

Czech University of Life Sciences Prague
Faculty of Economics and Management
Department of Economics



Bachelor Thesis

**The Analysis of Crude Oil Price and its Determinants – Case study
of Algeria**

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CZECH UNIVERSITY OF LIFE SCIENCES PRAGUE

Faculty of Economics and Management

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Business Administration

Thesis title

The analysis of crude oil price and its determinants – Case study of Algeria

Objectives of thesis

The main objective of this thesis is to analyze the impact of crude oil price volatility on the economic performance. In many countries crude oil plays crucial role and presents the main determinant of economic performance of these countries.

Methodology

The thesis will be divided into two parts. The first part will be theoretical and the second part will be analytical. To achieve its aims the thesis will mainly use descriptive and comparative methods.

The proposed extent of the thesis

40 – 60 pages

Keywords

Crude oil, GDP, Economic Performance

Recommended information sources

DOWNEY, M. Oil 101. Wooden Table Press, 2009. ISBN-13: 978-0982039205

MANNING, Francis S.; THOMPSON, Richard E. Oilfield Processing Volume two: Crude oil. Oklahoma: PennWell Publishing, 1995. ISBN 0-87814-354-8

SHAH, S. Crude: The Story of Oil. New York: Seven Stories Press, 2004. ISBN-13: 978-1583226254

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Declaration

I declare that I have worked on my Diploma thesis Title: The Analysis of Crude Oil Price and its Determinants – Case study of Algeria. By myself and I have used only the resources mentioned at the end of the thesis.

In Prague 14th of March

Hiblo fituri

.....

Analýza ropných cen a jejich determinantů - Případová studie Alžírsko

Souhrn

Cílem této práce je provést analýzu a interpretovat ekonomické příčiny, které vedly k výkyvům na trhu s ropou se zaměřením na alžírskou ekonomickou výkonnost a HDP.

Použité metodiky v této práci jsou popisná, srovnávací a historická. Tyto metodiky popisují historický vývoj ropného průmyslu. Bude použita také analytická metoda, v níž se budou analyzovat a interpretovat křivky a faktory způsobující nestabilitu na trhu s ropou, navíc bude analyzován vliv ropných šoků na fiskální politiku v Alžírsku.

Práce je rozdělena do dvou částí. První část je teoretická, zahrnuje surovou ropu, její historii, druhy a fáze jejího težení. Později je psáno o OPEC, o světových trzích s ropou a jejich rezervách. V první části práce se zavádí pojem cenové krize ropy a globální inflace.

Druhá část provádí analýzu vlivu cen ropy na Alžírskou ekonomiku. Alžírsko je členem OPEC od roku 1969, jeho ekonomická výkonnost je silně závislá na vývozu ropy, což je 95% příjmů z celkového vývozu.

Trh s ropou je ovlivněn významnými faktory, jako je nabídka, poptávka a politické události. Tyto mají stejně jako globální krize přímý vliv na stanovení cen ropy, což může mít kladný nebo záporný vliv na ekonomickou výkonnost Alžírsko.

Klíčová slova: ropa, ceny ropy, zásoby, OPEC, Alžírsko, HDP, ekonomický výkon.

The Analysis of Crude Oil Price and its Determinants – Case study of Algeria

Summary

The aim of the thesis is to analyze the causes of the economic and interpretations that led to fluctuations in the oil market with focus on Algerian economy performance and GDP.

In order to describe the historical development of the oil industry, the methodologies used are descriptive, comparative and historical. The analytical methodology will be also used to analyze and interpret the curves and the factors causing the instability of the oil market, in addition I will analyze the effect of oil shocks on fiscal policy in Algeria.

The thesis is divided into two parts. First part is the theoretical part including: crude oil history, types and its phases. Also a description about OPEC, world crude oil market and reserves will be included. The concept of crude oil price crisis and global inflation will be introduced.

The second part will analyze the impact of crude oil prices on Algerian economy. Algeria is a member of OPEC since 1969, its economy performance is heavily dependent on crude oil exports, which is 95% of total export revenues.

The market of crude oil is affected significant factors such as supply, demand and political events as well as global crisis have direct impact on the determination of crude oil prices, which can affect the economic performance of Algeria positively or negatively.

Keywords: crude oil, oil price, reserves, OPEC, Algeria, GDP, economic performance

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1. Introduction

Oil appeared by ancient geological ages in the forests that existed in some parts of the earth. The organelles and sea plankton and aquatic plants, those gathered under layers of organic material from the ground and increased the pressure and turned over millions of years to the oil. The first oil well was drilled in china in the fourth century.

There is oil in every continent, and under every ocean, but modern methods allow oil engineers to extract only just third of oil accumulation, this is called the recoverable reserves quantities.

Mostly it consists of hydrocarbons which are compounds of hydrogen and carbon atoms interlinked in long chains which were formed for more than 200 million years of the dissolution of the remaining animals and plants. Chemists are making thousands of products from crude oil today.¹

Coal remained the main fuel until the mid-twentieth century. But today we are noticing the growing of oil and natural gas use because they are cleaner and easier to use.

The use of oil is not limited to provide energy to rotate wheels only, but also to pave the roads that goes on them. Oil exists naturally as a black gooey smelly liquid in the ground or under the sea.

Almost 80% of world oil reserves exist in the Middle East, and approximately 62.5% of it in five countries: Saudi Arabia, United Arab Emirates, Iraq, Kuwait, and Iran. While the United States has only 3% it accounts for almost 40% of total energy consumption in the United States.²

Today oil and gas provide the world's 7 billion people with 60 percent of their daily energy needs. The other 40 percent comes from coal, nuclear and hydroelectric power, and “renewables” like wind, solar and tidal power, and biomass products such as firewood.

¹ The Making of Oil: Birth of a Reservoir, Schlumberger Excellence in Educational Development available at: (<http://www.seed.slb.com/en/scictr/watch/makingoi/birth/index.htm>).

² Thomas Gold, "The Origin of Methane (and Oil) in the Crust of the Earth, U.S.G.S. Professional Paper 1570, The Future of Energy Gases

1.1 Aim of the thesis

The aim of the thesis is to analyze the causes of the economic and interpretations that led to fluctuations in the oil market.

1.2 Methodology

From the importance of the subject of the oil industry in the 21st century and the adoption of economies on oil as a primary source of energy instead of other energy sources, and central role that oil plays in the growth and economic development. According to what has been referred to in the introduction of the inability of both producing and consuming countries and companies to dominate the market, despite the ongoing attempts to prevent price unrest.

The methodology used varies depending on the nature and the problem of study, our study is associated with the analysis of the impact of oil price fluctuations on fiscal policy in Algeria.

The study will use the descriptive, comparative and historical methodology in order to describe the historical development of the oil industry in the presence of oil price fluctuations as well as the study of supply and demand on the oil curve characteristics.

Also will use analytical method to analyze and interpret the curves and the factors causing the instability of the oil market, in addition I will analyze the effect of oil shocks on fiscal policy in Algeria.

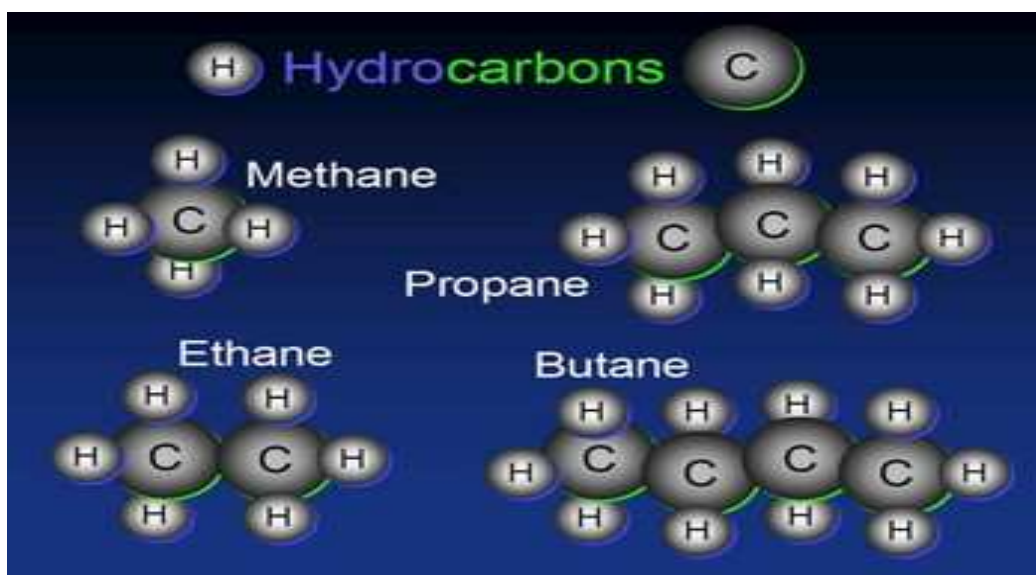
2. Literature

The word oil is originally a Latin word (Petroleum) where Petr means rock and Oleium means oil which means the Rocks oil.

Oil is simple and composite material at the same time. It is simple in that, it consist only two chemical elements, hydrogen and carbon.

All the material is made up of molecules which are the basic units of its structure. And every part consists of atoms. Each oil product has a unique atom structure, as it is illustrated at the figure down.³

Figure No. 1: the structure of oil atoms



Source: Hydrocarbon chains of varying lengths lead to different petroleum products. Available at: (chemistryland.com)

The first definition of oil is the liquid of hydrocarbons. It has special smell and special color which is kind of a mixture of black, green, brown and yellow. It's also very sticky liquid, and that differs to its intensity. The crude oil intensity depends on the amount of carbonic atoms.⁴

³ Crude oil petroleum products available at:(<http://www.britannica.com/science/crude-oil>)

⁴ Crude oil definition available at :(<http://www.investopedia.com/terms/c/crude-oil.asp>)

The second definition is that oil is as a gas substance or natural gas where it contains gases and main gases are Methane, Ethane, propane and butane it also contains nitrogen and carbon dioxide. The biggest share goes to Methane with 70-90% which under high degrees can turn into liquid.

The third definition is defined as that the oil consists mainly of complex mixtures and partial combinations with a variety of natural and chemical with different properties. It also contains some impurities like sulfur, oxygen, nitrogen, water and salts, as well as some minerals such as iron, Vanadium And sodium.

The presence of these impurities is considered as unwanted, and their negative impact on the refining and processing operations so it requires special devices for purification. The operation of Gas separation, Dehydration, desalting, desulphurization and heating it all requires more and more expenses. The following table shows us the overall rate for the proportions of the constituent elements of oil⁵.

Table No. 1: Elements of oil

Element	Percentage by weight
Carbon	82 – 87
Hydrogen	11 – 15
Sulfur	0.2 – 4
Oxygen	1
Phosphorus	Less than 1%
Diesel	0.1
Ash	0.05 - 0.11

Source: Crude oil petroleum product available at: <http://www.britannica.com/science/crude-oil>

The crude oil price determinants are differs from country to another according to the location of the county on the map and the method of the export they are using, the understanding of the

⁵ ENCE equipment for oil and gas production, available at:(http://www.ence.ch/eng/equipment_ngd.php)

gravity model the country who export the oil following, there are many studies were focusing on the crude oil price determinants.

Most of the studies were defining the determents of oil price as “The concept of supply and demand is fairly straightforward. As demand increases (or supply decreases) the price should go up. As demand decreases (or supply increases) the price should go down.”⁶

According to Andreas Breitenfellner, Jesús Crespo-Cuaresma and Catherine Keppel in their study under the name unveiling the determinants of crude oil prices, they were defining the determinants of crude oil price from the demand and supply side as well as the role of OPEC and finally The Contribution of Financial Markets.⁷

And there are several studies focusing on the determinants of crude oil price and most of them are putting the demand and supply as the main factors that affect the price of the crude oil.

2.1 History of crude oil

Oil is one of the most important discoveries since 1859; it is the most important source of energy, and the focus of all industrial and agricultural production in the modern world.⁸

Oil is not only the most important source of energy, but also became a source for the extraction of at least ten thousand different industrial commodities.

Crude Oil has become the most important commodity in the international trade; it constituted 33.2% of world trade energy ratio in 2008, there is no other substance which has the same amount of commercial and economic importance like Oil.

Despite numerous attempts in industrialized countries to replace Oil with other sources such as gas, coal, nuclear energy or renewable energies such as Solar energy and wind energy and hydropower and other permanent energies (since the first oil crisis in 1973 Because of the

⁶ Paul Kosakowski. What Determines Oil Prices? Available at:
(<http://www.investopedia.com/articles/economics/08/determining-oil-prices.asp>)

⁷ Breiten fellner, Jesús Crespo-Cuaresma and Catherine Keppel. unveiling the determinants of crude oil prices available at:
(http://www.webmeets.com/files/papers/SAEe/2011/336/Determinants%20Oil%20Breitenfellner_Crespo_Keppel.pdf)

⁸ Oil industry following history available at:(<http://www.history.com/topics/oil-industry>)

versatility and flexibility of its products) oil turned into a strategic commodity which controls the future of the world and its economy.

Oil does not have impact just in the global economic system and international trade, but can accommodate up to cover all aspects of contemporary civilization that are difficult to imagine without oil.

Professor Daniel Yergin, who is one of the most important writers on modern societies of oil communities, he says: "our age is the age of oil, and modern societies are oil societies, and modern humans need the derivatives of oil"⁹.

This is why oil industry and oil economy is important subject in the media and universities for example in Paris IFP (Institute Français du Pétrole), USA API (American Petroleum Institute) and Kuwait (The Arab Institute of Oil)

The critical importance of oil in the world economies has made the oil market a non-free economic, in the traditional sense, and not governed only by the market laws It's influenced at the same time by policies and strategies between The interests of the major industrial countries which are consuming Oil and developing countries which are producing Oil.

The world major companies and especially Americans are the first, who established the market of Oil, because of the birth of the oil industry in the United States (when the first commercial discovery in "Pennsylvania" in the region United States of America in 1859), Where this industry grew up and has been developed under the capitalist system since the Beginning of the twentieth century and up to the period from the fifties.

In this period, just a couple of companies had dominated (their number does not exceed eight; five of them American, and the rest European, which nicknamed Universal Cartel) the global oil market.

⁹ Daniel Yergin the quest: Energy, Security, and the Remaking of the Modern World, September 26, 2012. ISBN: 978-0143121947

During World War II, Global economic collapsed and new parties appeared and broke into the oil market. Developing countries worked themselves out from the domination and control of the international companies and from the Exploitation of their oil wealth.

One of the main factors of reducing the domination of oil market is the appearance of independent and national companies after World War II and in particular since the fifties of the twentieth century to the present day, besides the entry of some political and economic variables and the forces of a new oil market, like the creation of OPEC (Organization of Petroleum Exporting Countries) in 1960, and OAPEC (Organization Arabic of petroleum exporting countries) in 1968. This worked to open the world oil market and the diversion of the global economy to shift the balance of supply and demand, so that the status of the oil market has changed from a buyers' market to sellers' market¹⁰.

2.2 Types of crude oil and degree of intensity

Crude oil found in nature despite being a homogeneous material in its constituent elements, but it does not have a single type in the world. It is on multiple types affected by these types of natural or chemical characteristics or density or viscosity according to the amount of sulfur contained.

Oil varies and differs in kind from one area or country to another. And even within the same field, there is no single kind of oil, but there may be multiple types. The oil of European continent is different from the African continent oil; the Arab oil in the Asian continent is different from the Arab oil in the African continent. There is light, medium or heavy oil depending on the degree of density (high or low), and there are sweet and bitter oil depending on the amount and percentage of sulfur.¹¹ The table below (table No.2) shows different oil products.

¹⁰ André Bénard. World Oil and Cold Reality. Available at:(<https://hbr.org/1980/11/world-oil-and-cold-reality>)

¹¹ Crude oil facts about the crude oil available at:(http://benergypartners.com/Facts_About_Crude_Oil.html)

Table No. 2: the degree of the density for oil products

Kind	The degree of relative density	The number of barrels per metric ton	Density by according to API
Crude Oil	0.80 – 0.97	6.6 – 8.0	12.9 – 45.4
Aircraft Petrol	0.78 – 0.80	8.2 – 9.1	49.9 – 70.6
Car Gas	0.79 – 0.81	8.1 – 9.0	47.6 – 67.8
Kerosene	0.78 – 0.84	7.6 – 8.2	37.0 – 49.9
Oil Gas	0.82 – 0.90	7.1 – 7.8	25.7 – 41.1
Diesel	0.82 – 0.92	6.9 – 7.8	22.3 – 41.1
Lubricating Oil	0.85 – 0.95	0.85 – 0.95	17.5 – 35.0
Fuel Oil	0.92 – 0.99	6.5 – 6.9	11.4 – 22.3
Asphalt	1.00 – 1.10	5.8 – 6.4	10.00

Source: Louisiana Department of Natural Resources Crude Oil Gravity Adjustments, available at:
<http://dnr.louisiana.gov/index.cfm?md=pagebuilder&tmp=home&pid=301&ngid=1>

This difference and variation in the types of material oil result in multiple effects on the industry and oil economic activity among the most important effects are:

1. Impact on the value and price of oil.
2. The impact on production cost in terms of purity as well as the method of refining and quality of oil refineries.
3. The impact on the oil supply by estimating what it gets from the amount and percentage of possible obtained from the specific oil. We cannot use and consume oil as a raw material; we only use it after we filter it or refine it into different oil products, some of them with different heating value and with bigger range in diversity consumption and use, and others with lower heating value and with limited diversity of use and consumption.

Oil products

Crude oil includes many petroleum products which are different in nature, form, value and use. There are light, heavy and medium products.¹²

Table No. 3: Oil products

Light	Medium	Heavy
<ul style="list-style-type: none">• Natural gas• Jet fuel• Motor fuel• Kerosene	<ul style="list-style-type: none">• Gas Oil• Diesel Oil• Lubricants	<ul style="list-style-type: none">• Fuel Oil• Asphalt• Wax

Source: refining of the crude oil available at: (http://investmentpedia.net/?page_id=231)

2.3 Phases of crude oil industry

It is considered that the oil industry, has unlimited stages of production. These stages are connected and integrated with each other to form the oil economic. All stages of the industrial activity of oil are under two main stages, upstream and downstream stages.

2.3.1 Upstream stage

This stage is also called the upper stage, which means a sum of several different activities that are embodied in the knowledge and scientific theory studies, as well as analytical and practical, in the organizational and administrative aspects of geological Technology, aiming to know and identify the presence of the oil wealth both, in terms of the amount of oil and its types of geological and geographical location, as well as the economic exploitation.

This stage despite being abstracted in one stage, but it actually involves three main stages (research and exploration stage, drilling and exploration stage and the extraction and production stage).¹³

¹² Crude oil petroleum products available at: (<http://www.britannica.com/science/crude-oil>)

Despite the differences between each of them, they are interrelated and integrated with each other. These stages have one goal, which is the presence of oil both spatially and the nature of that presence, and determine the characteristics and advantages.¹⁴

Research and exploration stage: The stage of research and exploration has appeared clearly, since the discovery the relationship between oil and rock types on earth. It has been proven that they come from the sedimentary rocks, likely this phenomenon throughout history outweigh the theory of organic origin, and therefore Explorers connects the possibility of the presence of these rocks. Accordingly, the focus of research in sedimentary basins at the edges of continents and mountain ranges are near the Continental Shelf. Among the most important methods used in the search for oil are:

- **Geological Survey:** Where the geological task is limited in the drawing maps showing different combinations and types of rocks for the area to be scanned, after being sampled, modeled and laboratory analyzed. Researchers can find locations of oil through some natural phenomena.
- **Geophysical survey:** As a result of scientific and technological progress in the field of oil industry scientists have found a more complex ways but also more feasible, mainly:
- **Seismic Survey:** This method relies on sending sound waves into the ground by triggering movement on the surface or In sufficient depths were waves are being sent by different layers on the magnetic strips which gives us information about the rocks structures and types.
- **Magnetic Survey:** is the measurement of the magnetic field component in different areas to see the thickness of sedimentary rocks after basic rocks (igneous) above the ground and this gives a picture of the rock layers from which to infer the presence of the reservoir or not.

¹³ The Three Oil and Gas Energy Markets: What Is Upstream? Available at: (<http://setxind.com/upstream/what-is-upstream/#sthash.imVCDHJU.dpuf>)

¹⁴ - OPEC facts and figures available at : (<http://www.opec.org/home/PowerPoint/Reserves/OPEC%20share.htm>)

Drilling and exploration stage: This is a critical stage for the success of the economic exploitation of the oil wealth. After the oil or gas traps have been identified the exploration starts, to find out whether there is oil or not.

Since drilling is the only way to verify the presence of oil, the selection of locations must be accurate. The accuracy in choosing the locations of wells do not need only the scientific terms but also in economic terms due to costs. The error in choosing the locations of wells can lead to failure to find oil despite to its existence because of not reaching the reservoir correctly.

The drilling process is the most dangerous stages of the oil exploration and most expensive since the costs of drilling in the flooded areas are ranging from three or four times the price. Where the cost of drilling on land in 1979 prices are (0.9 to 1.8) million dollars, while in 1990 the cost of flooded areas are (6.7 to 57) million dollars as for the land ranged (1.7 to 38) million dollars.¹⁵ The tables below in the next page (table No.4 and No.5) show the costs of crude oil exploration of private and independent companies.

¹⁵ Lux Research, INC. Available at (www.luxresearchinc.com)

Table No. 4: The cost of crude oil exploration for big oil companies between (2000-2001) Barrel /USD.

Big five companies	2000	2001
Exxon Mobil	3.35	6.60
Royal Dutch Shell	3.42	7.49
BP – Amoco	3.29	3.78
Chervon Texaco	5.37	7.11
Total FinaElf	4.06	4.48

Source: Lux Research, INC. Available at (www.luxresearchinc.com)

Table No. 5: The cost of crude oil exploration for Independent and national companies in alphabetical order between 2000 and 2001 - Barrel/USD.

Independent and national companies in alphabetical order	2000	2001
Amerada Hess	8.50	17.97
Apache	6.92	7.20
Conoco	8.10	9.71
ENI	4.92	6.11
Enterprise Oil	14.75	6.44

Source: Lux Research, INC. Available at (www.luxresearchinc.com)

It is evident from the table that the inequality cost of drilling and oil exploring differs from company to company and from year to year. It may be due to the company size or technology used. As example for the differences between companies, the cost reduction to 3.29\$ for barrel in BP, while Marathon rise about 24\$, as for the variation from year to year within the same company is for example in Exxon Mobil, where costs reduced to 3.35 USD in 2000 and rose to 6.60 USD in 2001. As well as for Enterprise Oil, costs were 14.75 USD in 2000 and dropped to 6.44 USD in 2001.

Over the last two decades of the twentieth century, the oil industry experienced significant technical improvements in the field of the development in oil production, leading to a cost reduction of about 27 USD/barrel in 1981 to about 9 USD/barrel in 1995. But it should not be understood from those improvements that global reserves of oil has benefited from that growth, but the opposite is true, these reserves have not been able to compensate what has been extracted over the last two decades.

There is difference in the period required for the drilling of the well depending on the depth and difficulty of the area and problems that may arise during drilling and are all usually extended to several months. This stage is characterized of economic activity from the oil component of adventure or risk of diversity and variability of region to another.¹⁶

Extraction and production stage: It is aimed to the extraction of crude oil from the ground to the surface to be ready for transport, export and manufacturing in within the country. This stage includes activity related to the creation and validity of the oil region and economic exploitation, whether of the technical aspects, technological or constructional use of the drilling of oil wells, and determine the number and make it suitable for the production or extraction and the establishment of various mechanical equipment of reservoirs and purification of transport and purify the tanks and assembling ... etc.

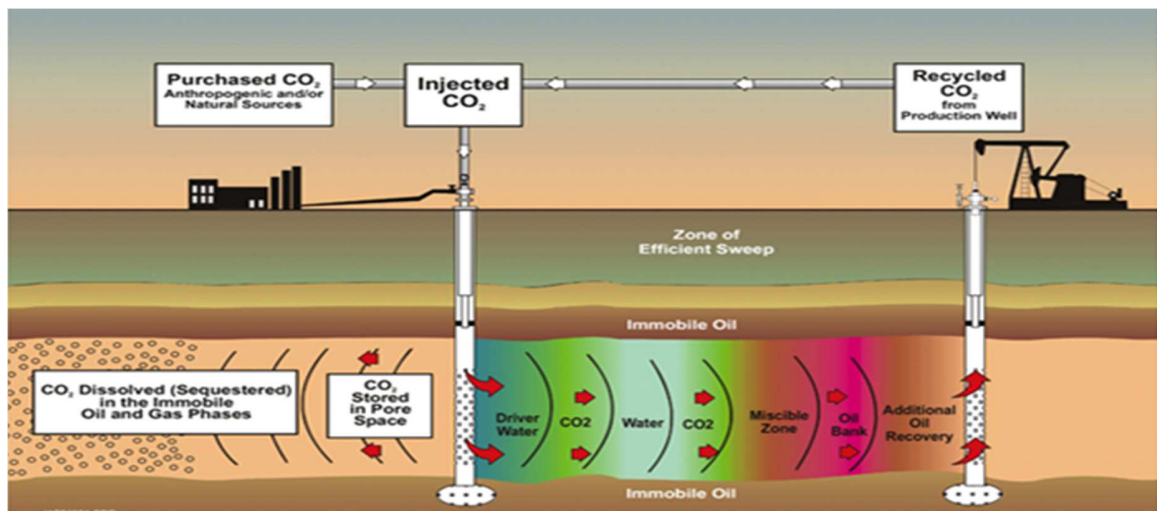
The oil extraction stage is linked entirely and directly on earlier stages of crude oil production process. The flow of oil in the second stage of the production is by natural drain relying of natural energy of the reservoir. If this energy is low, the pressure is possible to start by a sharp fall if we continue with production, and therefore the rate of production starts to reduce. As long as the goal is to extract the largest possible amount of oil inventory in the ground, secondary methods had to be invented to be economically feasible. Where secondary methods are assisted by various reservoirs at this stage, which have been classified by the basis of influential propulsion power, for example:

¹⁶ Crude Oil Exploration and Production. Crude Oil Production Equipment's available at: (<http://www.enggcyclopedia.com/welcome-to-enggcyclopedia/crudeoil-exploration-production/>)

- Self-propulsion reservoirs
- Gas dome propulsion reservoirs
- Water propulsion reservoirs
- Gravity propulsion reservoirs

The secondary extraction methods represents the injection well machine in various ways, the most important is gas and water injection. Where these machines are considered the most efficient way at the present time, water is injected into the reservoir to increase pressure and thereby stimulate production; it can also increase oil recovery from an existing reservoir.

Figure No. 2: Extraction methods of water injection



Source: Advanced Resources International (ARI), Improving Domestic Energy Security and Lowering CO2 Emissions with “Next Generation” CO2-Enhanced Oil Recovery (CO2-EOR), available at : <http://neori.org/resources-on-co2-eor/how-co2-eor-works/>

2.3.2 Downstream stage

This stage comes immediately after the upstream stage, called as well as the lower stage. This means a group of several different activities that are taking advantage of the oil after extraction. This stage is based on the economic and industrial side more than on the theoretical

and cognitive side where downstream stage like its predecessor is based on a group of other stages.¹⁷

1. Oil transport stage: This stage is aimed to transfer of crude oil from the production centers or -regions to be exported or refined or consumed. This is done by formation facilities and provision of various facilities and equipment to transport oil types (Like tubes and trucks etc.) and by sea by giant ships. Oil exporting and processing zones may be near or far or internal and external.

2. Oil filtering and refining stage: This stage is aimed for oil production in refining facilities where it's converted from raw crude oil into various oil products, to satisfy the demand. These petroleum products are some essential and major, and some are minor and light such as benzene, kerosene, and some heavy products such as asphalt or wax. This stage is called the manufacturing industry.

3. Marketing and distribution stage: This stage is aimed at marketing and distribution of crude oil as raw material or petroleum products for local consumption or global export. The major distribution centers or sub-centers are always equipped with tools and storages to be ready for distribution.

4. Petrochemical manufacturing stage: This stage is aimed to convert oil products into different petrochemical products like agricultural fertilizers, pesticides, dyes and plastic... etc. This stage includes a wide unlimited number of economic and industrial activities in the importance of national or global economic. It did not appear only since the thirties of the twentieth century and in some countries like the United States and Germany. The petrochemical manufacturing stage can be regarded among the other initial stages because of the correlation between them and the adoption of industrial activity of oil and its various forms. This stage is not considered within the oil production because of its independence among those stages, especially because oil production process is completed without the petrochemical stage. In many countries of the world oil industry activity is limited to the first six stages of the two phases of the upstream and downstream then extends in many other

¹⁷ Oil & Gas: What is the downstream process? Available at:(<https://www.reed.co.uk/career-advice/oil-gas-what-is-the-downstream-process/>)

industrialized countries to the petrochemical manufacturing stage. While the oil industry is limited activity in many Asian and Western European countries, where oil is not available in their territory but is still importing crude oil products, for petrochemical industry.

2.4 World crude oil market

It is well known that the market has three basic elements which are: sellers, buyers and place of trading. The difference between these elements are in the nature of the market and its division, according to this difference we can divide it several types, most notably is the pure monopoly and monopolistic competition and oligopoly. Of course to graduate the oil market its part of economic analysis (Micro economic).

Crude oil is one of the biggest markets in the world. Despite the fact that crude oil is delivered by a generally small number of companies, and frequently in remote areas that are exceptionally a long way from the point of consumption, trading in crude oil is strong and worldwide . About 80% of international crude oil exchanges uses waterway in supertankers.

Crude oil is shipped all over the world. That's why; worldwide supply and demand decides costs for this energy source. World events can also influence costs of production and exporting. For example, when supply stops because of war or some political strife higher-cost substitutions must be found and therefore cost goes up. Crude oil market shocks or economy crisis can also have direct impact on the prices of crude oil.

Since the crude oil with different degrees of intensity, it is fairly even match homogeneity between the types of crude oil, this case makes the monopoly of the few market applies to a large extent on the world crude oil market.

One of the most important global market components of crude oil are the producers (OPEC and non-OPEC) and consumers (industrial countries and developing countries).

The oil market is affected negatively or positively by multiple factors. Theoretically, the fundamentals that determine the prices in the oil market supply and demand, which is estimated inaccurately, in practice, transactions conducts the future markets such as stocks, bonds and foreign exchange rate which play important role in determining oil prices, Which

means that crude oil prices are affected by a variety of factors dominated by non-oil elements, this fact cannot be ignored as oil as a commodity, it does not apply to the law of supply and demand, which is supposed to determine the price and this fact applies to all time periods during the past decades.

The most important conclusion to be drawn is that the process of crude oil pricing is no longer accessible to the producing countries (as it was in the seventies), but the main control became to those who are capable of storing oil and marketing it. We cannot ignore the non-economic factors and that is the political factor, including the extreme fluctuation in the oil markets lately and the levels that have been recorded in 2008, which amounted prices peak in June 2008, having drawn the price of a barrel 145 USD, which made it difficult to predict the future of crude oil prices.

2.4.1 World crude oil importers

Oil is the main source of energy in the world since 1950 to 2010, compared with other energy sources such as coal, nuclear energy and renewable energy ... It is supposed to remain so over the next 20 years according to the latest research conducted in the field of economy and energy .

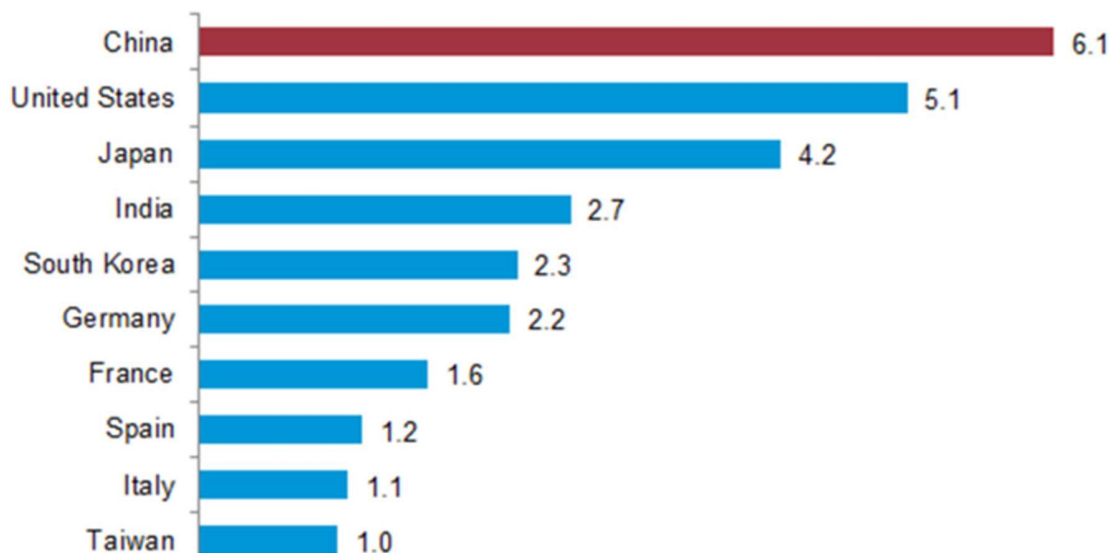
Our modern society really depends on crude oil. Countries in the Middle East are the world's leading oil exporters, like Saudi Arabia, Iraq, and Iran. But other countries like Russia or Venezuela has pretty strong supplies too.

Global crude oil consumption is estimated to increase of an average of 1.6 USD million b/d in 2016 and by 0.6 USD million b/d in 2017¹⁸.

The biggest crude oil importers in the world are China and the United States. According to EIA (U.S. Energy information and Administration) the consumption of these two countries in 2015 was about 30.5 million barrels per day, which is 32% of the world crude oil consumption. The consumption of both china and the US are estimated to raise in 2016 due to the low crude oil prices.

¹⁸ EIA, Short-term energy outlook. March 8, 2016 available at: (https://www.eia.gov/forecasts/steo/report/global_oil.cfm)

Graph No. 1: Top Ten Crude Oil Importers year 2014



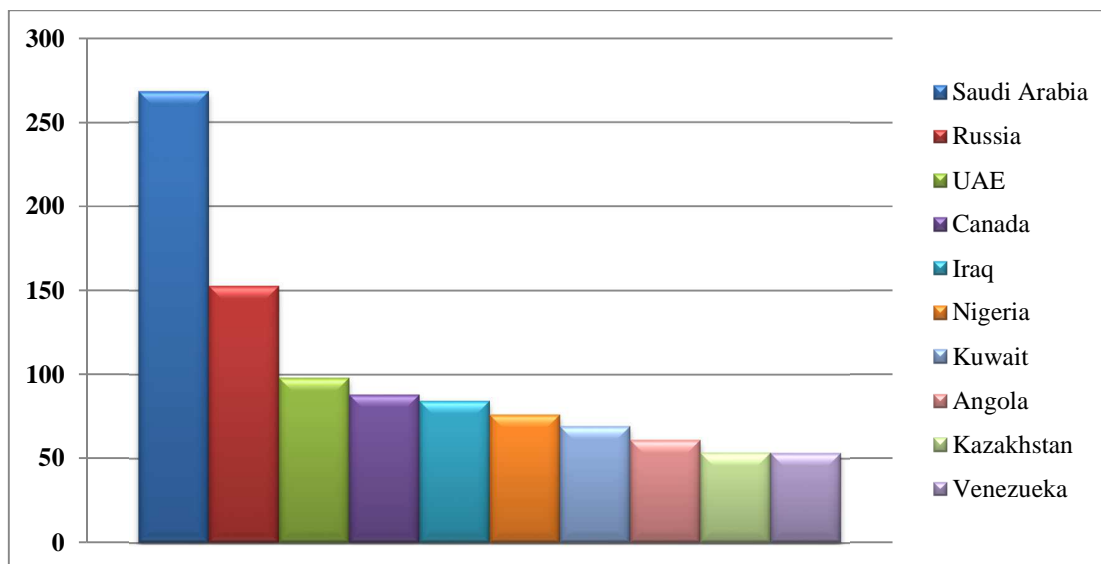
Source: <https://www.eia.gov/beta/international/analysis.cfm?iso=CHN>

As we can see from the graph, Japan is occupying the third place in the world largest crude oil importer, but the slowing Japanese economy and falling interest from Japan will keep on weighing crude oil costs in 2016. However, low oil prices will motivate India to import more according to the US Energy Information Administration (EIA).

2.4.2 World crude oil exporters

We need to understand that crude oil demand is increasing among countries with strong economic every day. Its considered that possibilities of stock in the oil fields, and the policies of oil-producing countries and the extent of their need for oil to meet the domestic needs, and export, in order to get the cash resources to meet the financial needs or keep it for future generations, is of the factors affecting the global oil supply, as well as for the demand for oil and its price plays a vital role in supply of oil, as well as commercial and strategic reserves which affect the display size, especially in seasonal fluctuations, the observer of the events during the period finds that the above factors achieved all of them affected the supply of oil and consequently in the price level.

Graph No. 2: Top ten world crude oil exporters (2014)



Source: <http://www.worldstopexports.com/worlds-top-oil-exports-country/>

From the graph above (Graph No.2) we can see that Saudi Arabia has always been one of top five top exporters in the world. We can also notice the huge gap between Saudi Arabia crude oil export and Russia. From that we can conclude that these economies are highly dependent on crude oil prices, because it can have direct impact on their economy performance.

2.5 Reserve of crude oil over the world

The concept of oil industry and economy is connected with the term oil reserves. The change of supply and demand of the oil market during the period of the sixties and seventies, a new term appeared in the oil economy vocabulary which is oil stocks. These two new terms have three major titles:

- The fundamentals of global oil reserves.
- The evolution of world oil reserves and future estimates.
- Global Oil stocks.

The fundamentals of global oil reserves: The oil reserves based on the oil industry, which is part of the upstream stage of the industry. The concept of fuel reserves is very complex.

Reserves in general represent a set of resources available to meet the present requirements and future communities.

2.5.1 Definition of crude oil reserves

It is the part of the amount of oil stored in the ground, whether in land or sea, which can be extracted by available technical means. The estimation of oil reserves depends on multiple factors such as: means of propulsion, chemical and physical properties of rocks.

The extractable percentage varies from field to another and from region to another.¹⁹ Oil reserves include reserves of oil and natural gas and in spite of the link between natural gas reserves and oil reserves, there are different considerations taken into account when estimating natural gas reserves, including:

1. Natural gas comes out either mixed with oil, or flowing so there is no need to use automatic means for extraction as for oil.
2. The volume of gas varies significantly between location to another, according to the temperature and pressure level.
3. Gas is used often to extract the oil by re-injecting it into the well.

2.5.2 Types of crude oil reserves

Oil reserves change with time according to the prevailing technical conditions. Therefore oil reserves are classified into three main types,

1. Proved reserves: Means the underlying oil quantities in the ground which was discovered by scientific basis (based on engineering and geological information available) its presence is approved through the drilling of oil wells. Possible extraction probability ratio is up to 90%.
2. Probable Reserves: Are quantities that can be obtained from the reservoir. This kind of reserve presence is known technically, but unknown in the terms of production

¹⁹ bp.com. British petroleum .oil reserve definition, acceded 12.12.2015 available at:(
<http://www.bp.com/en/global/corporate/about-bp/statistical-review-of-world-energy-2013/review-by-energy-type/oil/oil-reserves/oil-reserve-definitions.html>)

costs, and there is lack of geological information that makes it in the ranks of proven reserves. The estimation of presence is 50%.

3. Possible reserves: are expected quantities of oil extracted from reservoirs that have not been developed yet. This type requires the presence of oil, but it is not known in quantitative and in economic terms. Thereby it's described as an inaccurate reserve with an estimation of 10%.²⁰

It is clear that the estimated reserves are not stable and therefore the pessimistic outlook, which says that oil exporters in the world will be threatened by depletion very soon, is a deficient vision based on misunderstanding the real meaning of world oil reserves.

2.5.3 The Importance of crude oil reserve

The importance of oil reserves: Reserve estimates show the importance of accuracy in the multiple effects of the uses for each engineers and accountants, including:²¹

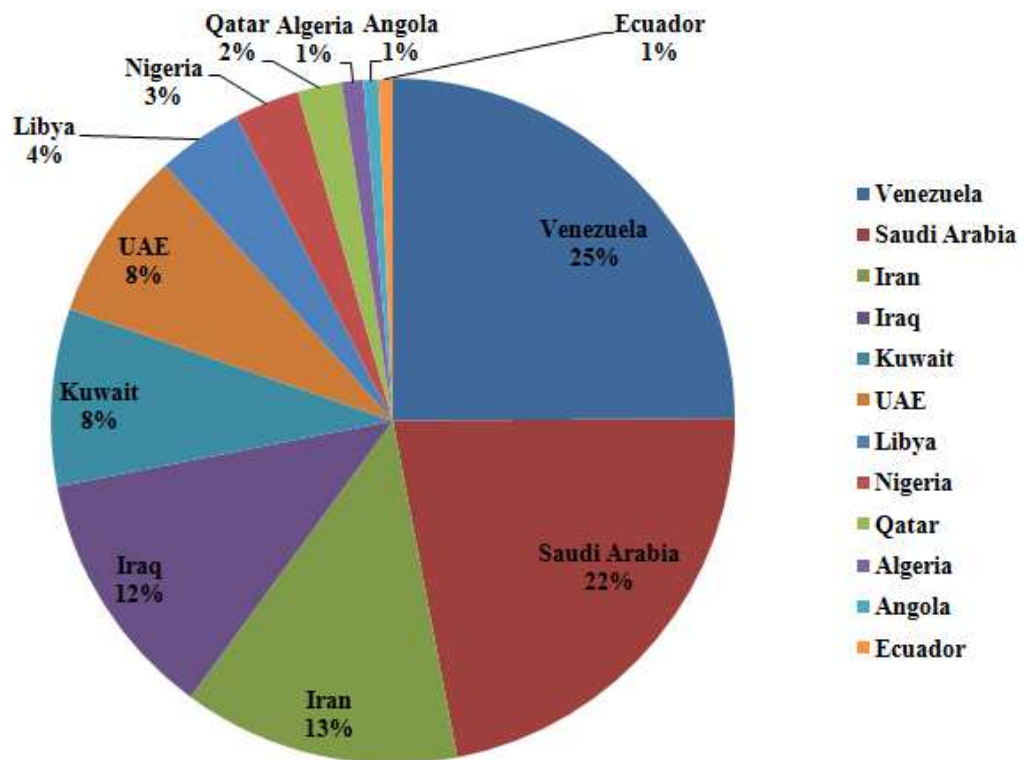
1. Assessing the economic viability of the reserves discovered.
2. Determine the size necessary to exploit the reserves, which include the establishment of tanks facilities (reception and treatment, Storage, shipping) and stations necessary for the operation and production of crude oil or gas.
3. Estimating the appropriate production rates, this does not lead to any damage to the underground oil reservoir.
4. Determining the life of the reservoir, which significantly affect the final configuration of the company and the continuity of activity and the time of liquidation.
5. Estimating costs needed for the development of the discovered wells by drilling productivity and evaluation fields.
6. Making policies and programs for development and planning needed to exploit reserves in order to achieve the greatest possible return, by lowering production costs and increasing production rates.

²⁰ Types of Oil and Gas Reserves. adapted from M. Simmons (2008), available at: (<http://www.simmonspjc.com/>)

²¹ Guidelines for the Evaluation of Petroleum Reserves and Resources, SOCIETY OF PETROLEUM ENGINEERS.2001. ISBN 978-1-55563-105-5

7. Calculating the annual costs for researches, exploration and drilling.
8. Due to the importance of oil reserves, as it's the largest and most important asset for oil companies, the accuracy helps accountants to provide the best measure of company success.

Figure No. 3: OPEC share of world crude oil reserves 2014 (Billion barrels)



Source: OPEC annual statistical bulletin 2015. Available at : (http://www.opec.org/opec_web/en/data_graphs/330.htm)

2.6 Organization of Petroleum Exporting Countries (OPEC)

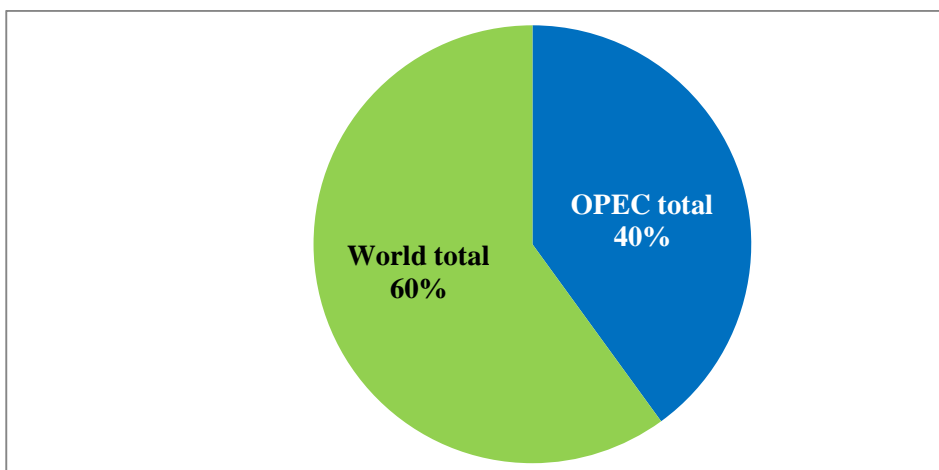
Is an intergovernmental organization of the most exporting countries for crude oil, established in 1960 with five members, headquarter is located in Vienna, Austria. Today OPEC has 13 members with 40% share of the global oil production and more than 70% world's oil reserves. That leads OPEC to the monopoly of global oil prices.



“The main mission of the Organization of the Petroleum Exporting Countries (OPEC) is to coordinate and unify the petroleum policies of its Member Countries and ensure the stabilization of oil markets in order to secure an efficient, economic and regular supply of petroleum to consumers, a steady income to producers and a fair return on capital for those investing in the petroleum industry”.²²

From the statement up we can understand that the organization main mission is to organize the oil market OPEC had to set policies for oil exporting countries to control and secure the price of oil for the benefit of the producers, also to limit and to deal with shortages and surpluses in the world market.

Figure No. 4: The production of crude oil 2014 (bbl/day)



Source: US Energy Information Administration, international energy statistics available at: (<http://www.eia.gov/beta/international/rankings/#?product=53-1&cy=2014>)

²² OPEC official website - our mission, available at: (http://www.opec.org/opec_web/en/about_us/23.htm)

From the figure above (figure No.4) we can see that the oil production of the OPEC countries is approximated by 40% of the overall oil production. In year 2014 the total oil productions were about 92.362.000 bbl/day while the OPEC productions were about 37.240.000 bbl/day. While the OPEC reserve in 2014 is approximated by 73% of the total oil reserve over the world. In October 2015, Sudan formally submitted an application to join OPEC.²³ To be new member of the organization it need to have the approval agreements by three-fourth of the members as well as the approval of the five main establishers of the OPEC.²⁴

2.7 price crisis concept and the effects on the balance of the crude oil market

The Oil market witnessed several crises linked to oil prices in the past 50 years like the energy and prices crisis in 1991, 1998 and 2008, that was because of the structural changes experience by the oil industry during that period.

The historical development of the petroleum industry under the price crisis requires us to search in the economic concept of price crises and the economic effects that this crisis occur on the economies of various forms such us advanced, developing or under developing economies.

So we will use the economic consequences of the first energy crisis in case of increasing prices, and the economic impacts of the crisis of low prices to be the scientific material in our study of the 2008 crisis.

So many conflicts appeared in the 20 century which had big influence on the crude oil price crisis in 2008, such as North Korean missile tests, Israel and Lebanon conflict, Katrina Hurricane and Iranian nuclear plans.

All these factors had insignificant impact on oil price. Therefore the global recession caused for energy demand to be reduced in late 2008. The price of oil fell from 147 USD to 32 USD/barrel. Later on the oil prices has stabilized by august 2009.

²³ -Sudan awaiting decision on its OPEC membership application: minister available at: (<http://www.sudantribune.com/spip.php?article56814>)

²⁴ - OPEC statue.2012 available at:(http://www.opec.org/opec_web/static_files_project/media/downloads/publications/OPEC_Statute.pdf)

The crisis began in the United States of America, and then spread to the countries of the world to include European and Asian countries and developing countries, whose economy is directly related to the US economy, the number of banks that collapsed in the United States during the year 2008 to 19 banks.

The global oil demand of 86.6 million barrels per day in 2007 has reduced to 86.1 million barrels per day, 500 thousand barrels per day, resulting in the disruption of the balance of demand and supply to the construction of a large reservoir in oil by 1.6 million barrels per day during the third quarter of 2008, and 1.2 million barrels per day during the fourth quarter of 2008, according to OPEC Secretariat estimates.²⁵

2.7.1 The concept of price crises in the petroleum industry

The definition of price crises in the oil industry is a sudden imbalance in the market equilibrium leads to a reduction or a sharp rise in prices extends over a certain period of time. That happens as a result of supply or demand determinants, or both at the same time by internal factors, such as structural changes in the industry or the lack of availability of supply to rebalance 1970 – 1979 or the collapse of monopolistic communities, like in the first energy crisis. It can also be due to external factors unrelated to the industry, such as the movement of capitals and geopolitical changes.

2.7.1.1 The economic effects of the crisis when the price rises

We will disclose the most important economic effects that can happen in price crises in the oil industry, and since most of the economic effects on the global economy are the same, its repeated every time the oil price rises in the market, we will rely on coverings these effects to a brief analysis of the most important effects that followed the first energy crisis, because this period have special features throughout rest of the period in which oil prices are high, that we can observe these effects and monitor them clearly.

²⁵ Annual reports 2008, OPEC in the world available at:(
economyhttp://www.opec.org/opec_web/static_files_project/media/downloads/publications/AR2008.pdf)

The first energy crisis created disruptions in the global economy exceeded the risks involved in the deficit in oil supply in the market at that period; the crisis has included both Western and developing economies alike in the following points:

- Financial surpluses of oil exporting countries.
- Global inflation and phenomenon of stagflation.
- Balance of payments at both developed and developing countries and external debt.
- Actions taken by consumer countries toward the crisis.

2.7.2 Financial surpluses of crude oil exporting countries

The appearance of the financial surpluses of oil exporting countries lead to a radical shift in the pattern of international payments from industrialized countries to make a major center for deficit contrast to these surpluses.

These benefits have risen so quickly and reached about 65 USD billion in 1974, and the direct impact of the phenomenon of surpluses is a radical change in the structure of international payments. Before the rise of the problem there was a deficit in the United States and surplus in Japan and Western Europe, as developed countries achieved surpluses against a deficit of developing countries. The size of this surplus has been amounted before the rising oil price of 12 USD billion, and by the appearance of petroleum surpluses this structure changed completely, as the deficit moved to the European balance of payments and the industrialized countries become suffering from the effects of the deficit. Where the amount of the deficit reached about 35 USD billion in 1974 developing countries (non-oil-exporting countries) reached a deficit of 20 USD billion in the same period, conversely producing and oil-exporting countries reached net surplus of 65 USD billion.

Because of financial surpluses, it was natural that the capitalist countries opposed this trend and because of that the crisis influenced the international monetary relations. Then the idea of surplus recycling mechanism appeared which means to reinvest these surpluses into the oil consuming countries. This mechanism has already been able to establish and develop internal systems to allow countries to prepare to any possibilities such as barter

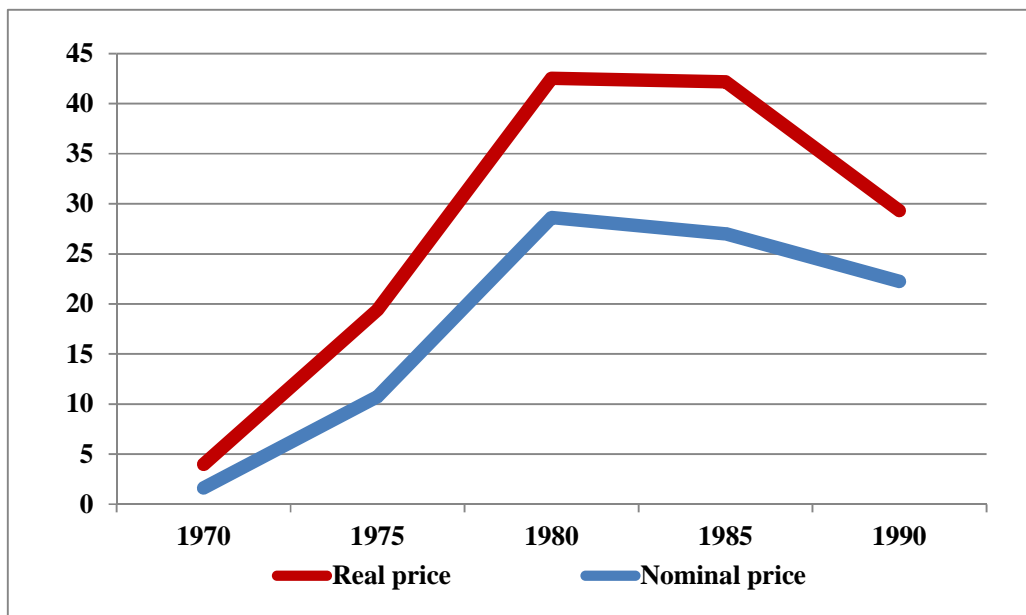
networks, where a short term insurance is exchanged between central banks to protect their exchange rates from any sudden changes.

On the other hand, the petroleum stocks, despite its size, it represents only a weak rate of currencies traded in financial markets in the United States and Europe, the size of the petroleum funds are floating in the international markets to search for investment ports where in 1974 it was estimated to invest 55 USD million.²⁶

2.8 Global inflation and phenomenon of stagflation

The US economic Milton Friedman returns the phenomenon of stagflation to a situation where there is high inflation and high unemployment rate, and then goods and services will change from producers to non-producers through direct government spending, such as aid and direct support and security, Graph No.1 shows us nominal and real oil prices shows in the United States in the period between 1990 and 1970.

Graph No. 3: oil’s nominal and real prices in the US (1970-1990)



Source: crude oil price 1970-1990 earth policy institute available at: (www.earth-policy.org/datacenter/xls/update67_5.xls)

²⁶ European communities (minimum stocks of petroleum oils) regulations, 1974 .available at:(<http://www.irishstatutebook.ie/eli/1974/si/325/made/en/print>)

In addition to the risks of the petroleum assets of OPEC countries, capitalist countries are trying to highlight the negative effects caused by the increase in oil prices and the most important of inflation and recession. Inflation usually connects directly to the increase of oil prices as the primary reason responsible for inflation and it inflicts damage for industrialized countries.

3. Practical part

3.1 Algerian economy overview

Algeria or officially the Democratic People's Republic of Algeria is the largest African and Arab country in terms of area, and the tenth in the world. Algeria is located in the north-west of the African continent.

Algeria is a founding member of the Arab Maghreb Union in 1988, and a member of Arab League States and the Organization of the United Nations since its independence, and a member of the African Union, OPEC and many global and regional institutions.

Algeria has area of 2,381,741 km squared with a population of 34.8 million according to the statistics in 2008, after the secession of southern Sudan from the Sudan on July 9, 2011; Algeria became the largest African and Arab country in terms of area. The capital city is Algeria.

Algeria has important Energy and Mines reserves mostly located in the south. According to the company Sonatrach, 67% of oil and gas reserves are in Hassi Messaoud and Wadi Mia. Hassi R'Mel gas and Hassi Messaoud oil contain 14% of the reserves and the rest are spread over several areas.

Algeria joined the Organization of the Petroleum Exporting Countries (OPEC) in 1969, not long after it started oil production in 1958. Algeria's economy is intensely dependent on incomes from its hydrocarbon segment, which represent around 30% of the nation's (GDP), more than 95% of export profit, and 60% of spending budget incomes, according to the International Monetary Fund (IMF).

Crude Oil have step by step declined recently, mostly because of the project delays from the government approval, troubles pulling in speculation, foundation holes, and technical issues. In the previous three authorizing rounds, there was limited interest from investors to embrace new oil and gas projects under the administration's terms. Subsequently, the Algerian government authorized new contractual and financial procurements in 2013 with expectations

of pulling in more foreign investors to new activities, especially toward resources (shale oil and gas, tight gas, heavy oil, and coal bed methane). In January 2014, the government dispatched its first permitting license. According to PFC Energy, 31 blocks, of which 17 hold shale resources, are being offered. All blocks are expected to be awarded in 2014.

GDP is an important indicator of a country's economic power. In 2006, Algeria's gross domestic product amounted to around 117.03 billion USD since that time the GDP of Algeria started to increase year after year and as we can see in the graph below that the gross domestic product increased dramatically in year 2008 because of the economic crises the prices of oil jumped to reach about 156 USD/ barrel and since the country is dependent mostly on the petroleum industry, that help the economy of Algeria to structure itself and develop. And from year 2010 the GDP gradually increased year after year to reach around 214.06 billion USD, in 201, as the graph No.4 shows.²⁷

Graph No. 4: Algeria GDP (2006-2014) Billion USD



Source: The Gross Domestic Product (GDP) in Algeria. Data statistics available at:(
<http://www.tradingeconomics.com/algeria/gdp>)

²⁷ The Gross Domestic Product (GDP) in Algeria. Available at:(<http://www.tradingeconomics.com/algeria/gdp>)

3.2 Algeria's Crude Oil Production and export

The Production of crude oil in Algeria is steady at 1370 BBL/D/1K for November and October 2015. The production of oil in Algeria is issued and controlled by U.S. Energy Information Administration (EIA). The average Production of crude oil in Algeria is 1260.44 BBL/D/1K from 1973 until 2015, except a rising of average which has ever happened November 2007 to reach 1735 BBL/D/1K net to the fall in 1975 which achieved only 786 BBL/D/1K the thing which is shown evidently in the graph below (graph No.5).

The predominantly of the nation's observe oil stores are held seaboard on the mainlands that there has been compelled seaside realization. The important fraction of observe oil stores are presented in Hassi Messaoud province, which compromise the states' exceedingly seasoned and massive oil domain. Hassi Messaoud is holding approximately 3.9 billion barrels of observes and superficial recaptured stores, affected by the Hassi R'Mel field which in role producing 3.7 billion barrels, as well as the Ourhoud field which provides 1.9 billion barrels.

Graph No. 5: Crude oil Production in Algeria from (1976-2014)



Source: crude oil production. Statistical data, available at: (<http://www.tradingeconomics.com/algeria/crude-oil-production>)

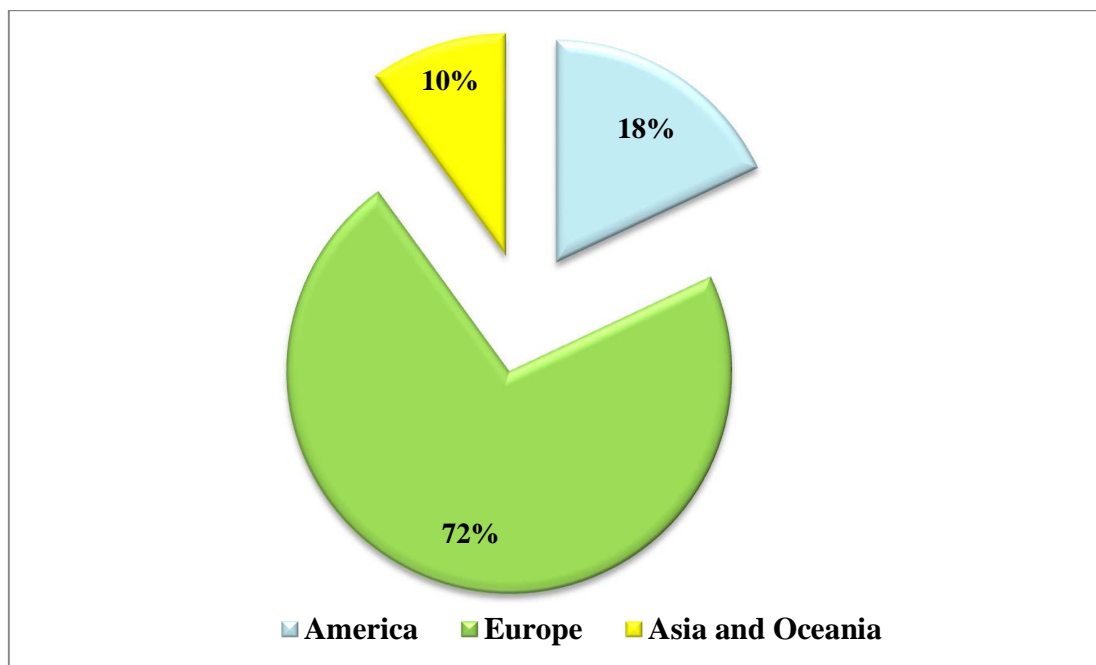
Algerian oil domains provide a high-quality light crude oil with considerable low sulfur proportion and mineral content. Hassi Messaoud which provided about 500,000 bbl/d of crude oil in 2013, or in other words provides more than 40% of Algeria's total output of crude oil.

Most of Algerian exports is the “light crude oil”. The state’s prime crude grade is the Sahara blend, which is a mixture of crudes produced at the domain of the Hassi Messaoud region. In 2013, Algeria exported about 750,000 bbl/d of oil, inclusively condensate, due to the estimations of EIA, Global Trade Atlas (GTA), as well as FACTs Global Energy.

The vast preponderance (near by 72%) of country’s crude oil exports are resurrected to Europe. The United States was the only massive location till 2013 afterwards, the U.S. imports was dropped to 29 000 bbl/d, or dropped by higher than 75% in comparison with the previous year.

The United States imported approximately a 29,000 bbl/d of crude oil from Algeria in 2013 which represented almost 18% of Algeria’s exports as shown in the figure below (figure No.5). However, US crude oil imports from Algeria have declined dramatically compared to 2007, which reached to 443 000 bbl/d. The incline in U.S. light crude oil production from both of Bakken as well as Eagle Ford shale, has been playing an important role in reducing the proportion the U.S imports of the same blend of crude oil, which is presented in Algerian crude oil.

Figure No. 5: Algeria's crude oil importers in 2013



Source: EIA beta the exports of Algerian crude oil 2013. available at:
(<https://www.eia.gov/beta/international/analysis.cfm?iso=DZA>)

3.3 Fiscal policies in Algeria

Algeria have huge potential of natural resources, which are an important element in the enrichment of the Algerian economy and support its strength, but the management of these resources outside the hydrocarbon sector seems weak due to lack of incentives for the development of the production of goods outside the sector, and this has had a clear impact on fiscal policy, especially in Algeria Because the tax structure which slows down the development of alternative sources of income.

Algerian economy's dependence on petroleum resources is a main source of foreign exchange. This have effects on the macroeconomic growth which have made the real GDP subject to fluctuations in international oil prices, which have had differences to the value of exports and revenues and the availability of foreign exchange.

As it also has a direct impact on public expenditure management. We can divide the reasons for the expansion of fiscal policy in Algeria to three overlapping and integrated determinants:

economical and doctrinal, social and finally and most importantly the financial determination, as it sees favorable oil prices are often referred to a permanent increase in income led to high levels of public spending which has been difficult to reduce.

Since the early nineties, Algeria started in the application of a set of economic reforms in order to change the conduct of the economy pattern and mitigate the fiscal policy of oil revenue dependency, so that the law of tax reform was adopted in 1992, with reduction of state intervention in the economy and to allow private initiative.²⁸

3.4 Crude oil prices development in Algeria

Since the discovery of oil only few companies dominated this industry. Therefore the oil cartel undertook the task of dividing markets and pricing which always returned at the cost of the states interests. The current decrease in oil prices has a heavy impact on markets globally and Algeria's economics performance especially, because the Algerian economy relies on the revenues from crude oil. Social uprising in 1988 represented the bad situation of the economic conditions at that time, especially when the price of crude oil dropped.

Algeria depends on oil exports as primary driver of its economy. As indicated by official figures, crude oil represents almost 90 percent of the overall country export revenues and 40 percent of its Gross domestic product. Crude oil now days hit new low prices which is approximated around 37 – 40 USD/bbl. Oil prices nowadays push the government to change its plan budget for the future.

According to an expert in economy of Algeria Mustafa Mekidechen says “If the price decline prolongs over the long term, it will result in a deficit in the balance of payments and there will be a problem in project financing.”²⁹

Referring to the decrease of oil prices, minister of finance Mohamed Djelab said “Algeria has useful tools which will support it against financial shocks.”³⁰

²⁸ Abderrahim Chibi the Macroeconomic effects of fiscal policy shocks in Algeria: An Empirical Study. Available at:(
<http://econpapers.repec.org/paper/ergwpaper/536.htm>)

²⁹ English News, Africa. Falling oil prices weigh heavily on Algerian economy
http://news.xinhuanet.com/english/africa/2014-12/11/c_133848747.htm

The minister of finance Mohamed Djelab added that Algeria “has been adopting a preventive policy for over 10 years, including the Oil Revenue Regulation Fund, which helps nations combat the effects of oil price plunges.”

Algerian energy dominant Sonatrach is confident that the drop in crude oil prices will not harm its 90 billion USD investment for the next five years. Algeria revenues from crude oil exports in 2014 were 60.15 USD billion which represented 95.5% of the country foreign income. That shows us how dependent Algerian economy is on crude oil exports.³¹

Algeria has made some key projects to handle the oil price drop, even though, the government approves that it has enough of cash reserves which will handle the next three years without any problems, the budget in 2015 has been set on 60 USD per barrel.

Sonatrach has already requested that its contractors and service suppliers reduce their charges by 10-15% in order to not get affected by the lower oil prices, however changes are required if Algeria is to benefit as much as possible from its oil and gas potential.³²

According to the information above, we can conclude that the prices of crude oil are not constant and it has gradually increased in the past 20 years, but now the crude oil industry is facing rapid decrease from 2015, as it’s shown in the (graph No.4).³³

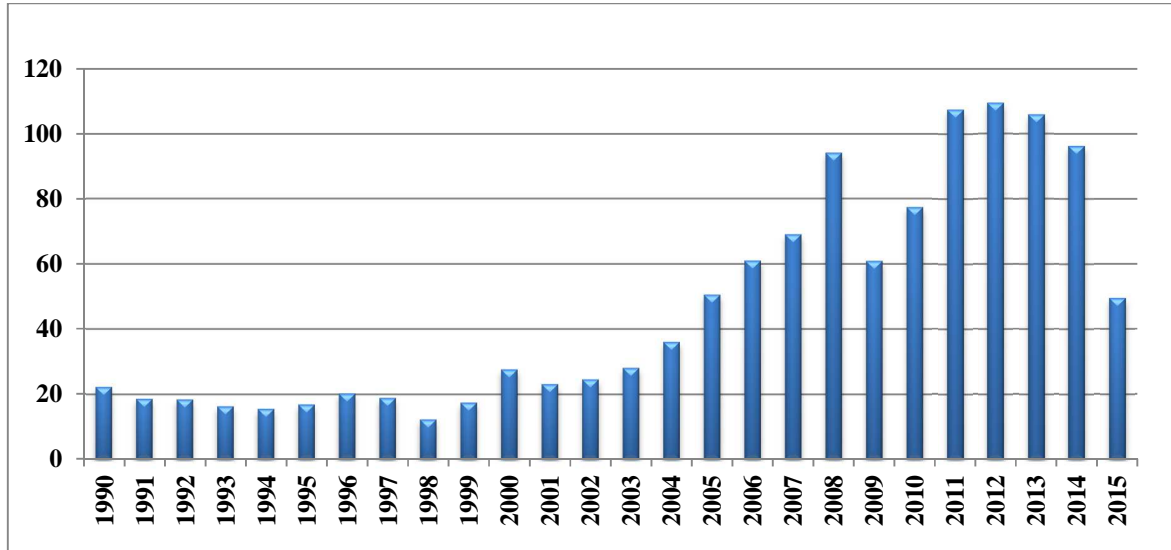
³⁰ English News, Africa. Falling oil prices weigh heavily on Algerian economy
http://news.xinhuanet.com/english/africa/2014-12/11/c_133848747.htm

³¹ US energy information administration, Algeria available at:
https://www.eia.gov/beta/international/analysis_includes/countries_long/Algeria/algeria.pdf

³² Neil Ford: Algeria to spend its way out of trouble, 22 October 2015. available
at: (<http://africanbusinessmagazine.com/sectors/commodities/algeria-to-spend-its-way-out-of-trouble/>)

³³ Average annual OPEC crude oil price from 1960 to 2016 (in U.S. dollars per barrel). statista available at: (<http://www.statista.com/statistics/262858/change-in-opec-crude-oil-prices-since-1960/>)

Graph No. 6: Crude oil price development in OPEC from (1990-2015)



Source: <http://www.statista.com/statistics/262858/change-in-opec-crude-oil-prices-since-1960/>

3.4.1. The impact of crude oil prices change on Algeria's economy

Oil is considered as a vital and depletable source of national income for many countries around the world, so it is mainly linked to the national security of the state and its power and prestige, especially those countries that is linked to their income year, including earn from taxes and a GDP the year depends on oil revenues, which leads to fall to imbalances in the economy of those countries that threaten the unity of its existence and sovereignty.

Since that Algeria is one of the oil-producing countries thus, the hydrocarbon sector has played a prominent and important role in building and laying the foundations of its national economy, as well as in the financing of development projects. Petroleum sector occupies a giant position in the Algerian economy as that it interconnect different positions of the country's economy thus, the author put this section to study the effects of changes in oil prices on the national economic indicators in the period (1970-2010).

Added to that, since the nationalization of the country to its' hydrocarbon sector which started by the beginning of the seventies oil exports accounted for more than 95 percent in spite of its focus on the industry in that period, which contributed to the increase in revenues in foreign

currencies, but that the total subordination of the Algerian economy Petroleum has become a curse upon it since the gradual decline in oil prices with the beginning of the eighties and up to the total collapse of prices in 1986, the thing that led to the collapse of the Algerian economy and the disruption of a structural double in the budget and balance of payments, as this collapse led to high ratio of external debt, and most importantly of all, what had resulted more from the social as well political implications.³⁴ The results of changes in oil prices on the Algerian economy

3.4.1.1 The development of crude oil revenues in the period (1973-2009)

By the beginning of 70's the prices of oil market have been increased dramatically, the thing which helped the petroleum countries in general especially Algeria to achieve high flows allow them to create Cash balances exceed the capacity of these countries, The thing which has resulted in a poor planning of taking advantage of these funds high economic and social costs.³⁵

Monitoring the evolution of the oil revenue in Algeria can be through two phases:

The first phase started before the 1986 crisis Increased financial returns for the OPEC countries (Algeria), during the seventies, where oil-producing countries were able to Simplify its influence in the oil market by controlling production and special prices after the October War of 1973, And the use of oil as a weapon, as was the Iran war in 1979 a major role in increasing this revenue. And the second stage which took place from 1986 till 2009, and worthy to mention that this phase has been to couple of sub phases, first is the adverse oil crisis of 1986 and its impacts on national economy, as that the collapse of oil prices in 1986 has been surprised most of the decision-makers in the Algerian economy. The fastest tangible effects of this collapse was the decline in oil revenues and therefore confined to the financing of the economy sources National certified heavily on oil revenues.

While the second sub phase is the development of financial revenues (2000-2009) as that, In early 2000 the world oil market has achieved a sensible incline in oil prices had a positive

³⁴ Jean Pierre Angelier, « the international energy of Algeria 1987-1988 »,Economica 1987.

³⁵ Maurice durousset, « the market of petrol in Algeria », Edition ellips 1999.

impact on the development of Oil revenues for OPEC countries, public and private Algeria, and it seems certain that Algeria will not be able to give up the dependence of petroleum materials in advance of the national economy.

Table No. 6: Crude oil prices (2000 – 2009) USD bbl/day

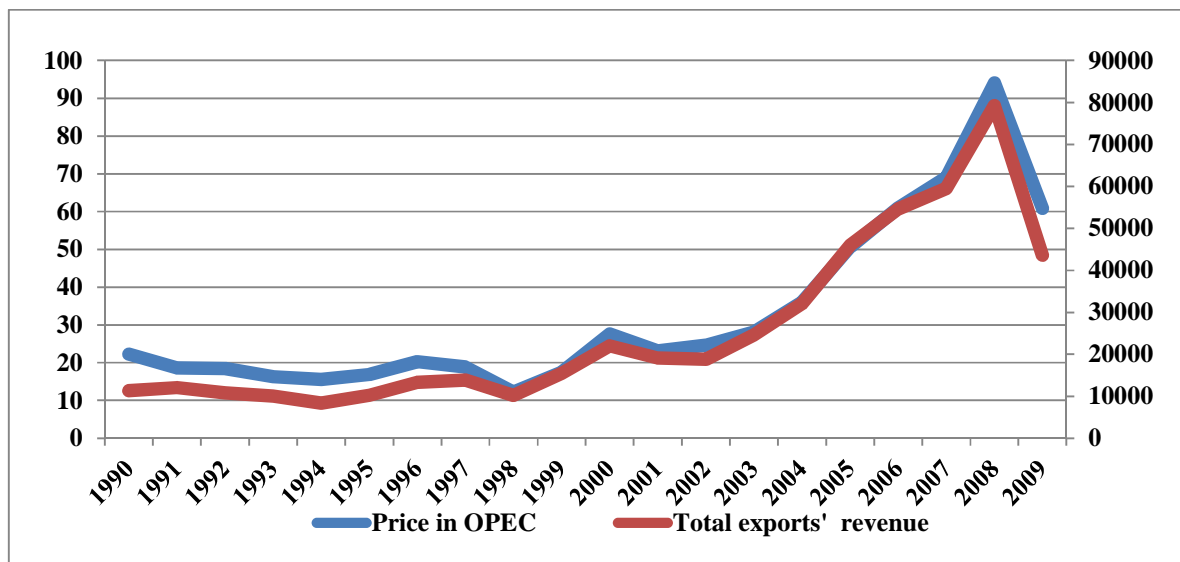
Year	2000	2002	2004	2005	2007	2008	2009
Crude oil prices	28.8	24.8	38.4	54.6	74.7	98.9	61

Source: Average annual OPEC crude oil price from 1960 to 2016 (in U.S. dollars per barrel).statista available at: (<http://www.statista.com/statistics/262858/change-in-opec-crude-oil-prices-since-1960/>)

3.4.1.2 The impact of crude oil prices development on the trade balance components in the period (1990-2009)

Crude oil prices have an impact on the exports of the countries, in other words it has an impact on the petroleum parts and non-petroleum exports of Algeria. Added to that Oil prices play a role in influencing the volume of imports indirectly, throughout providing the means of external payment. Also oil prices have an affection on the trade balance's account as that, it is a change in the balance of trade balance outcome of developments in both exports and imports changes.

Graph No.7: the development of the Algerians export and crude oil price in Million USD (1990-2009)



Source: Average annual OPEC crude oil price from 1960 to 2016 (in U.S. dollars per barrel).statista available at: (<http://www.statista.com/statistics/262858/change-in-opec-crude-oil-prices-since-1960/>)

3.4.1.3 The impact of fluctuations in crude oil prices on the state budget

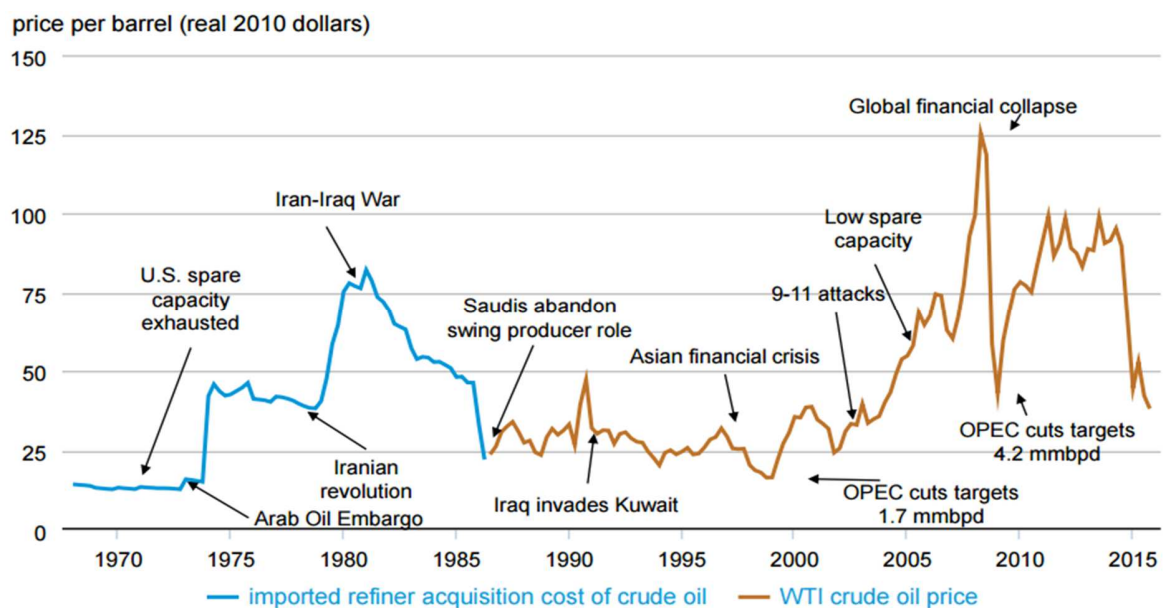
The hydrocarbon resources has played an important role in the state budget balance, especially when knowing that oil revenues represent the most important source of revenue for the budget, and this figure continues to rise as long as the real value of the resources of hydrocarbons in constantly increasing, due to the high oil prices.

3.5 Crude oil price determinants all over the world

The oil price determinants are the factors that affect or have impacts on oil prices over time. These factors can have either positive or negative impact on oil prices which means it will result in an increase or decrease in oil prices. However, not all the determinants play at the same time. In a period of time, only one or two factors would have impact on oil prices.

For many years, the fundamentals of supply and demand were representing the main driver of oil prices. Over time, new drivers of factors were found to have an impact on oil prices.³⁶ The analysis of oil prices over time showed that oil prices can be affected by political issues and wars between nations, cost of production, OPEC production decision, expectations, and weather.³⁷

Figure No.6: Crude oil prices in react to different factors



Source: US Information Administration (EIA), available at:

http://www.eia.gov/finance/markets/reports_presentations/eia_what_drives_crude_oil_prices.pdf

In addition to the factors above, global and national financial crisis play a role in determining oil prices, according to the US Energy Information Administration (EIA). As it is shown in the figure above (figure No.6), the Asian in the 1990s and the global crisis in 2008 have impacts on oil prices.³⁸

³⁶ Review of issues affecting oil prices – pdf page #1-abstract

³⁷ Review of issues affecting oil prices – pdf page #4-traditional drivers of oil prices

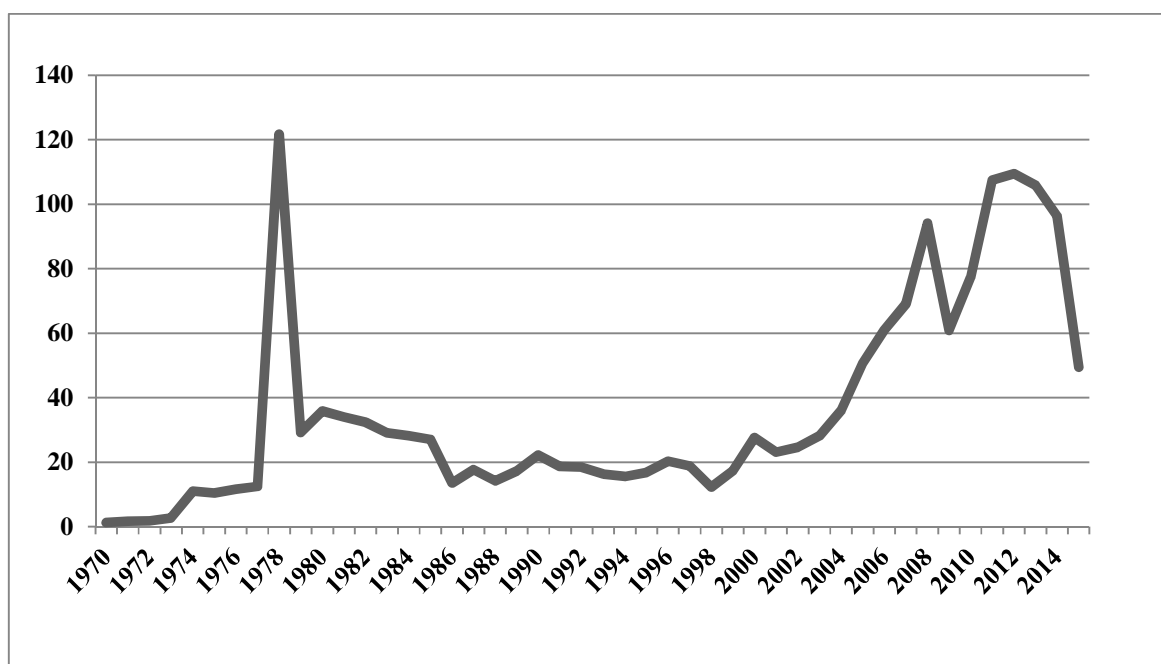
³⁸ http://www.eia.gov/finance/markets/reports_presentations/eia_what_drives_crude_oil_prices.pdf

Moreover, expectations about oil reserve and official reports about the reserve of oil in a certain region or country has an impact on oil prices.³⁹ When the reserve of oil is high, the nation has the possibility to produce and supply more. According to basic economic fundamentals, higher supply leads to lower prices.

3.6 Analysis of crude oil prices determinants in Algeria (OPEC)

Algeria as a part of OPEC is affected by the factors or the determinants that affect oil price of OPEC. However, OPEC is a part of the world and events that affected the world in general have affected OPEC's oil prices too. The following graph (graph No.8) shows the historical oil prices of OPEC.

Graph No.8: OPEC historical oil prices (1970-2015)



Source: Historical crude oil price available at :(<http://www.statista.com/statistics/262858/change-in-opec-crude-oil-prices-since-1960/>)

³⁹ Mahmud Suleiman. Oil Demand, Oil Prices, Economic Growth and the Resource Curse: An Empirical Analysis. Available at:(<http://www.seec.surrey.ac.uk/PGProgs/PhDTheses/2013MahmudSuleimanThesis.pdf>)

In the beginning of the 1970s, the price of oil in OPEC was relatively stable and ranged between 1.2 – 1.8 USD/barrel. In 1973 and because of the Arabic embargo, the price of oil has increased to reach 11 USD/barrel in 1974. In the following years, the signs of the industrial revolution in many countries around the world had significant impact on OPEC's oil prices. The industrial revolution has led to higher oil demand at that period and the increase in demand with constant supply of oil led to high oil prices that reached to 35.82 USD/barrel in 1980. So, in the end of the 1980s, the demand was the determinant of oil prices.

In the 1980s, the OPEC has resorted to production cuts to support prices that were actually lowered, seeking to keep prices at a high level, in 1982. However, the instability in oil prices has continued in the following years, the thing that made the OPEC cut oil production again in 1984. By the end of 1986 when the prices of oil witnessed a dramatic reduction to 13.5 USD/barrel, the OPEC has decided to impose a production ceiling which involved individual stakes committed by the member countries, and that has led to higher oil prices in 1987.⁴⁰ In this period, it seems that OPEC oil production decision is the main determinant of oil prices.

Actually, the instability in oil prices in the 1980s is ascribed to the war between the two members of the Organization of Petroleum Exporting Countries (OPEC) which are Iraq and Iran. The rest of OPEC decided to reduce oil prices to increase the bad impacts on the conflicted nations (Iraq and Iran). Therefore, the production cuts were only a reaction to the insane actions of the OPEC members in reducing oil prices at that time. When the war between Iraq and Iran has finished, the recovery in oil prices started to appear to reach to 22 USD/barrel in 1990.

By the end of 1990, Iraq which is a member of OPEC has invaded Kuwait. And to reduce Iraqi power, OPEC members resorted to decrease oil prices to reach to 15.5 USD/barrel in 1994. However, the increase in oil prices has continued in the following years to reach 18.8 USD/barrel in 1997. So, in this period the political and war issues were the determinants of oil prices in OPEC.

⁴⁰ Oil Price History and Analysis, WTRG economics. Available at:(<http://www.wtrg.com/prices.html>)

In 1998, the Asian financial crisis hit the economy of different countries all over the world. The economic crisis resulted in low oil demand. In other words, countries didn't have the ability to buy the same amounts of oil at the same price. Thus, OPEC has to reduce its production as well as its oil prices to 12.2 USD/barrel in 1998, in order to meet the market recession at that time. However, the impact of the Asian financial crisis was not significant and for a long time. The prices of OPEC's oil have increased in the following 2 years to reach 27.6 USD/barrel in 2000.

In 2001, the prices of oil have decreased slightly to 23.1 USD/barrel because of the 11 Sep. attacks in the United States. Therefore, the security and political issues was the factor that determined the oil prices in the period. The following years 2002-2008, the prices of oil in OPEC have increased significantly to 94.1 USD/barrel. The global financial crisis at the end of 2008 has affected oil price in OPEC. The crisis has reduced the global demand for oil and lower demand with constant supply has led to lower oil prices in 2009 to reach 60.8USD/barrel. However, the prices of oil had recovered in the following years and reached to 109.4 USD/barrel, in 2012. The reason behind the increase of oil prices in this period can be ascribed to the official reports that mentioned that Algeria (an OPEC member) reserves of oil is limited and by 2020, the country will not be able to produce and export oil. These reports imply lower supply of oil in the middle run and that resulted in higher oil prices.

From 2013, the prices of oil in OPEC started to decline significantly to reach to 49.5 USD/barrel in 2015. This can be ascribed to the conflicts and political issues between different countries of the OPEC. To demonstrate, the sanctions that imposed on Iran, the war of Saudi Arabia against protest in Yemen and the presence of the Islamic State between Iraq and Syria (ISIS) in the Middle East.

At the end, it sounds that supply and demand and the political issues are the main determinants of oil prices of OPEC and Algeria eventually. But other factors that affect the world can have an impact on OPEC's oil prices such as global financial crisis.

4. Conclusion

From the analysis, we found out how dependent the global development is on energy sources, therefore there is no forecast that says crude oil consumption would decline some day in the future. In our case study we analyzed the Algerian economy and GDP. These two elements are very important for the economic performance in Algeria, but they are also highly depended on revenues which come from crude oil export, it's approximately 95% of the total Algerian exports.

Any impact on crude oil prices in the world market will have direct impact on the Algerian economic performance. Therefore, the higher crude oil prices, the better for the stability of Algerian economy. There are several factors that affect the price of crude oil in the market, such as the demand and supply, the political situation as well as the global and regional crisis.

Due to the fluctuations in crude oil prices in history, and we cannot ignore the fact that crude oil is a non-renewable resource, that's why Algerian government should seek some changes in their policies so that its economy can find some alternatives and to also benefit from other sources.

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