friedman, 2016)

#### 3.2.3.2. Russia

Russia is one of the biggest oil consumers and producers. Oil Russian industry impacts about European energy market. The Oil industry is the strongest source of trade exchange and the biggest contributor to the state budget. Exporting represents annually more than 60 million tons of finished products, 125 billion and 130 million tons of crude oil to Europe

Russia was the biggest oil producer in the world from 1975 to 1991, unfortunately, between 1989 and 1995, Russian production collapsed from 550 to 300 million tons. However, Russia remains, in the top level of crude oil producer with Saudi Arabia and the United States.

(Garifullin, 2011)

### **3.3. Economic analysis of Cameroon Crude oil market**

#### 3.3.1. Cameroon overview

Cameroon is a country located between latitude 2° and 13° N and longitude 8° and 16° E at the Gulf of Guinea. Cameroon has a total surface area of 475,440

km<sup>2</sup> and has a population of 23,739,218 inhabitants (2015). Cameroon is also considered as the most populated country in Central Africa with an estimate in 2000 which shows that 48% of the population live below the poverty line and in 2015, USAID reports that about 40% of Cameroonians live below the poverty line of \$2/day. More so, the population growth rate and economic (GDP) growth rate are 2.59% (2015) and 5.9% (2015), respectively. (Muh, 2017)

**Figure 4:** Cameroon Map



**Source:** (EIA, Cameroon, 2017)

3.3.2. Cameroon Crude Oil History

Crude Oil investigation began clinched alongside 1947 in Cameroon. The principal business discoveries were aggravated in the Rio del Rey bowl for 1972, yet all it might have been just until 1977 that the country procured that status about oil producer. (Clarke, 2010).

Cameroon crude oil production reached a record level of 186,000 barrels / day in 1985, which really increase Cameroon economic growth. (SONARA, 2015).

### **3.4. Mining and Manufacturing of Cameroonian Crude Oil**

Cameroon's sole oil refinery is dominated by three companies in Cameroon: The National Refining Company NRC in French SONARA for Société Nationale de Raffinage, an oil price stabilization fund (Caisse de Stabilisation des Prix des Hydrocarbures, CSPH), and the SCDP for Société Camerounaise des dépôts pétroliers). To complete the action substantial numbers companies' distributors, ensure the retail network for Gasoline and butane deals to consumers.

#### **3.4.1. The Companies which are manufacturing Crude Oil in Cameroon**

Made over 1973, SONARA promotes, develops and monitors oil and gas activities throughout the country. In this context, it works in cooperation with international oil companies.

SONARA deals on the worldwide market, through contracts with international partners, those impact on the national production of crude oil with revenues returns to the State. Income from these sales is transferred to the Treasury after deduction of expenses and production costs. Its main role is the refining of crude oil into finished products. The different finished products are butane gas, gasoline, kerosene, diesel, bunker, etc. Domestic demand is estimated at approximately one million tons per annum. (SONARA, 2015).

The second significant player in oil sector is the CSPH established on 1974 whose principal purpose is to "regulate the price of oil products and hydrocarbon to avoid price increases through the partial assumption of the cost expansion". (Camcom, 2006).

To its part, the SCDP oil storage company have been made in 1979 its mission is: storage, distribution, control of crude oil product in one side, and in another side to guarantee human and environment protection

### 3.4.2. Cameroon Crude Oil production

Although the country's development policy is not particularly focused on oil revenues, Cameroon tends to accentuate and establish crude oil assets. After tax and customs revenues, crude oil is one of the main income of the state.

**Table 5:** Crude oil African countries producer African and world rank

<b>African rank</b>	<b>World rank</b>	<b>country</b>	<b>Production in 2015 BPD(thousand)</b>	<b>Value in African production(%)</b>
1	13	Nigeria	2322	27
2	16	Angola	1856	22
3	18	Algeria	1671	19
4	27	Egypt	707	8
5	30	Lybia	461	5
6	34	Congo(brazza)	278	3
7	35	Equato Guinea	268	3
8	36	Sudan	262	3
9	37	Gabon	213	2
10	44	Chad	120	1,4
11	46	South Africa	112	1,3
12	49	Ghana	103	1,2
13	51	Cameroon	97	1,1
14	64	Tunisia	51	0,6
15	70	Ivory Coast	34	0,4
16	78	Niger	21	0,2
17	79	Congo(DR	20	0,2
18	96	Mauritania	5,2	0,1
19	109	Ethiopia	0,3	0,0
20	112	Zambia	0,2	0,0
		<b>Total</b>	<b>8602</b>	<b>100</b>

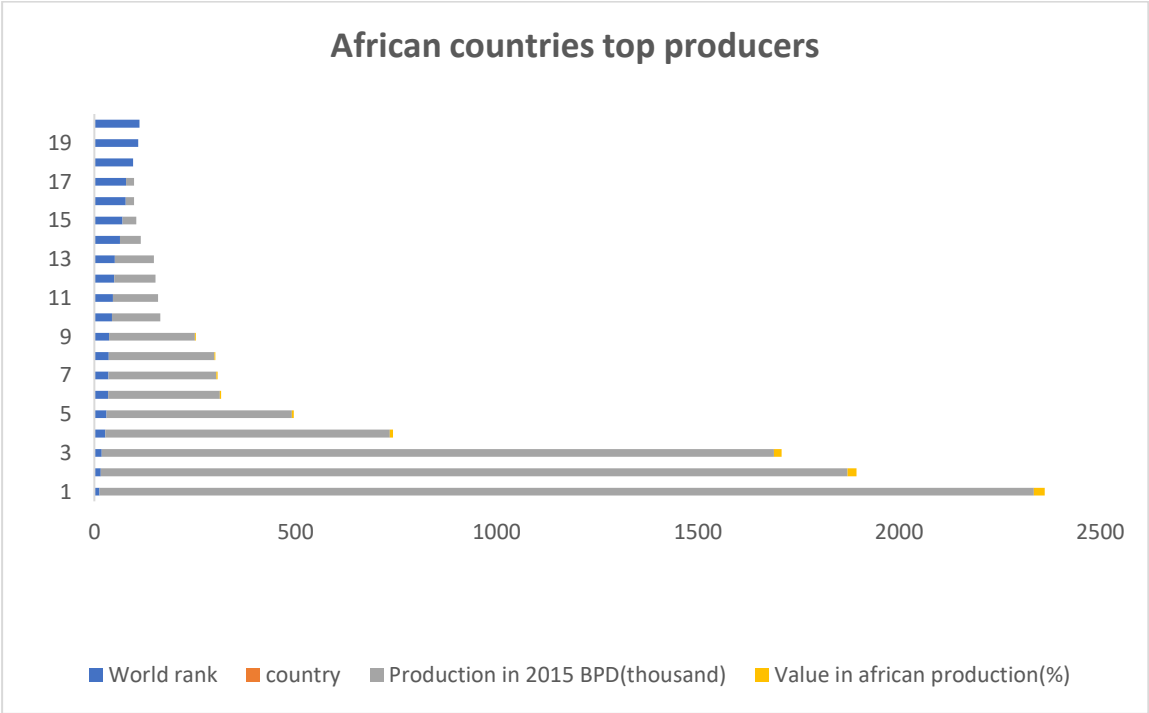
**Source:** (maymoussi.com, 2015)

This table shows the top 20 African oil producing countries in 2015.

Cameroon is 13<sup>th</sup> in Africa and 51<sup>st</sup> in the world. with a crude oil production of 97,000 BPD.

African crude oil is mainly produced in the north part (Algeria, Libya, Egypt), but also in the western part (Nigeria, Angola Equatorial Guinea) (Godzimirsky, 2016)

**Figure 5:** World rank of African crude oil producers



**Source:** Own processing from table 5

3.4.3. Commercialization of Crude Oil into finish products

After manufacturing the Crude Oil, the finish products are Fuels and Liquefied Petroleum Gas (LPG). The commercialization of Crude oil and LPG is ensured by 2 groups: The Producers and the distributors.

3.4.3.1. Households

We might evaluate household through consumption. Cameroon is household consumption is more than 50%. The crude oil industry is one of the major benefits

of Cameroon and enhances human resources area, by the creation of enterprise and employment. (Bikas C. Sanyal, 1990).

#### 3.4.3.2. The Suppliers

The Société Nationale de Raffinage (SONARA): its task is divided into 3 levels:

- Strategical level: Expanding oil production
- Economical level: Move forward rate of all refinery units
- Marketing level: Expanding the product in Cameroonian and international level market (oil, fuel, kerosene)

(SONARA, 2015)

The Société Nationale des Hydrocarbures (SNH)/National Hydrocarbon company(NHC) in English is National company supplier of crude oil, the main tasks are: Promotion, development, and monitoring of oil activities throughout the national territory; Management of State oil interests; Commercialization of oil in national and international market and State's management of crude oil production. (SNH, 2017) .

The société Camerounaise des dépôts pétroliers (SCDP)

The supply takes place through 2 channels: local production and importation. Local production is provided by the National Refining Company, which is obliged to supply the market with 80% of the national consumption. The latter exports of oil represented nearly 50% of Cameroon oil production to the countries of the Economic and Monetary Community of Central Africa (CEMAC) and the international market. (SCDP, 2016)



### 3.4.3.3. The Distributors

we have several in the L.P.G distribution market in Cameroon. Cameroon has many brands of crude oil distributors.

- Gas distribution

The Société Camerounaise de transformation Métallique (SCTM) is the major national gas distribution and transportation company with market share close to 50%, follows by Camgaz and Total both control 18% of the market and then Afrigaz with 11% of the market. (Business in Cameroon, 2017).

- Oil distribution

-Total Cameroon S.A has more than more than 400 consumers sites and 170 sell points in Cameroon

-Exxon Mobil Corporation and Shell International Ltd: International Oil and gas groups. Their activities cover the entire oil supply chain from exploration to production of oil, gas, fuel as well as distribution and transportation.

-Tradex Cameroon, the company shares 19% of the market and operates with 60 sell points over the country

(SONARA, 2015)

**Figure 6:** Cameroon pipeline



**Source:** (Valerie Nodem, 2009)

### 3.5. Crude oil and economic growth

#### 3.5.1. Crude oil challenge

Africa's energy consumption remains low; all African countries are today crude oil-dependent due to the major place of oil in African economies.

The share of oil is significant in Cameroon's economy and accounts for about 40 to 50% of GDP in Cameroon (Geraud & Vliet, 2005)

Huge crude oil price fluctuations bothersome in rich countries bring bad results in underdeveloped countries. Several types of explanations have been proposed to account for the antagonistic impacts of oil exploitation on the economies. We first focused on “Dutch disease”, or “Dutch syndrome”, and refers to the impacts of the abuse of exploitation of Groningen gas, in the 1950s: the rise in exports appreciated the currency and penalized other exports. (Favennec, 2011).

- **Technical progress:** The oil produced should be higher quality and the geographical situation of Cameroon attracts Europe and the United States market. North Africa (Algeria and Libya) are also important supplier to Europe, because of the geographical position, which is closer to Europe. Unfortunately, the political tensions of the Arab-Muslim reach them to a risk market for investors. (Oil and Gas in Africa, 2009).
- **Crude oil Opportunities:** Crude oil exploration Opportunities: Cameroon offers relatively for foreign investors, a favorable operating regime both in terms to the tax system and resource access, while others African producing countries remain quite closed.
- **Positive results:** Cameroon is the 52nd largest producer in the world and 12th largest producer of crude oil in Africa. Cameroon produces almost 81,000 barrels of oil every day. crude oil production added up to 5,763 million barrels on April 30, 2017, which means 29.59% less than a year earlier Gas production totaled 4341.7 BPD in the first four months of 2017, up 1.29% from the same period in 2016 (A.Lobban, 2017)
- **Employment opportunities:** to evaluate a project, we must consider some indicators. This evaluation starts by an observation in socio-economic aspects: such as employment, services, income, Social organization, infrastructure, and migration are all the indicators that serve for a project analysis (Geoffrey, 1990).

Employment depends on the investment, which contributes to a declining unemployment and promotes employment. In Cameroon, several companies have emerged due to many investment projects. The mains Cameroon investors are China, United States, and France who through their companies employ thousands of people.

With future-oriented achievements as well as those already in progress, the employment sector in Cameroon is gradually being revolutionized. The Head of State Paul Biya has initiated the projects of great achievements since 1990 to the present day and several development projects have seen the day and continue to follow one to another. Among the most important one note the construction of the pipeline Chad Cameroon (2003) and which will henceforth serve the oil transport between Chad and Cameroon for international export (figure 5)

### 3.5.2. Crude oil agreement and mining license

Multinational companies operating in the oil sector in Cameroon are subject to a special tax regime. The Natural resources all belong to the Government, the research or the exploitation of crude oil is subjected to preliminary obtaining of a license. The oil business is divided into two sectors: the upstream sector consisting of exploration, research or production; the downstream sector which consists of the exploitation and distribution. (Mailula, 2013).

It shows 2 types of exploitation agreement of mining crude oil:

#### **A Concession Contract (CC)**

Sets out the rights and obligations of the state and the oil company. The multinational assumes at its own risk the financing of oil operations and has, according to the contract crude oil products extracted during the period of validity of the contract. (Mining Laws and Regulation Handbook, 2014). In an oil concession agreement, the State transfers to the concessionaire, on an exclusive basis, ownership of the resources contained in the subsoil or the seabed and the right to exploit them. In return, he receives a royalty and a tax on profits declared by the concessionaire. The company assumes the mining risk and in case of discovery, exploits oil as it is owning.

e.g. PETCO and ONHYM

### **Production sharing contract(PSC)**

This agreement sets out the rights and obligations of both parties, arranges their relations, presents exploitation and sharing of production between the parties and sets the rules and duration of the exploration. The exploitation phase duration is 35 years for gas and 25 years for oil and can be renewed once, for a maximum of 10 years. (Mining Laws and Regulation Handbook, 2014)

#### 3.5.2. Impacts on Economy

The oil boom between 1980-1985 in Cameroon production showed that Cameroon have accomplished a good management oil income, and at this time was an example for others African countries in term of economic management of natural resources. (J.Tamba, 2012)

Economic growth of Cameroon is still driven by investment in projects such as completion of the second Wouri bridge, commissioning of the Kribi Deepwater port, and construction of three dams. also, the gas sector is in the process of development, due to the expansion of offshore gas fields in Kribi. (SONARA, 2015)

Cameroon's economy suffers from factors that often impact underdeveloped countries, the well-known are:

- Oil value dependant (Price volatility)
- Rapid re-debt
- Increasing of political risk: insecurity in the Far North of the country, and uncertainties regarding the succession of Paul Biya (35 years in power, 84 years)

- Increasing tensions between the regime (mainly French-speaking) and the English-speaking (minority)

Oil contributes for some accounts for around 40%,40% to exports, and 6% to Cameroon's GDP, of the Cameroonian government's fiscal revenues.

The usage of new drilling technologies and the discovery of new pools has recovered oil production for at least few years.

In March 2017, IMF staff execute a monetary program with Cameroon for boosting private investment, making comprehensive development, supporting the broadening of the economy and improving the business environment.

(Theodora.com, 2017).

### 3.5.3. Management and Crude Oil perspectives

Properly managed, oil and gas operations can be expected to provide benefits to the communities in which they take place. Some potential benefits include:

- Mineral and agricultural natural resources
- Debt reduction
- Diversified economy compared to other crude oil exporting countries
- Infrastructure modernization in progress

The good management of the Cameroonian crude oil relay on 3 big factors

- Economics factors: the debt cancellation, Economic development with respect to the environment and increase of investment.
- Environmental factors: The management and sustainable use of natural resources (soil, air, water), the control of energy and human knowledge, as

well as the control of the economy and mining resources (oil, gas, coal, minerals ...)

- Social factors: fighting against all forms of exclusion (professional, social, tribalism) and respond to the basics needs of Cameroonians

#### 3.5.4. Environmental aspect

##### **Crude oil and ecosystem**

Crude oil mining clearly impacts in the environment and causes many damages in the environment as well as in population. A huge part of the population or the communities living in this area is exposed to environmental, socioeconomic problems and diseases.

The damages caused by the oil industry affects both human and nature. We will make a quick overview of some consequences.

(M.Ramirez, 2017)

- **Environment**

**Air Pollution:** toxic materials into the air and / or greenhouse

**Water pollution:** The extraction of oil sands requires a lot of water and the use of solvents that are discharged into pits. This waste goes down to the water.

**Soil pollution:** rejection mounds of toxic products for humans and Nature by multinational.

**Beach pollution:** crude oil residues agglomeration is, handling of oil and petroleum products at ports and refineries located in coastal areas, leaks from oil coming from drilling operations.

**Species extinction:** Consequences on flora and fauna, especially on fragile species.

- **Human**

**local population poverty:** In most of the country where multinational is located populations do not enjoy the wealth. Government and multinational enjoy all benefits

**Diseases:** exposition of water pollution and air combustion may affect human health (cancer, anemia, hypertension)

**Conflicts:** unfair division of wealth causes fighting.

## **Catastrophes**

- Oil Spills
- Hydrocarbons fire
- Gaz explosion
- Accident of truck

### 3.5.5. Solutions and environmental protection

The multinational oil companies have defined some strategies to protect the environment:

**Conduct rules:** The pressure of some International Organization as National Wildlife Federation...) and Non-Governmental Organization (Greenpeace...)



pushed multinational companies to adopt conduct rules that define rules and objectives to follow in the field of human rights and environmental protection.

**Awareness:** Many ways are used for this purpose. Awareness by educating the population, awareness through the media, forums, seminars or open days.

(Kamto, 1996).

## Chapter 4: Practical part

For this practical part, we will present first Cameroon import/export of crude oil and for calculation we choose 3 main values to analyse:

- Total production of crude oil in Cameroon
- Cost of production of crude oil
- Cameroon GDP

We will use statistical analysis for data by:

- Correlation analysis
- Regression analysis
- Time series analysis for forecast

### **4.1. Exportations / Importations**

Cameroon exported 554.000 tons of refined crude oil products outside the CEMAC zone this (Actucameroun, 2016).

**Exports countries:** India 36%, China 21%, Portugal 40%, Spain 10%, United Kingdom 4,9%. (Simoes, 2017)

Cameroon imports crude oil around 11% and refined oil for 5,49%.

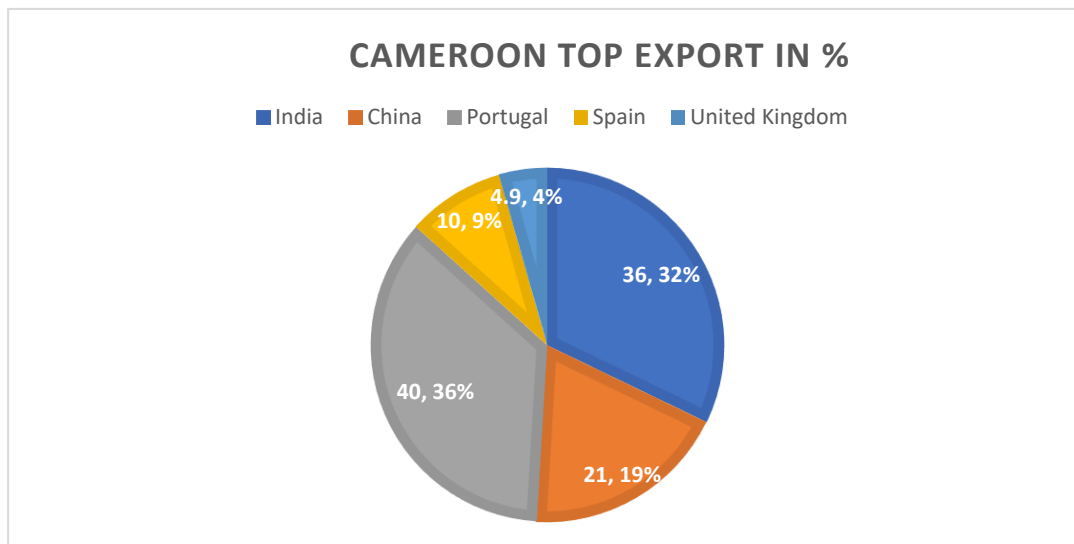
**Imports Countries:** China 22%, Nigeria 11%, France 11%, United States 3,7% (Simoes, 2017)

**Table 6:** Cameroon import/export of crude oil in percentage

Export countries	Percentages (%)	Import countries	Percentage (%)
India	36	China	22
China	21	Nigeria	11
Portugal	40	France	11
Spain	10	United States	3.7
United Kingdom	4.9		

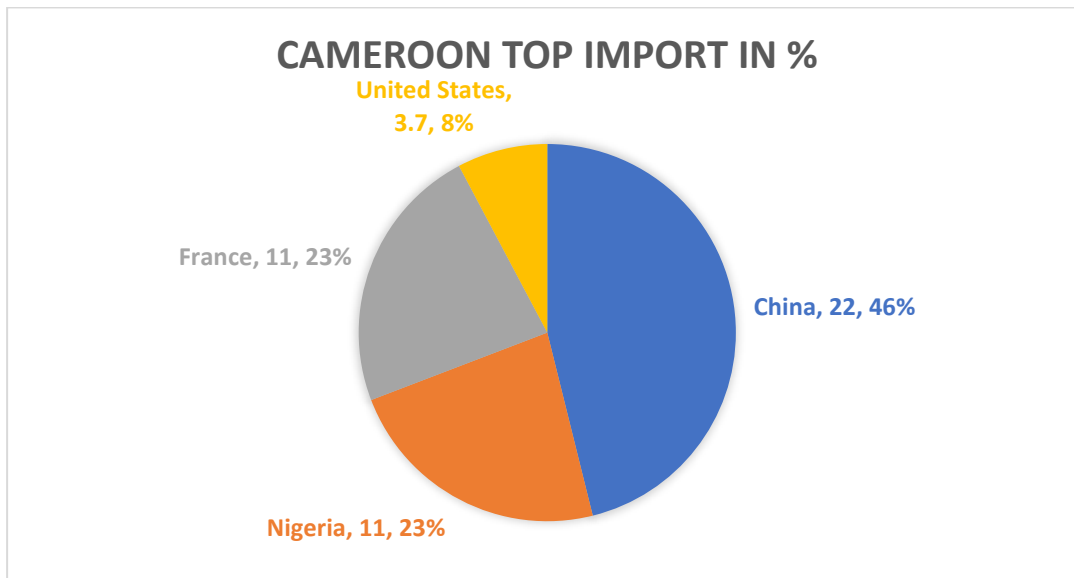
**Source:** Own processing from 3.6.2

**Figure 7:** Cameroon top export in percentage (%)



**Source:** Own processing from table 6

**Figure 8:** Cameroon top import in percentage (%)



**Source:** Own processing from table 6

## 4.2. Presentation of statistical methods

### -Correlation analysis

- Coefficient of correlation

We assume that:  $-1 < r < 1$

If:

$r < 0,3$  weak correlation between variables

$0,3 < r < 0,7$  medium correlation between variables

$r > 0,7$  strong correlation between variables

The correlation analysis helps to know if there is any relationship between variables.

### -Regression analysis

- Equation of regression:  $Y' = a + b X$

Where a is intercept and b is the coefficient of regression.  $a; b \in -\infty, \infty$

- The coefficient of determination  $r^2$  is interpreted to explain the linear regression model.
- P-value analysis: If

$P > \alpha$  we accept null hypothesis

$P < \alpha$  we reject null hypothesis

### **-Time series analysis**

Will be used for forecasting and for prediction of total year production.

The table below is showing the main data for correlation analysis, regression analysis and time series analysis for Cameroon total crude oil forecasting.

We will analyse Cameroon total production of crude oil, oil price, and Cameroon GDP.

We will find the connection between those 3 variables, how much Price and how much GDP can affect oil total production, this analyse helps us to quantify that value. It will show a slew of statistics (Correlation coefficient, P-value).

We will use very basic statistical analysis technique, like making Scatter plots, Trend line, and linear regression, and then be using advanced techniques like Multiple regression analysis.

**Table 7:** Data table of SNH total oil production and price 2006-2016.

GDP value from 2006 to 2016.

year	Total production (thousand barrels/day)	Price(\$/barrel)	GDP
2006	20.583	61.72	17.9531
2007	20.432	68.82	20.4318
2008	20.231	93.26	23.3223
2009	17.624	59.62	23.3811
2010	15.511	78.87	23.6225
2011	14.367	109.49	26.5873
2012	14.766	111.66	26.4721
2013	15.278	107.76	29.5675
2014	16.33	97.04	32.0508
2015	21.585	49.33	28.416
2016	20.034	40.20	24.2044

**Table 8:** Data table of SNH partners total oil production and price 2006-2016.

GDP value from 2006 to 2016.

year	Total production (thousand barrels/day)	Price(\$/barrel)	GDP
2006	11.323	61.3	17.9531
2007	10.814	69.22	20.4318
2008	10.463	93.65	23.3223
2009	9.056	59.33	23.3811
2010	7.8	77.04	23.6225
2011	7.243	112.15	26.5873
2012	7.61	110.47	26.4721
2013	8.997	109.12	29.5675
2014	11.171	97.29	32.0508
2015	13.389	49.68	28.416
2016	13.657	41.71	24.2044

**Source:** (SNH.cm, 2017)

(worldbank.org, 2017)

**4.3. Correlation analysis of total production, price, and GDP**

**Table 9:** Correlation analysis of SNH total production, price and GDP

	Total production	price	GDP
Total production	1		
price	-0.773623174	1	
GDP	-0.476365447	0.443094738	1

**Source:** Own processing from table 7(Using Excel)

The table above shows the correlation analysis between SNH total production, price, and GDP.

The correlation between total production and price is -0.773623174

The correlation between total production and GDP is -0.476365447

And the correlation between Price and GDP is 0.443094738

**Table 10:** Correlation analysis of SNH partners

	Total production	price	GDP
Total production	1		
price	-0.732122137	1	
GDP	-0.055179789	0.453658049	1

**Source:** Own processing from table 8(Using Excel)

The table above shows the correlation analysis between SNH partners total production, price, and GDP.

The correlation between total production and price is -0.732122137

The correlation between total production and GDP is -0.055179789

And the correlation between Price and GDP is 0.453658049

#### **4.4. Regression analysis of total production, price and GDP**

- Multiple regression analysis

Dependent variable (Y): Total production of crude oil

Independents variables:

- **X<sub>1</sub>** Price of crude oil (\$/barrel)
- **X<sub>2</sub>** GDP



**Table 11:** Multiple regression analysis of SNH total production, price, and GDP: Ordinary least square method.

Model 1: OLS using observation 2006-2016 (T=11)

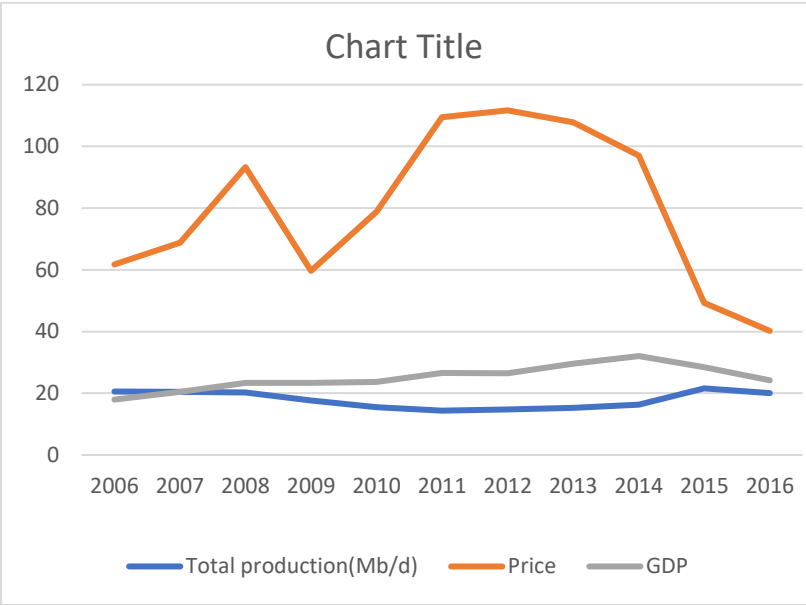
Regression Statistics					
Multiple R	0.787841732				
R Square	0.620694595				
Adjusted R Square	0.525868243				
Standard error	1.879357648				
Observations	11				
ANOVA					
	df	SS	MS	F	Significant F
Regression	2	46.23787	23.11893	6.545591869	0.00206993
Residuals	8	28.25588	3.531985		
Total	10	74.49375			
	Coefficient		t stat	P-value	
Intercept	26.65872188		7.166135	9.5566E-05	
Price (\$)	-0.0748884501		-2.88185	<b>0.02045322</b>	
GDP	-0.11567317		-0.6843	<b>0.51311937</b>	

**Source:** Own processing computed from table 7(Using Excel)

The table above shows statistic values of multiple regression analysis.

We will analyse the P-values to conclude if there is any relationship between total production, price, and GDP.

**Figure 9:** Total production, price and GDP dependency



**Source:** Own processing from table 7

The graph above shows the relationship between oil production, price, and GDP. The data are from the year 2006 to 2016.

Total production decreases when the price goes up and increases when the price goes down.

**Table 12:** Simple regression analysis of SNH crude oil total production and price

Model 2: OLS using observation 2006-2016 (T=11)

Regression Statistics					
Multiple R	0.773623174				
R Square	0.598492815				
Adjusted R Square	0.553880905				
Standard error	1.822994336				
Observations	11				
ANOVA					
	df	SS	MS	F	Significant F
Regression	1	44.5839	44.583973	13.415539	0.0052134
Residuals	9	29.90977	3.3233083		
Total	10	1312			
	Coefficient		t stat	P-value	
Intercept	24.48801401		12.9908	3.90661E-07	
Price (\$)	-0.0827633		-3.6627229	<b>0.00521342</b>	

**Source:** Own processing from table 7

The table above shows statistic values of simple regression analysis.

We will analyse the P-value to conclude if there is any relationship between crude oil total production and price.

**Table 13:** Multiple regression analysis of SNH partners Total production, price, and GDP: Ordinary least square method.

Model 3: OLS using observation 2006-2016 (T=11)

Regression Statistics					
Multiple R	0.795350631				
R Square	0.632582627				
Adjusted R Square	0.540728283				
Standard error	1.495497372				
Observations	11				
ANOVA					
	df	SS	MS	F	Significant F
Regression	2	30.80483	15.402416	6.8868014	0.018224
Residuals	8	17.8921	2.23651239		
Total	10	48.69693			
	Coefficient		t stat		P-value
Intercept	11.5225629		3.89549596		0.004573617
Price (\$)	-0.076577589		-3.7023379		<b>0.00602232</b>
GDP	0.189256945		1.45013457		<b>0.185067957</b>

**Source:** Own processing from table 8

The table above shows statistic values of simple regression analysis.

We will analyse the P-value to conclude if there is any relationship between crude oil total production and price.

**Table 14:** simple regression analysis of SNH partners Total production, price, and GDP: Ordinary least square method.

Regression Statistics					
Multiple R	0.732122137				
R Square	0.536002823				
Adjusted R Square	0.484447581				
Standard error	1.584481664				
Observations	11				
ANOVA					
	df	SS	MS	F	Significant F
Regression	1	26.10169342	26.10169	10.39667	0.010416
Residuals	9	22.59523931	2.510582		
Total	10	1312	48.6969327		
	Coefficient		t stat		P-value
Intercept	15.18159687		9.283121		6.62E-06
Price (\$)	-0.062970584		-3.22439		<b>0.010416</b>

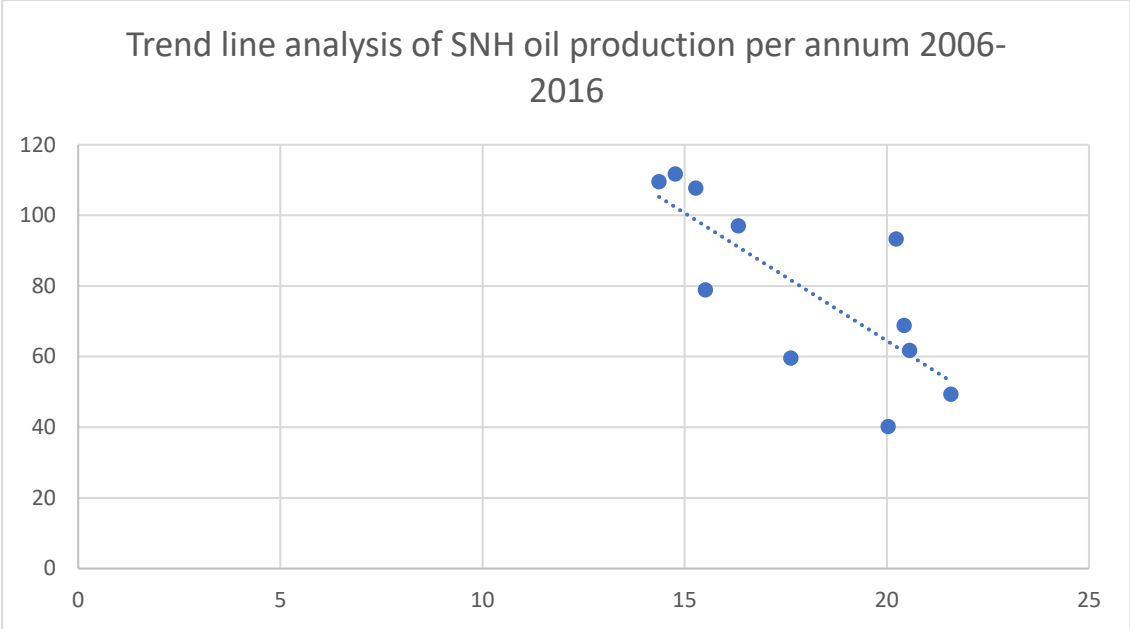
**Source:** Own processing from table 8

The table above shows statistic values of simple regression analysis.

We will analyse the P-value to conclude if there is any relationship between crude oil total production and price.

**4.5. Time series analysis of crude oil total production**

**Figure 10:** Trendline analysis, trendline of total production and price



**Source:** Own processing from table 10

We will use this trend line equation to show how the variable total production will change based on market crude oil price.

That helps also for SNH total oil production prediction or forecasting for next years.

**5. Results and comments:**

**5.1. Correlation analysis**

-From table 9 (SNH)

$r = -0.773623174$ : negative correlation between price and total production

$r = -0.476365447$ : middle negative correlation between total production and GDP

$r = 0.443094738$ : Middle positive correlation between price and GDP

-From table 10 (SNH partners)

$r = -0.732122137$ : negative correlation between price and total production

$r = -0.055179789$ : low negative correlation between total production and GDP

$r = 0.453658049$ : Middle positive correlation between price and GDP

Hypothesis:

The negative value of  $r$  shows a negative linear association between variables price-total production and total production-GDP. Which means if one variable increases in value the other will decrease.

Variables price and total production move in opposite direction with the same trend. That means if the price increases, total production decreases and if the price of oil decreases, the total production increases.

Variable total production and GDP also move in opposite direction. That means if the production increases, GDP decreases, and if the production of oil decreases GDP increases.

The positive value of  $r$  shows a positive linear association between variables price and GDP. Which means if one variable increases the other will increase.

Variables price and GDP moves in the same direction with the same trend. That means if the price of oil increases, GDP follows in tandem and if the price of oil decreases, so does the GDP.

## 5.2. Multiple regression analysis

-From table 11

$$Y = -0.0748 X_1 - 0.111 X_2 + 26.658$$

$$R^2: 0.62069$$

P-value of price: **0.020453221**

P-value of GDP: **0.513119372**

$$\alpha=0.05$$

Hypothesis:

$H_0$ : The Null hypothesis, there is no dependency between total production, Price, and GDP.

-Test of the null hypothesis:

If P-value is greater than  $\alpha$  we accepted the null hypothesis, therefore, there is no relationship between variables.

If P-value is lower than  $\alpha$  we rejected the null hypothesis, therefore, there is a relationship between variables.

-Regression equation hypothesis:

If  $X_1$  (Price of crude oil) increase by 1\$ /Mb/d, crude oil production decreases by 0.0748 bbl/d

If  $X_2$ (GDP) increase by 1 crude oil production will decrease by 0.111 bbl/d

-Comments:



P-value of GDP is greater than  $\alpha$ : **0.513119372** > 0,05: Statistical verification shows that GDP does not have any impact on total production. We accept the null hypothesis, there is no dependency between oil total production and GDP.

P-value of price is lower than  $\alpha$ : **0.020453221** < 0,05: Statistical verification shows that Price has an impact on total production. We reject the null hypothesis, there is a relationship between oil total production and price.

The hypothesis of  $X_1$  (Price of crude oil) is verified. So, by increasing crude oil price by 1\$/bbl/d crude oil production will decrease by 0.0748 bbl /d.

-From table 13

$$Y = -0.0765 X_1 + 0.189 X_2 + 11.522$$

$$R^2: 0.63258$$

P-value of price: **0.006022321**

P-value of GDP: **0.185067957**

$$\alpha=0.05$$

Hypothesis:

$H_0$ : The Null hypothesis, there is no dependency between total production, Price, and GDP.

-Test of the null hypothesis:

If P-value is greater than  $\alpha$  we accepted the null hypothesis, therefore, there is no relationship between variables.

If P-value is lower than  $\alpha$  we rejected the null hypothesis, therefore, there is a relationship between variables.

-Regression equation hypothesis:

If  $X_1$  (Price of crude oil) increase by 1\$ /Mb/d, crude oil production decreases by 0.0765 bbl/d

If  $X_2$ (GDP) increase by 1 crude oil production will increase by 0.189 bbl/d

-Comments:

P-value of GDP is greater than  $\alpha$ : **0.185067957** > 0,05: Statistical verification shows that GDP does not have any impact on total production. We accept the null hypothesis, there is no dependency between oil total production and GDP.

P-value of price is lower than  $\alpha$ : **0.006022321** < 0,05: Statistical verification shows that Price has an impact on total production. We reject the null hypothesis, there is a relationship between oil total production and price.

The hypothesis of  $X_1$  (Price of crude oil) is verified. So, by increasing crude oil price by 1\$/bbl/d crude oil production will decrease by 0.0765 bbl /d.

### **5.3 Simple regression analysis**

-From table 12

P-value of price: **0.005213421**

**$R^2$ : 0.598492815**

**$\alpha=0.05$**

**0.005213421 < 0.05**

Hypothesis:

$H_0$ : Null hypothesis, there is no dependency between total production and Price

-Test of the null hypothesis:

If P-value is greater than  $\alpha$  we accepted the null hypothesis, therefore, there is no relationship between variables.

If P-value is lower than  $\alpha$  we rejected the null hypothesis, therefore, there is a relationship between variables.

-Regression equation hypothesis:

If  $X_1$  (Price of crude oil) increases by 1\$ /bbl/d, crude oil production decreases by 0.08276 bbl/d

-Comments

P-value of price is lower than  $\alpha$ :  $0.005213421 < 0,05$ : Statistical verification shows that Price have an impact in total production. We reject null hypothesis, there is a relationship between oil total production and price.

Statistical verification shows that Price has an impact on total production.

When the price goes up, the total production goes down and when the price goes down, the total production goes up.

Equation of linear regression:  $Y = -0.08276X + 24.4880$

-From table 14

P-value of price: **0.010416**

$R^2$ : **0.536002823**

$\alpha=0.05$

$0.010416 < 0.05$

Hypothesis:

$H_0$ : Null hypothesis, there is no dependency between total production and Price

-Test of the null hypothesis:

If P-value is greater than  $\alpha$  we accepted the null hypothesis, therefore, there is no relationship between variables.

If P-value is lower than  $\alpha$  we rejected the null hypothesis, therefore, there is a relationship between variables.

-Regression equation hypothesis:

If  $X_1$  (Price of crude oil) increases by 1\$ /bbl/d, crude oil production decreases by 0.06297 bbl/d

-Comments:

P-value of price is lower than  $\alpha$ :  $0.010416 < 0,05$ : Statistical verification shows that Price have an impact in total production. We reject null hypothesis, there is a relationship between oil total production and price.

Statistical verification shows that Price has an impact on total production.

When the price goes up, the total production goes down and when the price goes down, the total production goes up.

Equation of linear regression:  $Y = -0.0629 X + 18.181$

5.4. Time series analysis: Prediction of SNH Cameroon total production for 2017,2018,2019 and 2020 (bbl/d)

Equation of linear regression:  $Y = -0.08276X + 24.4880$

**Year 2017**

$$Y = -0.08276X + 24.4880$$

$$Y = -0,08276*12+24.4880$$

$$Y (2017) = 23.49 \text{ bbl/d}$$

**Year 2018**

$$Y = -0.08276X + 24.4880$$

$$Y = -0,08276*13+24.4880$$

$$Y (2018) = 23.41 \text{ bbl/d}$$

**Year 2019**

$$Y = -0.08276X + 24.4880$$

$$Y = -0.08276*14+24.4880$$

$$Y (2019) = 23,32 \text{ bbl/d}$$

**Year 2020**

$$Y = -0.08276X + 24.4880$$

$$Y = -0.08276*15+24.4880$$

$$Y (2020) = 23.24 \text{ bbl/d}$$

Hypothesis: For the same value of price, we expected the total production decreased or remains equal to this value until 2020. The price affects directly the Cameroon oil production.

## 6. Conclusion

Crude Oil investigation began clinched alongside 1947 in Cameroon (Duncan Clarke, 2010) Cameroon's sole oil refinery is dominated by three companies in Cameroon: The National Refining Company NRC in French SONARA for Société Nationale de Raffinage, an oil price stabilization fund (Caisse de Stabilisation des Prix de Hydrocarbures, CSPH), Cameroon world crude oil rank is 51<sup>st</sup> and 12<sup>th</sup> in Africa (Table 5). Even if oil contribution is less than 10% of GDP crude oil production is one of the valuable resources that bring substantial income. (IMF, 2015). Oil is a vital resource for some economies (Russia, Equatorial Guinea...) and leads those countries under strong dependency, and some of these countries such as Guinea with world oil production contribution is very low (less than 1%). The oil boom in 1985 powered economies of all crude oil producers, In Cameroon, Crude oil investment and sector increased which impact in Cameroon economy growth. According to IMF, the fall of oil price in the market may be of significant impact in the Cameroonian economy which is also proved by data results; positive correlation between oil price and Cameroon GDP (figure 9). In 2013 the growth rate was 5.5% against 5% in 2014. Cameroon offers relatively for foreign investors, a favorable operating regime both in terms of the tax system and resource access, while others African producing countries remain quite closed. This positive result is also explained by Cameroon production of crude oil which is almost 81,000 barrels of oil every day. crude oil production added up to 5,763 million barrels on April 30, 2017, which means 29.59% less than a year earlier Gas production totaled 4341.7 BPD in the first four months of 2017, up 1.29% from the same period in 2016 (3.5). Recent years, Cameroon also has been facing many crises in the north of the country (Boko Haram, radical Islamic group) and the conflict between francophone and

anglophone in the south-west of the country by increasing security and humanitarian spending. Properly managed, oil operations can be expected to provide benefits to the country, according to Sonora, Cameroon expected its total oil production to increase for next years and is proved by calculation (4.4).

To be more competitive in the world crude oil market, Cameroon should improve Technical sector by reducing crude oil exportation due to the lack of refinery and economic sector by fighting corruption and promoting crude oil investment. Also, the country should solve internal problems (political problems) in the North and the south west which affect the stability of the state. There is also the environmental problem caused by crude oil exploitation which is pollution; Crude oil mining clearly impacts in the environment and causes many damages in the environment and in population. It is well known that, huge part of the population or the communities living in this area are exposed to environmental, socioeconomic problems and diseases and those damages affect both human and nature (3.5.3).

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