

**CZECH UNIVERSITY OF LIFE SCIENCES PRAGUE**

**Faculty of Economics and Management**

**Department of Economics**



**DIPLOMA THESIS**

**The Reasons and the Impacts of the Crude Oil Prices on World Economy**

**Author: Nina Dvořáková**

**Supervisor: Ing. Mansoor Maitah, Ph.D. et Ph.D.**

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## **DIPLOMA THESIS ASSIGNMENT**

**Nina Dvořáková**

specialization of the study: Economics and Management

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2. Objectives of thesis and methodology
3. Literature overview
4. The reasons and the impacts of crude oil prices on world economy.
5. Conclusions
6. Bibliography
7. Supplements

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The Diploma Thesis Supervisor: **Ing. Mansoor Maitah, Ph.D. et Ph.D.**

Deadline of the diploma thesis submission: April 2011

  
.....  
Head of the Department



  
.....  
Dean

In Prague: 10th June 2010

## **Declaration**

I declare that I have worked on the Diploma thesis “The Reasons and the Impacts of Crude Oil Prices on World Economy ” on my own and I have used only the sources mentioned in the references.

Prague, March 30, 2011

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Nina Dvořáková

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## **The Reasons and The Impacts of Crude Oil Prices on World Economy**

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### **Důvody a dopady cen ropy na světovou ekonomiku**

## **Souhrn**

Tato práce se zabývá cenou ropy a jejím dopadem na světovou ekonomiku se zaměřením na Saudskou Arábii, protože je to největší producent ropy na světě a tudíž ropný sektor v této ekonomice dominuje. Zásadním úkolem je najít vhodná řešení která se budou zabývat vysokou volatilitou příjmů z ropy a jejichž hlavním cílem bude ji snížit. První část této práce definuje důležitost ropy, její historický vývoj a také prokázané ropné rezervy, které se nacházejí přímo v Saudské Arábii. Cena ropy úzce souvisí právě s nabídkou a poptávkou, je také však ovlivněna dalšími faktory. Jedná se například o faktory geografické, geopolitické či kvantitativní. Další část práce obsahuje analýzu vývoje ceny ropy od roku 1948 až do dnešní doby, je zde také zmíněna důležitá role OPEC (Organizace zemí vyvážejících ropu) na ropném trhu. Hlavní část je rozdělena do tří částí. V první řadě bylo nutné nastínit důležitost ropného sektoru v ekonomice Saudské Arábie, poté definovat důvody a dopady tohoto sektoru v jejich ekonomice a v poslední řadě stanovit doporučení pro zmírnění volatility ropných příjmů, i pro zabezpečení makroekonomické stability v Saudské Arábii. Součástí hlavní části práce je i řešení problému, který pochází zejména z faktu, že ropa je vyčerpateľný zdroj a problému rozdělení národních ropných zdrojů mezi generacemi.

**Klíčová slova:** ropa, Saudská Arábie, cena ropy, ropné příjmy, nabídka, poptávka, volatilita

## **Summary**

This thesis is about crude oil price and the impact on the world economy with the focus on Saudi Arabia because it is the world's largest oil producer, thus the oil sector has dominant role in this economy. The crucial point is to find sufficient solutions for dealing with high volatility of revenues from oil with aim to decrease it. The first part of this paper defines importance of crude oil, the historical development of crude oil and also proven reserves that are primarily in Saudi Arabia. The price of oil is tightly related to supply and demand and it is also influenced by other factors such as geographical, geopolitical and other quantitative factors. Next part includes the analysis of history of oil prices from 1948 to the present time and there is also mentioned important role of OPEC (The Organization of the Petroleum Exporting Countries) in the oil market. The main part of this thesis is divided into three sections- the crucial importance of oil sector in Saudi Arabian economy, then the reasons and impact of oil on this economy and finally there concluded several recommendations to reduce the volatility of crude oil revenues as well as ensuring long-term macro economic stability in Saudi Arabia and to deal with problems that mainly come from exhaustibility of crude oil and the problem of inter-generational allocation of national oil resources.

**Key words:** crude oil, Saudi Arabia, crude oil price, oil revenues, supply, demand, volatility

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## **1. Introduction**

Crude oil has been the most important (and not only) energy resource globally. Nowadays, petroleum is used to produce most of the products that are necessary for our everyday life. Almost 90 % of all vehicles are powered by fuels, which are made from crude oil. Therefore it is very important strategic commodity that caused also many political conflicts. However, it is a non-renewable resource and its reserves have been narrowing down gradually. The reserves of crude oil are defined as “quantities of petroleum claimed to be commercially recoverable by application of development projects to known accumulations under defined conditions”. The biggest crude oil producer is the Middle East region with 31 % of overall production. The consumption has been increasing since people invented engines powered by gasoline which are widely used for all means of transportation as well as for production of various products that are all around us.

Crude oil is a global commodity and its price is related to world’s supply and demand. That is why the price of petroleum is the most important factor in terms of further prices of products that are made from petroleum. The price of a barrel is influenced by many factors, such as its grade, API gravity, amount of sulphur or geographical location and also by supply and demand, geopolitical situation or by unexpected events (weather). The demand is highly dependent on macroeconomic conditions around the world. Oil-exporting countries are usually highly dependent on the revenues from crude oil. To sustain stability in the oil market OPEC was established. By setting suitable prices it enables regular supplies and reasonable revenues and influence the density of petroleum reserves.

This thesis is dealing with the special case of Saudi Arabia. Saudi Arabia was the biggest producer and exporter of petroleum liquids in 2010 and second largest producer of crude oil behind Russia. The oil revenues have been around 80 to 90 % of total Saudi Arabian revenues and 42 % of GDP. Saudi Arabia has almost one-fifth of the world’s proven crude oil reserves and the half of it is situated in only eight oil fields from which the largest one Ghawar field is estimated to provide 70 billion barrels of crude oil reserves. It has been announced that Saudi Aramco (the world’s largest oil company in terms of proven oil reserves and production of

hydrocarbons) had reached the target capacity of 12 million barrels daily and it is well above the noted target of 1.5 – 2 million barrels per day.

There is a clear dominance of oil industry in the economy of Saudi Arabia. In the past two decades share of oil sector in total GDP of Saudi Arabia went along with the ups and downs in the global oil market, and this lack of economic performance of Saudi Arabia in contrast to other developing countries has shown the relationship between wealth of natural resources and economic growth, so called „Holland disease“. That is why the Middle East countries have set the objective of developing diversification of their economies to increase resilience to external shocks.

In the specific case of Saudi Arabia the diversification has been accomplished mainly by expanding in petrochemical and refining industry. Another step includes free-trade agreements between Arab countries as well as the integration process among them. The recent oil boom has offered for that many opportunities. Implementation of these ideas requires innovative policies in taxation, industry and commerce. The key point is to accumulate financial assets to replace oil revenues and thus preserve oil wealth for future generations.

## **2. Objectives of Thesis and Methodology**

The first objective of this paper is to clarify the crucial facts about crude oil, beginning from its history, through the attention of limited crude oil reserves to the relationship of the world's oil supply and demand. Second objective is to provide deep analysis of history of crude oil prices and the role of OPEC. The last objective is to determine crude oil role and its impact on the Saudi Arabian economy and to point out the importance of oil sector in Saudi Arabia. In this context, also highlighted the influence of different oil boom of the Saudi Arabia economy and its response during this period.

The main objective of this thesis is to analyze the public finance of Saudi Arabia and to find suitable method and arrangements, which could be used to ensure that the regulation of oil revenues would be in accordance with macro-economical stability and furthermore to find and recommend suggestions to reduce the macro-fiscal costs associated with volatility of revenues from crude oil.

This work combines more approaches and methods of methodology. An interdisciplinary approach requires broad application of comparative methods. Firstly, it is used quantitative method with an analysis of secondary data, which are gathering mainly from International Energy Agency (IEA), British Petrol (BP) Statistical Review, Energy International Administration (EIA), Central Intelligence Agency (CIA), and International Monetary Fund (IMF) and Arab Monetary Fund (AMF) and from statistics of Ministry of Finance in Saudi Arabia and it is used for examination of present data, as well as changes in the time and trends in the history. It is also used content and text analysis with regard to the media. This paper also uses a descriptive approach that is based on empirical analysis of already existing facts.

### 3. Literature overview

Crude oil (petroleum) is a naturally occurring liquid that is usually found underground or it can be found above the ground in oil seeps or tar pits. Petroleum consists of many liquid, solid and gaseous hydrocarbons. That is why crude oil is mostly found with natural gas and saline water. Crude oil differs in appearance depending on its composition and therefore its colour varies too, from black and dark brown to even some shades of red, green or yellow.<sup>1</sup>

Nowadays, petroleum has been the most important (and not only) energy resource globally. However, it is non-renewable resource and its reserves have been narrowing down gradually. Along with natural gas and coal forms crude oil the largest part of fossil fuels providing around 95 % of world's energy demand including transport, heating and other uses. From that, the biggest share has crude oil with 40 %, following by coal with 28 % and natural gas with 20 %.<sup>2</sup>

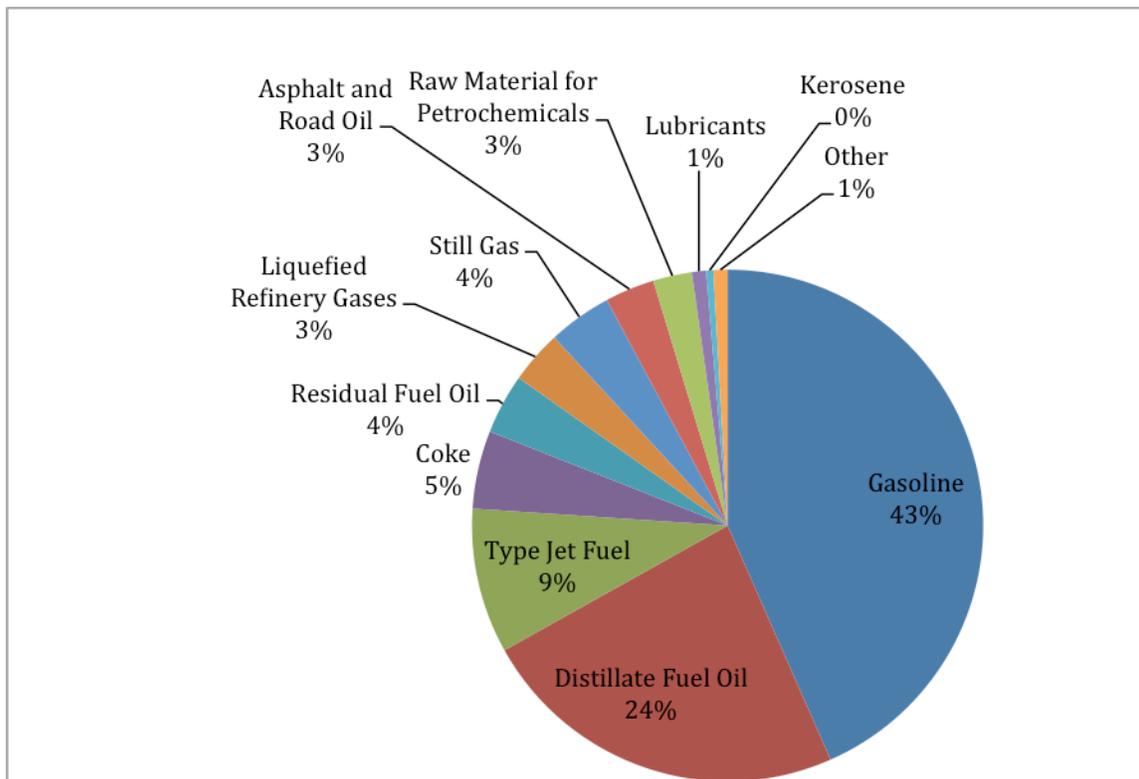
Crude oil has a wide range of uses; basically it is irreplaceable for mankind because products from petroleum are ubiquitous. There are over 4,000 petrochemical products that are made from refined crude oil - fuels (gasoline, diesel, jet fuel, heating oil), chemical products (fertilizers and pesticides, plastics, synthetic rubber and fibres - polyester, nylon, acryl), wax, candles, asphalt, photographic film, food additives, medicine, make-up just to mention few of them.<sup>3</sup> To be more specific, there is a division of refined products that are made from one barrel (42 gallons is approximately 159 litres) of crude oil (see Chart 1).

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<sup>1</sup> What is crude oil, available on: <http://www.alaska.boemre.gov/kids/shorts/crude/crude.htm> [cit. 2011-02-21]

<sup>2</sup> Energy resources: Fossil fuels, available on: <http://www.darvill.clara.net/altenerg/fossil.htm> [cit. 2011-02-21]

<sup>3</sup> Uses of crude oil, available on: <http://www.natural-environment.com/blog/2008/03/06/uses-of-crude-oil/> [cit. 2011-02-21]



**Chart No.1:** Products Made from 42-Gallon Barrel of Crude Oil

Source: <http://www.marketoracle.co.uk/Article3631.html>/own chart

### 3.1 Classification of Crude oil<sup>4,5</sup>

Crude oil is classified on the basis of its geographical location, API (American Petroleum Institute) gravity (light with low density and heavy with high density) and how much sulphur it contains (sweet if contains small portion of sulphur and sour if contains higher portion of sulphur). The most important indicator is the location where the petroleum was found, because of future transportation cost to the refinery. There are several important benchmarks according to the geographical location, such as United States crudes, North Sea crudes, Persian Gulf crudes and African crudes.

<sup>4</sup> Types and clasifications of crude oil, available on: <http://www.articlesnatch.com/Article/Types-And-Classifications-Of-Crude-Oil/1039941> [cit. 2011-02-21]

<sup>5</sup> Classification of oil, available on: <http://www.oilgasarticles.com/articles/7/1/Classification-of-Oil/Page1.html> [cit. 2011-02-21]

### **West Texas Intermediate (WTI)**

WTI consists mainly from West Texas Intermediate, West Texas Sour and Light Louisiana Sweet and it is the major benchmark in the United States. It is used to establish oil prices and commodity of NYMEX (New York Mercantile Exchange) trading in the future. It is mainly used in Western news and reports related to crude oil. It is a very high-quality light crude oil with 0.24 % of sulphur (sweet) and API gravity is around 39.6 degrees (light). Because of these features it could be refined in the USA, mostly in Midwest and also in the regions along Gulf Coast.

### **Brent Blend**

This benchmark consists of crude oil from 15 oil fields in the Brent and Ninian system located in the North Sea. It is one of the main oil classifications that includes Brent Crude, Brent Sweet Light Crude, Oseberg and Forties. Its API gravity is around 38.5 degrees, so it is light but not as light as WTI and with 0.37 % of sulphur it is sweet, but again not as sweet as WTI. It is ideal for gasoline production. Brent Blend is mostly refined in Northwest Europe but when its price is suitable for export it can be refined in the United States or in Mediterranean region.

### **OPEC basket**

It consists of seven crude oils including Arab Light from Saudi Arabia, Bonny Light from Nigeria, Fateh from Dubai, Isthmus from Mexico (non OPEC), Minas from Indonesia, Saharan Blend from Algeria and Tia Juana Light from Venezuela. This benchmark is a mixture of both heavy and light crudes and it is heavier than WTI or Brent Blend. For example, West African crudes has API gravity around 35 degrees and portion of sulphur is 0.2 %. Persian Gulf crudes have API gravity around 37 degrees and 1.08 % of sulphur. OPEC tries to balance oil price between lower and upper limits by increasing and decreasing production of crude oil.

### 3.2 History of crude oil<sup>6</sup>

During last 4,000 years people have been using crude oil in many ways for many purposes. In The Bible it is mentioned that asphalt was used to fortify walls in ancient Babylon and that petroleum was used in medicine and to create light. Furthermore, in the 4<sup>th</sup> century AD the Chinese were first who drilled wells up to 240 m deep to collect the oil, which was burned later to produce salt. By the 10<sup>th</sup> century there were first bamboo pipelines connecting oil wells and salt springs.

The modern history of crude oil has begun in 1846 when Abraham Pineo Gesner found out how to refine kerosene from coal. Six years later Ignacy Łukasiewicz improved his idea by refining kerosene from more available rock oil seeps. That is why in the year 1853 the first oil mine was built in Bóbrka in Poland. One year later Benjamin Siliman from New Heaven made first distillation to produce separate petroleum. The first oil well in North America was in Ontario, Canada in 1858 and one year after the oil industry has started in the US in Pennsylvania as well. In 1861 was built the first refinery in Russia and all at once it became the main producer of oil in that time.

During the 19<sup>th</sup> century the demand for kerosene increases due to industry revolution. But when Thomas Alva Edison invented electric light bulb in 1878, the demand for kerosene decreased. The revolutionary invention how to use oil was discovered by Karl Benz and Gottlieb Daimler in 1886 with introduction of first gasoline powered automobiles. The important fact was, that gasoline was a by-product of distillation of kerosene, thus it was cheap.

In that time many large oil fields in Dutch East Indies, Canada, Iran, Mexico, Venezuela and Peru were discovered. During the WWII represented these fields the main strategic worth. Crude oil has slowly overtaken coal in the position of primary fuel by the second half of the 20<sup>th</sup> century and enabled diversification from coal. But with both energy crisis in 1973 and

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<sup>6</sup> History of crude oil, available on: [http://americanhistory.suite101.com/article.cfm/history\\_of\\_crude\\_oil](http://americanhistory.suite101.com/article.cfm/history_of_crude_oil) [cit. 2011-02-21]

1979 people started to realize that crude oil is a limited and not renewable resource. However, by the 1980s the production has been increasing and it caused oil overspill.

Nowadays petroleum is used to produce most of the products that are necessary for our everyday life. Almost 90 % of all vehicles are powered by fuels, which are made from crude oil. It is very important and strategic commodity that caused many political conflicts (WWII, Persian Gulf Wars).

### **3.3 Conventional and unconventional oil**

There are two main types of oil, alias several possibilities how to extract crude oil from the underground or above the ground- conventional and unconventional oil. First one is extraction using oil well, which is traditional and most effective method in terms of quantity of petroleum produced versus associated cost and it is the easiest way how to get the petrol from the oil fields. But there is a problem with decreasing number of oil fields and their capacities because in most of the fields their “peak” has already occurred. Due to this fact there are another possibilities how to obtain the oil from the fields. Those are called unconventional methods and they are used to extract oil from resources such as oil sands, oil shale, biomass and coal-based liquid supplies and liquids getting from chemical process of natural gas.

Oil sands (tar sands) are major source of unconventional oil consisting of extremely viscous petroleum trapped in a mixture of water, clay and sand. The largest sources are in Venezuela and Canada but they are to find in many other countries all over the world. They can be divided into surface deposits, from which is the oil extracted by an “open pit” technique and deeper underground deposits, where the “in situ” technique is used<sup>7</sup>.

Oil shale is any sedimentary rock that contains kerosene and from which are extracted hydrocarbons liquids. Unlike the crude oil, kerosene needs to be more processed and therefore is more costly. For getting the oil, the oil shale has to be heated up to around 400°C. The

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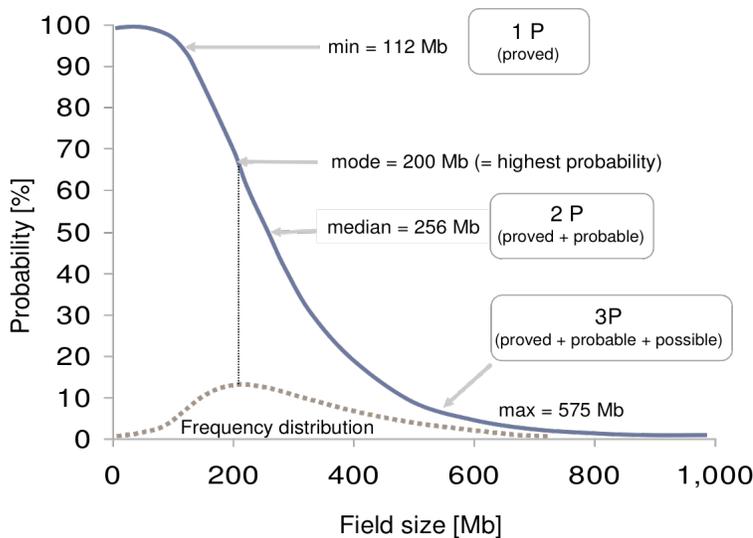
<sup>7</sup> Unconventional oil- unconventional\_oil\_final\_lowres.pdf, available on: [www.panda.ogr/oilsands](http://www.panda.ogr/oilsands) [cit. 2011-02-21]

deposits of oil shale are all over the world but the most are located in the USA. The methods for the extraction of surface mining are “open pit” technique and strip mining<sup>8</sup>.

Biomass is another type of unconventional oil. There are several options how to produce oil. First one is to grow crops either rich in starch such as maize and corn, or rich in sugar, such as sugar beet or sugar cane and process ethanol (bioethanol) by fermentation. Second one is to grow feedstock rich in vegetable oil such as sunflower, soy, oil seed rape or palm oil and to produce biodiesel using transesterification<sup>9</sup>.

### 3.4 World Proven Crude Oil Reserves

The reserves of crude oil are defined as “quantities of petroleum claimed to be commercially recoverable by application of development projects to known accumulations under defined conditions”<sup>10</sup>. They are divided into two categories- proven and unproven reserves with reference to the relative degree of uncertainty (see Chart 2).



**Chart No.2:** Reserve Assessment of the Recoverable Crude Oil  
Source: Petroconsultants, 1995

<sup>8</sup> Assessing Biofuels- Assessing\_Biofuels\_Full\_Report.pdf, available on: [www.unep.org](http://www.unep.org) [cit. 2011-02-21]

<sup>9</sup> Bio Diesel, available on: [http://www.biodiesel.org/resources/biodiesel\\_basics/](http://www.biodiesel.org/resources/biodiesel_basics/) [cit. 2011-02-21]

<sup>10</sup> Petroleum Resources Management System, Society of Petroleum Engineers, 2007, page 3.

- Proven reserves (P90, P1)<sup>11</sup>: are those reserves that “have a 90 % of confidence to be recoverable under existing political and economic conditions and using existing technology”<sup>12</sup>.
- Unproven reserves:
  - Probable (P50, P2)<sup>13</sup>: are reserves with 50 % of confidence of recovery.
  - Possible (P10, P3)<sup>14</sup>: are reserves with at least 10 % of confidence to be produced.

There are also strategic petroleum reserves (SPR) that are not part of proven reserves but many countries should have them to assure their national security during possible energy crisis, because at the most cases it is stated by law. According to the IEA, all the members have to have strategic reserves, which are equal to 90 days of the country’s previous year’s net oil imports. Today’s world strategic reserves are approximately 4.1 billion barrels (EIA, 2010)

The table below (Table 1) shows a comparison of the world proven oil reserves according to three official publications, such as British Petrol Statistical Review (June 2010), Oil & Gas Journal (Vol. 106.48, December 2008) published by PennWell Corporation and World Oil (Vol. 229, No.9, September 2008) published by Gulf Publishing Company. First differences are caused by the year when the data were collected. In each resource the latest possible data that were found are used. Secondly, there is significant difference of numbers related to North America between BP and PennWell Co. that are caused because PennWell Co. also counted 136.6 billion barrels of Canadian oil sands as remaining establishing reserves. The third big discrepancy is the data for South & Central America. The reason is huge increase in Venezuela’s proven oil reserves in the period 2008 - 2009 by 22.5 %, which was registered in

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<sup>11</sup> , "Glossary of Terms Used in Petroleum Reserves/Resources" (PDF). Society of Petroleum Engineers. 2005, page 10.

<sup>12</sup> "Glossary of Terms Used in Petroleum Reserves/Resources" (PDF). Society of Petroleum Engineers. 2005, page 10.

<sup>13</sup> "Glossary of Terms Used in Petroleum Reserves/Resources" (PDF). Society of Petroleum Engineers. 2005, page 9.

<sup>14</sup> "Glossary of Terms Used in Petroleum Reserves/Resources" (PDF). Society of Petroleum Engineers. 2005, page 8.

the Annual Statistical Bulletin of OPEC<sup>15</sup>. There are crude oil, gas condensate and natural liquids included in the review of BP, crude oil and condensate in Oil & Gas Journal and crude oil and condensate without natural gas liquids in World Oil Journal. The Data for the United States were gathered from EIA annual report DOE/EIA-0216 (2007).

Region	BP Statistical Review (June 2010) in billion barrels	Oil & Gas Journal (January 2009) in billion barrels	World Oil (December 2007) in billion barrels
North America	73.3	209.9	57.5
South & Central America	198.9	122.7	104.8
Europe & Eurasia	136.9	112.5	139.8
Middle East	754.2	746.9	727.3
Africa	127.7	117.1	114.7
Asia Pacific	42.2	34.0	40.1
<b>World Total</b>	<b>1,333.1</b>	<b>1,342.2</b>	<b>1,184.2</b>

**Table No.1:** World's Proven Crude Oil Reserves Comparison

Source: <http://www.eia.doe.gov/international/reserves.html> and BP Statistical Review (June 2010)/ own table

However, these numbers could be seen as relative in some cases because according to several sources (The Guardian, The Financial Times, Feb 2010) the biggest crude oil producer with largest proven oil reserves, Saudi Arabia lies about its reserves and overstate them up to 40 %, which is around 300 billion barrels of oil<sup>16</sup>.

From more than 40,000 oil and gas fields in the world only few are worth to mention because of its both size (larger than 1 billion barrels) and its production. The largest oil fields are mainly situated in the Middle East, namely in Iraq (see Table 2).

<sup>15</sup> Embassy of Bolivarian Republic of Venezuela, available on: <http://venezuela-us.org/2010/07/12/opec-certifies-historic-increase-in-venezuela's-oil-reserves/> [cit. 2011-02-25]

<sup>16</sup> The Guardian, available on: <http://www.guardian.co.uk/business/2011/feb/08/saudi-oil-reserves-overstated-wikileaks> [cit. 2011-02-25]

Field	Country	Discovered	Estimated oil in million barrels
<b>Ghawar Field<sup>17</sup></b>	Saudi Arabia	1948	71,000
<b>West Qurna Field<sup>18</sup></b>	Iraq	1973	43,000
<b>Burgan Field<sup>19</sup></b>	Kuwait	1938	43,000
<b>Rumaila Field<sup>18</sup></b>	Iraq	1953	17,000
<b>Majnoon Field<sup>20</sup></b>	Iraq	1975	12,600

**Table No.2:** World's Largest Oil Fields

Source: see footnotes

The largest crude oil proven reserves by country with further look on members of the Gulf Cooperation Council are seen in Chart 3. We can see that 42 % of all world oil reserves are in GCC member states with most significant share of Saudi Arabia (264.6 billion barrels). Followed by Canada with 175.2 billion barrels and Iran with 137.6 billion barrels.

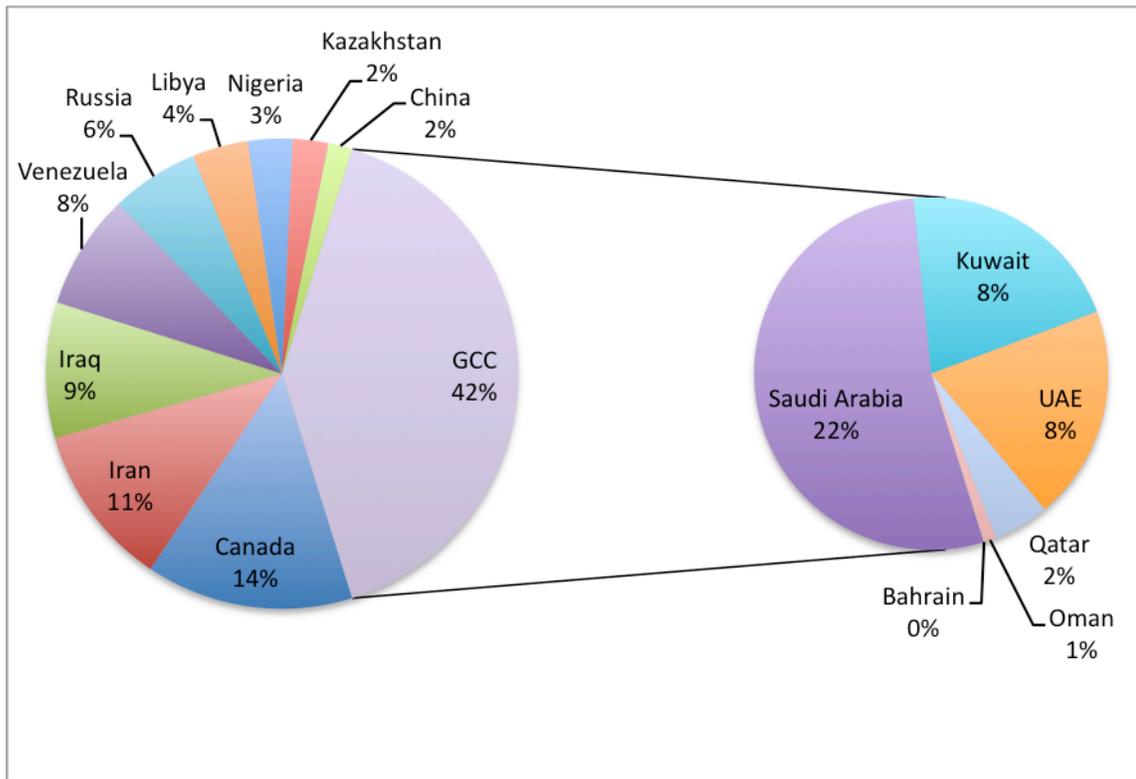
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<sup>17</sup> American Association of Petroleum Geologists, available on: <http://www.aapg.org/explorer/2005/01jan/ghawar.cfm> [cit. 2011-02-25]

<sup>18</sup> Forbes.com, available on: <http://www.forbes.com/2010/01/21/biggest-oil-fields-business-energy-oil-fields.html?boxes=businesschannelsections> [cit. 2011-02-25]

<sup>19</sup> Mindfully.org, available on: <http://www.mindfully.org/Energy/2005/Burgan-Field-Kuwait12nov05.htm> [cit. 2011-02-25]

<sup>20</sup> Offshore technology, available on: <http://www.offshore-technology.com/projects/majnoon-field/> [cit. 2011-02-25]



**Chart No.3:** World's Largest Proven Oil Reserves by Country

Source: CIA: <https://www.cia.gov/library/publications/the-world-factbook/rankorder/2178rank.html> (January 2010) /own chart

From the table below, it is obviously seen that crude oil reserves in Saudi Arabia is mainly operated by the national company Saudi Aramco. There are shown reserves from the years 1962 to 2008 and the number has been steadily increasing until 2007, when the crude oil reserves in Saudi Arabia was 264,210 billion barrels. It is expected that crude oil reserves will not increase in the future because it is almost sure, that there is not new crude oil to be discovered.

Year	SAUDI ARAMCO CO.	Others	Total	Year	SAUDI ARAMCO CO.	Others	Total
1962	56.90	2.60	59.50	1986	167.00	2.75	169.75
1963	57.80	3.30	61.10	1987	167.40	2.19	169.59
1964	59.10	3.30	62.40	1988	252.38	2.61	254.99
1965	63.70	3.30	67.00	1989	257.50	2.55	260.05
1966	74.70	3.30	78.00	1990	257.85	2.49	260.34

1967	77.00	3.40	80.40	1991	258.47	2.46	260.93
1968	132.60	3.40	136.00	1992	258.80	2.40	261.20
1969	133.30	3.40	136.70	1993	259.02	2.34	261.36
1970	135.00	3.70	138.70	1994	259.03	2.35	261.38
1971	134.72	3.54	138.26	1995	259.05	2.40	261.45
1972	133.83	3.24	137.07	1996	259.09	2.35	261.44
1973	133.68	3.15	136.83	1997	259.15	2.39	261.54
1974	136.85	4.19	141.04	1998	259.20	2.34	261.54
1975	141.25	3.33	144.58	1999	259.22	3.57	262.79
1976	147.85	3.56	151.41	2000	259.25	3.51	262.76
1977	165.68	3.80	169.48	2001	259.27	3.43	262.70
1978	163.35	3.71	167.06	2002	259.40	3.39	262.79
1979	164.77	3.62	168.39	2003	259.43	3.30	262.73
1980	164.22	3.24	167.46	2004	259.70	4.61	264.31
1981	161.90	2.92	164.82	2005	259.78	4.43	264.21
1982	165.46	2.86	168.32	2006	259.92	4.33	264.25
1983	166.22	2.80	169.02	2007	259.94	4.27	264.21
1984	166.30	5.41	171.71	2008	259.96	4.10	264.06

**Table No.3:** Crude Oil Reserves in Saudi Arabia (in billion barrels)

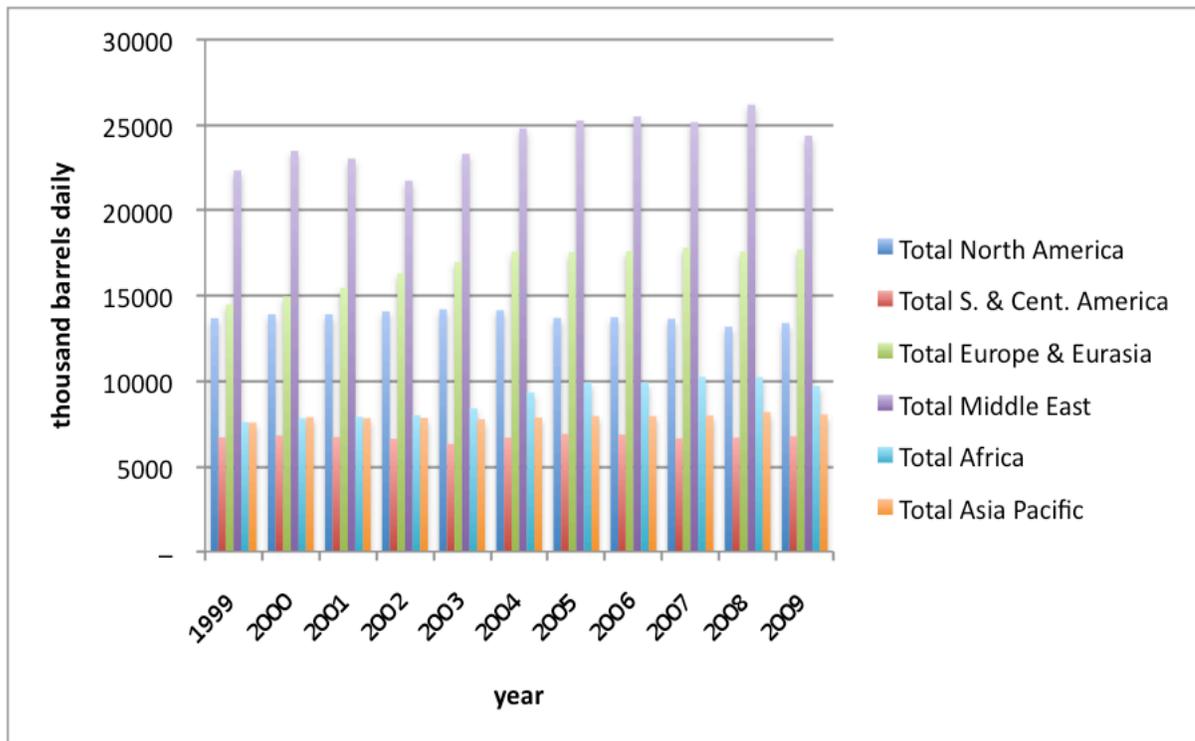
Source: Saudi Aramco Bulletin (2009)

### 3.5 World crude oil supply

Global economic recession decreased both energy production and consumption in the year 2009. The oil production fell by 2.6 % (2 million barrels/day), which was the biggest decrease since 1982. For reduction output in 2009, each member of OPEC had to follow the production-cutting agreement that resulted in falling the production by 7.3 % (2.5 million barrels/day). For example, the Middle East region reduced its production by almost 75 %. The opposite situation was among non-OPEC members, where US production increased by 7 % (460,000 barrels/day) and it was the largest increase globally. Other increments in production were in Russia, Kazakhstan, Brazil and Azerbaijan and it was balanced by decrements in China, Mexico, Norway and the UK<sup>21</sup>.

<sup>21</sup> BP statistical review of world energy, June 2010

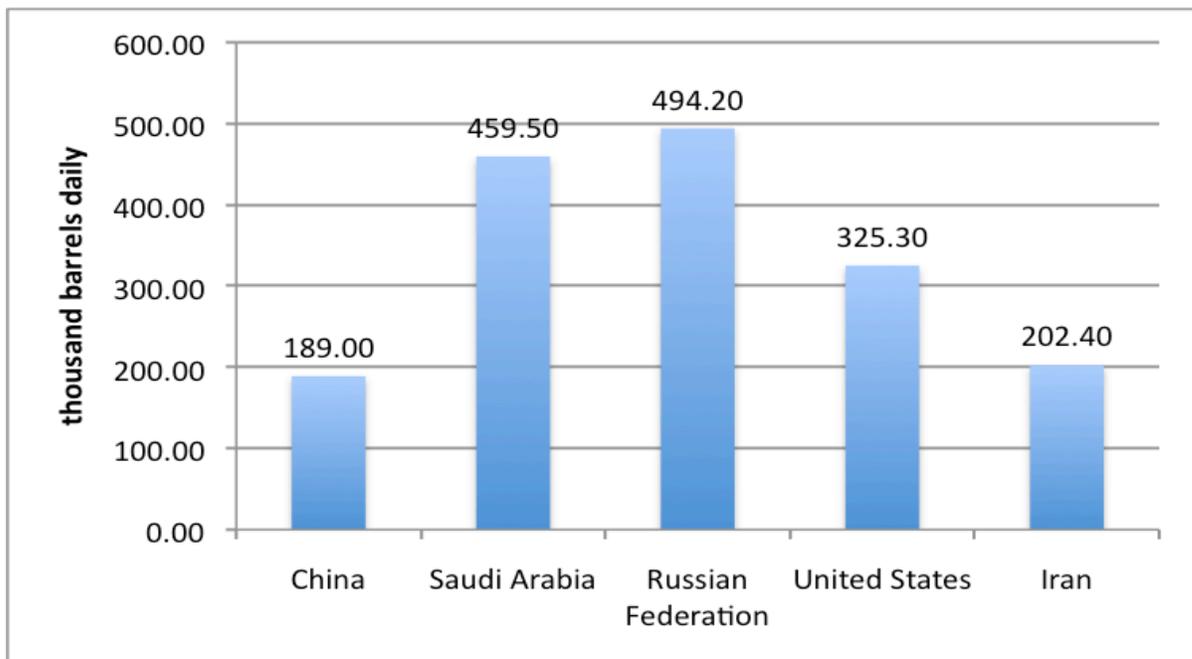
The biggest crude oil producers are Middle East region (31 %), Europe & Eurasia (22 %) and North America region (17 %). During the 10-year period the production of crude oil remained almost the same but there is one significant increase from the year 2002, when Middle East pushed the daily production by 3,529 thousand barrels a day till 2004. Namely it was Saudi Arabia and Kuwait. On the other hand, there has been a decline in production since 2008 in the Middle East by 7.3 % and in Africa region by 5.2 % due to financial crisis (see Chart 4).



**Chart No.4:** Daily Production of Crude Oil by Region

Source: BP Statistical review (June 2010)/ own chart

To be more specific about the crude oil production in the year 2009, there is a chart of five countries that have been the largest petroleum producers at the present time. The interesting point is that Saudi Arabia was not for the first time top one but was overtaken by the Russian Federation with all the time second largest amount of produced oil. The difference between them is 2 % (34,700 barrels per day). Third largest producer are the United States (325,300 barrels daily), followed by Iran (202,400 barrels daily) and China (189,000 barrels daily).



**Chart No.5:** Top 5 Crude Oil Producers in 2009

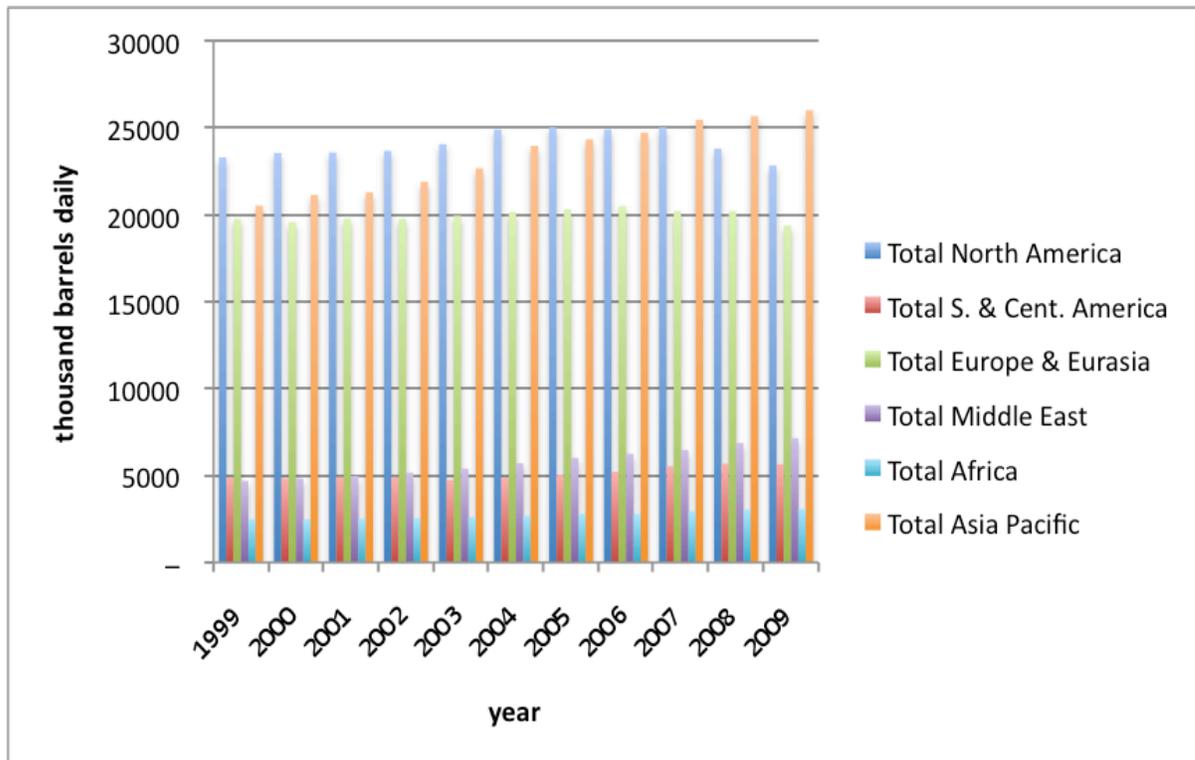
Source: BP Statistical review (June 2010)/ own chart

### 3.6 World Crude Oil Demand

The consumption has been increasing since people invented engines powered by gasoline which are widely used for all means of transportation as well as for production of various products that are all around us. Despite this fact, demand for crude oil decreased by 1.7 % (1.2 million barrels per day) mainly in OECD countries and Former Soviet Union. It is the greatest decline since the year 1982. The consumption of OECD members decline by 4.8 % (2 million barrels per day) and out of OECD grew slightly by 2.1 % (860,000 barrels per day) thanks to China, India and countries from Middle East region. However, the similar trend is obvious both in natural gas and nuclear power, while consumption of coal remains the same and energy made from renewable resources increased in 2009.

Furthermore, from the Chart 6 we can see that Asia Pacific region has becoming the biggest crude oil consumer with 25,998 thousand barrels daily (with largest share of China, Japan and India). Second largest consumer is traditionally the North America with 22,826 thousand

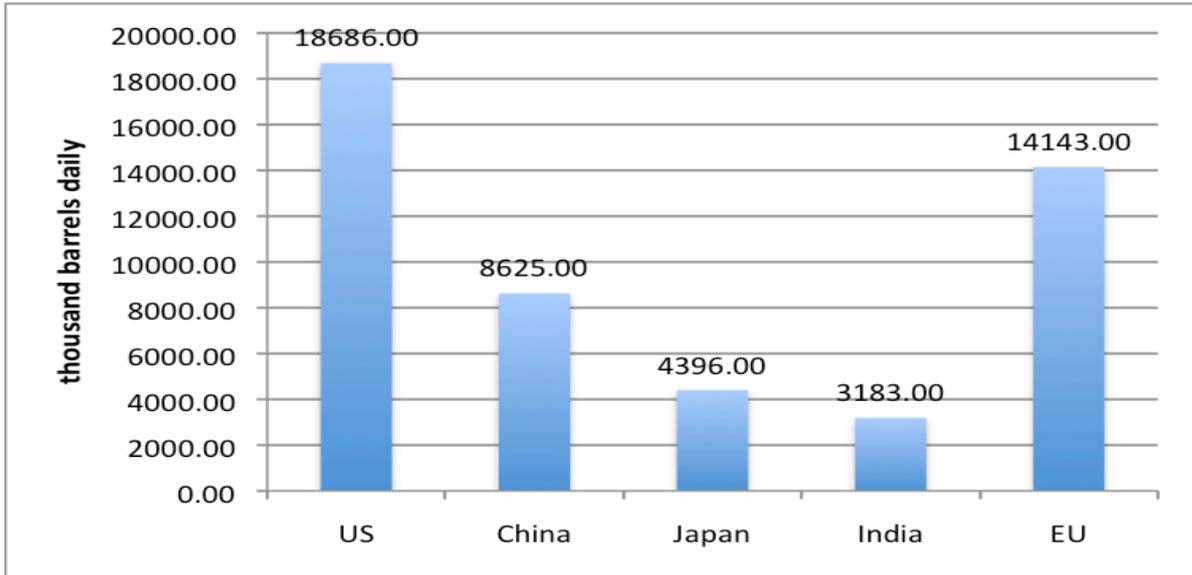
barrels daily (the US is the biggest consumer at this area). There is also a noticeable trend in growing consumption in Middle East region from 4,698 in 1999 to 7,146 thousand barrels per day in 2009.



**Chart No.6:** Daily Consumption of Crude Oil by Region

Source: BP Statistical review (June 2010)/ own chart

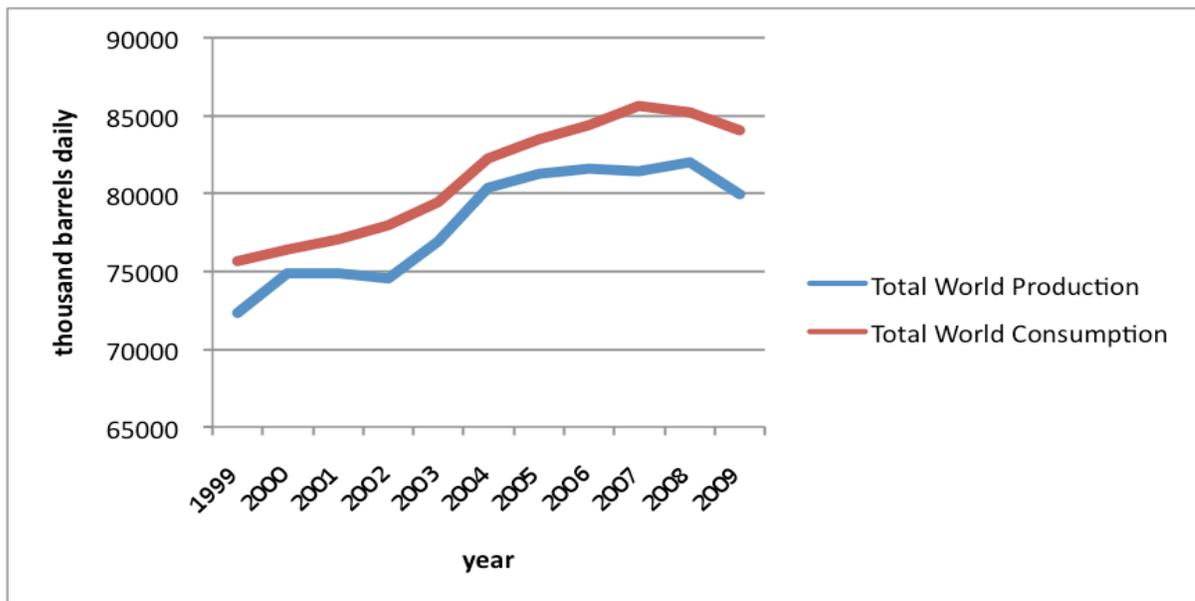
It is known that the United States are the biggest petroleum consumer, but in 2009 among the top five consumers has share of 38 % (18,686 thousand barrels daily). The second largest petroleum consumer is the European Union with 29 % share (14,143 thousand barrels/day). With 8,625 thousand barrels/day is China (18 %), Japan (9 %) and finally India (6 %) (see Chart 7).



**Chart No.7:** Top 5 Crude Oil Consumers in 2009

Source: BP Statistical review (June 2010)/ own chart

For comparison of world crude oil demand and supply, I also made a chart, where is clearly seen that consumption of petroleum has exceeded production during whole time period (see Chart 8). In 2009 the consumption for oil was 84,077 thousand barrels per day and production was 79,948 thousand barrels/day. Crucial point is that the countries with highest crude oil consumption cannot meet their demand from its proven reserves. That is why there is an issue of import and export, which is closely connected to political situation in given states.



**Chart No.8:** Comparison of the World’s Crude Oil Production and Consumption  
 Source: BP Statistical review (June 2010)/ own chart

## 4. History of crude oil prices

History of crude oil prices can be dated back to 1850's, when first refineries in Russia, United States, Canada and Poland were built and crude oil became an important commodity in both industry and everyday life. The price of a barrel is influenced by many factors, such as its grade, API gravity, amount of sulphur or geographical location and also by supply and demand, geopolitical situation or by unexpected events (weather). There is not just one price of crude oil, but directly three prices related to these benchmarks (West Texas Intermediate, Brent and Dubai)<sup>22</sup>.

Crude oil is a global commodity and its price is related to world supply and demand. That is why the price of petroleum is the most important factor in terms of further prices of products that are made from petroleum. In the past economic growth there was an increase in demand for such products<sup>23</sup>.

The demand is highly dependent on macroeconomic conditions around the world. The opinions on how oil prices affected global economic growth differs. One economist claims that high oil prices have negative impact on economic growth while the other says it enables restarting of the growth<sup>24</sup>.

### 4.1 Pre-embargo Period (1948-1972)

Europe was weakened and parched by after the World War II. The only solution for recovery of economies as well as well being of Europeans was to ask for help. In 1947 the USA announced the European Recovery Program (also known as Marshall Plan) to retrieve the Western European economy from 1947 to 1952<sup>25</sup>.

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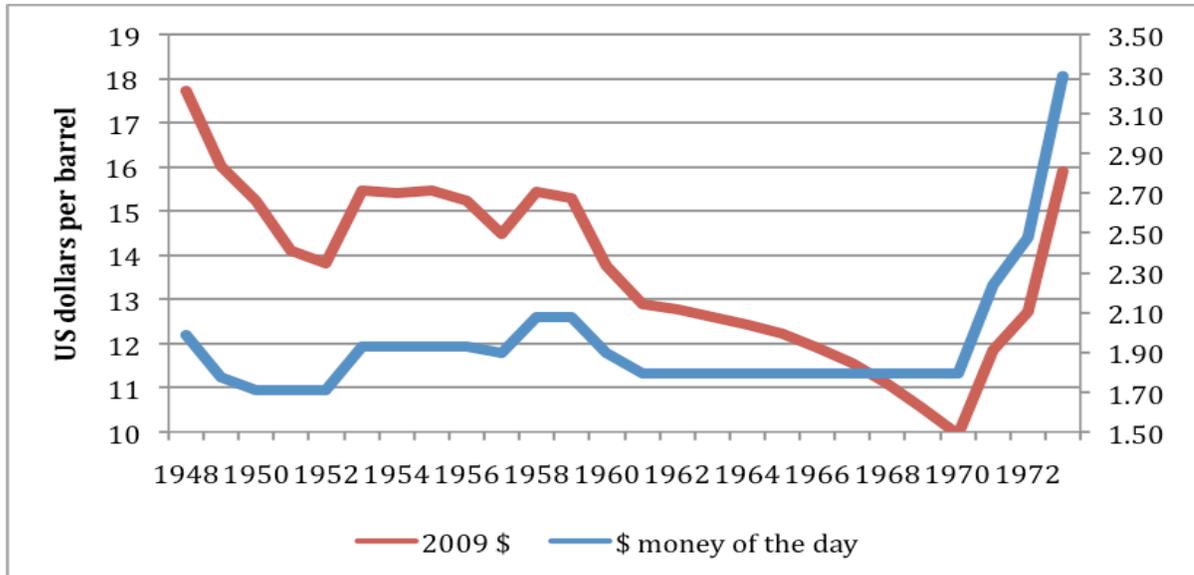
<sup>22</sup> IEA (2006), Energy Prices and Taxes

<sup>23</sup> Understanding Today's Crude Oil and Product Markets, Kenneth Grant, David Ownby, Steven R. Peterson, 2006

<sup>24</sup> Petroleum, available on: <http://www.solarnavigator.net/petroleum.htm> [cit. 2011-02.27]

<sup>25</sup> Newgeography, available on: <http://www.newgeography.com/content/001350-if-i-were-sheikh-mohammed> [cit. 2011-02-27]

A part of the Marshall Plan was to provide energy and financial help with facilities for recovery of mines and for economies that are dependent on crude oil enable supplies from the Middle East countries<sup>26</sup>.



**Chart No.9:** Crude Oil Prices (1948-1970)

Source: BP Statistical Review (2003)/ own chart

The oil price in the year 1948 was around \$2.0 or around \$15 adjusted for inflation to 2009 US dollars<sup>27</sup>. In 1956 most of the crude oil supplies were delivered through Suez Canal. On July 26 in the same year Egyptian President Gamal Abdel Nasser nationalized the Suez Canal Company to finance construction of the Dam in Aswan from its revenues because the US and Britain refused to give the promised financial aid. France, Great Britain and Israel organized military actions against Egypt. Despite the fact, the Suez Canal was closed until May 1957 and Europe was until that time in energy crisis<sup>28</sup>. This led to establishing EEC (European Economic Cooperation) in 1957 for setting up emergency plans for future lack of crude oil and MOIP (Mandatory Oil Import Program) in 1959, when President Eisenhower imposed quotas to control crude oil imports to the USA<sup>29</sup>.

<sup>26</sup> MOAN, J., SMITH, Z.: Energy Use Worldwide, California 2007, ISBN 978-1-85109-890-3

<sup>27</sup> used US Average till 1944, 1945-1985 Arabian Light posted at Ras Tanura, 1986-2009 Brent spot

<sup>28</sup> BBC, available on: [http://www.bbc.co.uk/history/british/modern/suez\\_01.shtml](http://www.bbc.co.uk/history/british/modern/suez_01.shtml) [cit. 2011-02-27]

<sup>29</sup> WTRG Economics, available on: <http://www.wtrg.com/prices.htm> [cit. 2011-22-27]

In 1960 OPEC (Organization of Petroleum Exporting Countries) was founded, founding members included Iran, Iraq, Kuwait, Saudi Arabia and Venezuela as an answer to low oil prices which were caused by foundation of MOIP. The main aims of OPEC were to increase revenues from produced oil in member states by controlling prices and to unify policies in production. Qatar, Libya, Indonesia, UAE, Algeria, Nigeria and Ecuador (2007) became OPEC members till 1971(see Supplement 1- OPEC Member States).

Accruing tensions between these two sides and the fact that petroleum has become very important and strategic commodity led in 1961 to foundation of OECD (Organization for Economic Cooperation and Development). It was union of most developed countries at that time (see Supplement 2- OECD Member States) and replaced OEEC founded in 1948. On June 5, 1967 Israel attacked Egypt because of the growing tensions among Egypt, Syria, Jordan, Iraq, Lebanon and Israel. The Six Day War occurred between Egypt and Israel and between Syria and Jordan<sup>30</sup>. The Arab countries applied oil embargo against Europe and the US due to supporting Israel and it lasted till the end of July. This closure led to an increase of supplies from Venezuela and Iran. As a result the Arab states created in 1968 OAPEC (Organization of Arab Petroleum Exporting Countries) to ensure and unify political interests among them.

The first notable change in a price of crude oil occurred in 1971 when regulatory agency Texas Railroad Commission established 100 % prorating. From that time the regulation of prices has shifted to OPEC, because oil producers were not limited by the amount of produced oil. In 1972 the price increased from \$1 to 3\$ (from \$10 to \$16) is seen in Chart 9.

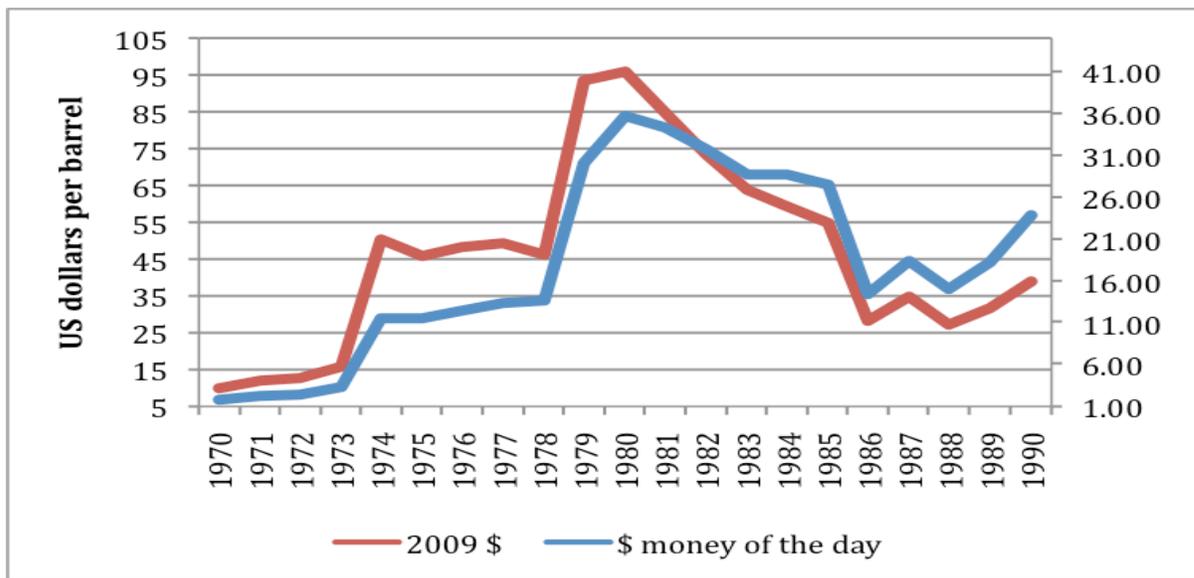
#### **4.2 Embargo Period (1973-1989)**

However, the price did not stay stable for long. Immediately one year after the price of oil jumped into \$12 (\$50 adjusted for inflation to 2009 US Dollars). The price was nearly four times higher than a year ago (see Chart 10). Such increase was related to oil crises in 1973. It

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<sup>30</sup> Zionism and Israel, available on: <http://www.zionism-israel.com/dic/6daywar.htm> [cit. 2011-02-27]

started with Arab-Israeli War on October 6, 1973 when Egypt and Syria invaded Israel by surprise on Yom Kippur Day<sup>31</sup>. It ended after 19 days on October 25 with Israeli victory with help from the US<sup>32</sup>. As a response of US cooperation with Israel OAPEC decided to cut the production by 5 % each month. The US gave \$2.2 million subsidy to Israel. And finally the Saudi Arabia imposed embargo against US and lately against other states, which caused an energy crisis<sup>33</sup>.



**Chart No.10:** Crude Oil Prices (1973-1989)

Source: BP Statistical Review (2003)/ own chart

In 1974 was founded IEA (International Energy Agency). ‘Its mission was to develop strategies for energy security during emergencies and to reduce member countries‘ dependence on oil (IEA 2005)‘. The prices between 1974 and 1978 were moving around \$12 to \$13.6 (\$50 to \$48 in view of 2009 US Dollars). In 1979 the price jumped again to \$30.03 (\$93.41). The reason was firstly Iranian revolution in 1978 and then a war between Iran and Iraq, which started in 1980. Consequently the production in both countries declined by 6.5

<sup>31</sup> the holiest day in Jewish calendar, similar to Ramadan in Muslim calendar

<sup>32</sup> Jewish Virtual Library, available on: [http://www.jewishvirtuallibrary.org/jsourc/History/73\\_War.html](http://www.jewishvirtuallibrary.org/jsourc/History/73_War.html) [cit. 2011-02-28]

<sup>33</sup> Charles D. Smith, Palestine and the Arab-Israeli Conflict, New York: Bedford, 2006, p. 329

million barrels daily which was 10 % of total world production<sup>34</sup>. The second energy crisis has occurred.

Both energy crises showed that whole world is highly dependent on crude oil and on its regular supplies. It led to general awareness that petroleum is a scarce resource which can be easily run out of. That is why consumers started to use crude oil more effectively, which further resulted in a decrease of production outside OPEC and thus in decline in price to approximately \$14 (\$28 in 2009 US Dollars view). It is also called the Oil Glut.

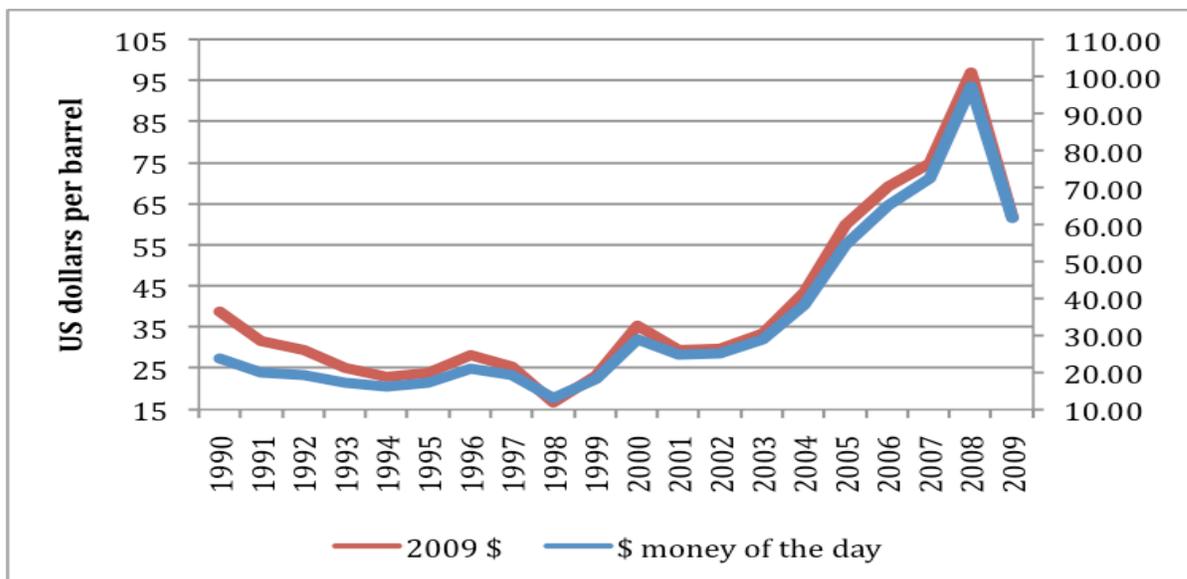
### **4.3 The Gulf War and OPEC's quota control (1990-2009)**

In the year 1990 the Gulf War has begun when United Nation's members invaded Iraq. It was started with invasion of Kuwait by Iraq on August 2, 1990<sup>35</sup>. This event resulted in decrease of production and slight increase in price to \$23.84 (\$38.94) in 1990 and \$20.05 (\$31.51 adjusted for inflation to 2009 US Dollars) in 1991. When Kuwait was set free again prices became relatively steady around \$17 (\$25) until 1994. Afterwards the US examined economic boom and oil prices shifted to approximately \$20 (\$28 viewed in 2009 US Dollars) until 1997.

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<sup>34</sup> MOAN, J., SMITH, Z.: Energy Use Worldwide, California 2007, ISBN 978-1-85109-890-3

<sup>35</sup> Jewish Virtual Library, available on: [http://www.jewishvirtuallibrary.org/jsourc/History/Gulf\\_War.html](http://www.jewishvirtuallibrary.org/jsourc/History/Gulf_War.html) [cit. 2011-02-28]



**Chart No.11: Crude Oil Prices (1990-2009)**

Source: BP Statistical Review (2003)/ own chart

By the end of 1997 OPEC increased production quota by 10 % per day and at the same time Asia was facing economic crisis. This all resulted in declining consumption in Asia region and high production inside OPEC and thus to steep fall in oil prices by around 40 % to the level of \$13.11 (\$16.74). OPEC answered by cutting its quota twice by 5 % but the prices were still very low but during next two years the price of petroleum increased to \$28.98 (\$35.5) in 2000 due to three successful OPEC quotas (see Chart 11).

In 2001 the US economy was weakened and production in non-OPEC countries raised, as a result OPEC implemented once again quota to cut production by 3.5 million barrels per day. It seemed good if the terrorist attack on September 11 did not happen. As a consequence the oil prices (WTI) fell down by 35 % in November. Due to this fact OPEC did not apply any quota until January 2002. Then it decreased its quota by 1.5 million barrels daily, which was followed by some non-OPEC members including Russia.

Strikes in Venezuela led to decrease in their production and was not Venezuela was not able to reach the production capacity of 3.5 million barrels per day. OPEC had to increase the quota by 2.8 million barrels daily. Also the beginning of Second Gulf War (Iraq War) influenced an

increase in the price of petroleum. The price was \$28.83 (\$33.62) in 2003 and had a raising trend<sup>36</sup>.

During the period from 2004 to 2007 the price climbed up firstly because of weak US Dollar, secondly due to conditions (hurricanes Katrina and Rita in 2005) and also OPEC production cuts and other geopolitical tensions. The price of petroleum was \$72.39 (\$74.9) at the beginning of 2007. Furthermore one year later the price of a barrel was \$97.26 (\$96.91). This extremely high prices affected governments to partially finance agriculturists to grow feedstock for energy proposes. Nearly 30 % of grown crops went to energy uses and it led to increase in prices of food, which resulted in nutrition problems in developing countries<sup>37</sup>.

Another important point in history of crude oil prices is recent global economic recession, which started at the end of 2008. The world demand for oil decreased with significant participation of China, one of the fastest growing economy and thus corresponding need for petroleum. The largest petroleum companies started to re-value the financial investments into new production in new oil fields. The price in February 2009 was around \$35 and the average price in 2009 was \$61.67 per one barrel. There is a problem when the price of oil is very low because oil-exporting countries are highly dependent on revenues from oil and should sell a barrel at a given price<sup>38</sup>.

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<sup>36</sup> WTRG Economics, available on: <http://www.wtrg.com/prices.htm> [cit. 2011-02-28]

<sup>37</sup> International Food Policy Research Institute, available on: <http://www.ifpri.org/pubs/bp/bp001.asp> [cit. 2011-02-28]

<sup>38</sup> Petrol, available on: <http://www.petrol.cz/ropa/clanek.asp?id=11298> [cit. 2011-02-28]

#### 4.4 Role of OPEC

Organization of Petroleum Exporting countries was established on September 10-14 1960 in Baghdad. “Its objective is to coordinate and unify petroleum policies among Member Countries, in order to secure a steady income to the producing countries; an efficient, economic and regular supply of petroleum to consuming nations; and a fair return of capital to those investing in the petroleum industry.” [WOO 2010] The member states meet two times a year to review present situation on the oil market and also to discuss further changes in terms of production of crude oil.

To be complete OPEC applied in 1968 a Declaratory Statement of Petroleum Policy in Member Countries. It meant to have a vested right of all member states to examine continual sovereignty of their natural resources to develop their countries. In addition, it ensures that the exploitation of OPEC’s non-renewable resources should be the goal in securing the best possible benefit for its member states. Altogether, it results in OPEC’s main focus on stability in oil market by setting suitable prices, enable regular supplies and reasonable revenues and to have right that producer of the oil can decide the density of petroleum reserves<sup>39</sup>.

The “Seven Sisters” ruled the crude oil industry during 1960’s. They were the multinational oil companies consist of Standard Oil of New Jersey, Royal Dutch Shell, Anglo Persian Oil Company, Standard Oil of New York, Standard Oil of California, Gulf Oil and Texaco<sup>40</sup>. These companies set the price at very low level with almost no revenues for states that their reserves was within the border. In 1970’s OPEC claimed its role by supporting the members to oversee its reserves and to have a significant weight in setting prices. In 1975 another document called “the Solemn Declaration” was signed to stress the importance and relevance of OPEC. It promoted fair economic system throughout the world by mutual cooperation between OPEC and developing countries.

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<sup>39</sup> The Role Of OPEC in 21st century, available on: <http://www.eppo.go.th/inter/opec/RoleOfOPEC.html> [cit. 2011-03-05]

<sup>40</sup> The Global Guru, available on: <http://www.theglobalguru.com/article.php?id=110&offer=GURU> [cit. 2011-03-05]

This is a nice demonstration of how cooperation in oil market is necessary because without OPEC there will be no stabilized market and if OPEC would deal alone it would be only possible with low success. What is more, OPEC handles around 60 % of petroleum export. According to General Secretary Dr. Rilwanu Lukman, “The achievement of an orderly market must be sustainable. What we have witnessed over the past two years is reaction to a crisis. What the market requires is "pro-action." Damaging situations should not be allowed to arise in the first place. If one does arise, then there should be means available at all times of nipping it in the bud. This is an issue that requires examination in re-appraising OPEC’s role for the future”<sup>41</sup>.

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<sup>41</sup> The Role Of OPEC in 21st century, available on: <http://www.eppo.go.th/inter/opec/RoleOfOPEC.html> [cit. 2011-03-05]

## **5. Crude Oil Role and Its Impact on Saudi Arabian Economy**

### **5.1 Crude Oil Role in Saudi Arabian Economy**

Oil and its relationship have shaped the Arab economy since the founding of states in the Arab world. Realization of the importance and potential for fulfilling global energy needs increased not only strategic importance of these countries, but also help to integrate them into global economy. During the 20<sup>th</sup> century socio-economic and political transformation of Saudi Arabia to the world's super powers was influenced by political and energy situation on one hand and by development of petroleum sector in Arab economies on the other.

The term "Arab world" is often used with reference to the countries of the Middle East and North Africa and the Member States of the League of Arab States with a population of 310 million (5 % of world population), the combined GDP of 870 billion U.S. dollars (3 % of world GDP) and income per capita of around \$ 2,900 are Arab countries, as defined by the World Bank classified as medium-low income countries. But Saudi Arabia has \$14,540 income per capita and thus it belongs to high-income countries (IMF 2009). Despite the historical and cultural ties that exist among Arab countries, there are big differences among the Arab sub-regions, for example in terms of population size, resource endowments, levels of socio-economic development, the structure of output and income per capita. These differences affect not only the growth patterns of Arab economies, but also the process of economic integration and political unity and cohesion in the Arab world.

Since the last three decades countries in the Arab world have been witnessing great social, economic and political transformations. The oil sector plays in this transformation in different historical moments a crucial role. During the first years after the discovery of oil, when mining was still in the hands of international oil companies and according to the old concessions, these transformations have been shaped by the world's major power rivalries, alliances, as well as various international oil companies have significantly influenced the production of oil and its pricing policy. After a wave of nationalizations and completion of the acquisition of former dealer was the oil industry gradually integrated into the economies of oil producing countries.

After integration of the oil industry in the Arab economies, its role has undergone different forms and degrees of dependence on oil market developments, flow of oil revenues and use the comparative advantages of Arab economies. The role of the oil industry differs in each country with dependence on the political, institutional and financial relations between the oil industry, represented by national oil companies and their respective governments. (Alabdeli, 2005)

### **5.1.1 Oil sector in Saudi Arabia**

At the end of 2009, Middle East countries had 754.2 billion barrels of world oil reserves, which represents 56 % of total world oil reserves. Saudi Arabia has 264.6 billion barrels of crude oil reserves, which is around 20 %. Only in 2009 Saudi Arabia produced 9.764 million barrels per day (CIA). With volume of oil exports of 20.5 million barrels per day were countries from Middle East region are responsible for 42 % of total world oil exports. In the last three decades the Arab countries have a higher share of global oil reserves than any other group of countries. This explains the relative dominance of the oil industry in the economies of Arab oil producing countries.

The Arab League has 19 members from which 14 members are producers of crude oil. Six countries are members of the GCC and along with Iraq, Algeria and Libya; all represent 98 % of the total Arab oil reserves. In the year 2004 the oil industry has participated from 30 % to 60 % of the gross domestic product in these economies, when GCC members had 42 % share and Iraq, Algeria and Libya had even 55 % share of oil sector. As it is seen, Saudi Arabia had the highest GDP of \$250.56 million and thus \$105.75 mil of oil sector. (see Table 4).

	<b>GDP (in mil USD)</b>	<b>Oil sector (in mil USD)</b>	<b>Share of oil sector (in %)</b>
<b>GCC members</b>	<b>474.5</b>	<b>197.8</b>	<b>42</b>
Bahrain	11.07	3.13	28
Kuwait	55.72	26.60	48
Oman	24.82	10.53	42
Qatar	28.45	17.68	62
<b>Saudi Arabia</b>	<b>250.56</b>	<b>105.75</b>	<b>42</b>
UAE	103.83	34.10	33
<b>Other oil producers</b>	<b>146.1</b>	<b>80.73</b>	<b>55</b>
Iraq	33.7	31.32	93
Algeria	84.8	32.18	38
Libya	27.6	17.23	62
<b>Arab countries in total</b>	<b>870</b>	<b>301</b>	<b>35</b>

**Table No.4:** Oil Sector and GDP in Major Economies in the Middle East in 2004  
Source: Arab Monetary Fund (2005)

In 2004, the average share of oil sector in Saudi Arabia was 42 %. This very high share in combined GDP represents increased production and high prices of oil recorded in that year. In the period 1990-2004, the share of oil sector in total GDP of Saudi Arabia went along with the ups and downs in the global oil market. During the period 1995-2004 four countries, namely Saudi Arabia, United Arab Emirates (UAE), Algeria and Egypt had total GDP of 60 %.

Saudi Arabia has set the objective of developing a diversification of the economy and increase resilience to external shocks. Over the past three decades Saudi Arabia has experienced growth in GDP in relation to the growth pattern in the oil sector. Lack of economic performance of Saudi Arabia in comparison with other developing countries has again initiated the interest in the relationship between wealth of natural resources and economic growth.

There are three ways how the oil sector is influencing development of Saudi Arabian economy. First one is crude oil as a source of financing. It means that redistribution of oil revenue through the government expenditures required to meet the needs of the national economy during the "ups and downs of oil", always depended on the volume of public finance of the economy and on the volume of the revenues from oil. Saudi Arabia did several

economic arrangements. From the fiscal point of view, these measures include privatization of state enterprises and government business, diversification of government revenues, setting up conservative oil price assumptions in the planning of public spending, reducing government subsidies and reforming energy prices to reflect marginal costs. (Maitah, 2010)

Second way is the crude oil as an input for further use in petrochemical industry. This means the real output from oil sector, which enters the economy as an input in further production processes of the economy, such as oil input into refineries, refined products into petrochemical industry or fuels from oil into energy-intensive industries and production of electricity. These relations are very important in terms of further development of processing industry in the Middle East countries and its growing share on GDP. It is done firstly by development of refineries, which have been growing since 1975 and secondly by development of petrochemical industry in oil-producing countries, mainly in Saudi Arabia. The share of petrochemical industry is 38 % and share of processing sector in GDP is 10.1 % in Saudi Arabia (AMF, 2004).

And finally third way is to see crude oil as a determining factor of the foreign trade. This fact refers to impact of revenues from oil to national economy. The more income spent on imports of goods and services, the greater the negative impact on the balance of payments. The first and second oil boom was characterized by increased oil exports and rising imports, a situation that usually maintain trade balance surplus. As the value of oil exports decreased during long-term decline in the oil market between 1982-1999, non-oil exports increased while the rate of imports decreased. The final effects of these ties on the economy differ depending on the size of the economy or the size of revenues from the oil, degree of economic freedom, the fiscal policy and the extent of political stability. (Maitah, 2010)

### **5.1.2 Future role of oil sector in Saudi Arabia**

The production of crude oil has been playing an important role in Saudi Arabia. This is based on the role of oil in the world energy mix on the one hand and the proportion of the world's oil reserves in the Middle East region on the other. Various research papers about world energy

published by IEA, OPEC and others show that oil will have an increasing share of the global demand for energy and the share of producers from Middle East will grow in the world's supply in next 20 years. For instance, the baseline scenario did by OPEC, suggests that world oil consumption in 2025 will increase by 30 million barrels per day or an annual average of 1.5 million barrels daily and its importance will grow. Its share of global production can increase from 40 % in 2010 to 46 % in 2030. From this fact, the Arab member states of OPEC supply the world from 72 % (currently a total of 24 million barrels per day). The projections tell that Saudi Arabia oil production capacity will increase of 5 million barrels per day to 40 million per day by 2030. Current Saudi Arabian production capacity of about 12.5 million barrels daily seems to be sufficient to meet demand until 2020, but after is expected modest expansion. Saudi Arabia will sustain its current market share of roughly 12 % over the next 20 years<sup>42</sup>.

Unlike in the past 20 years, when the level of investment has stagnated, in the next few years is expected that investments in oil will increase, whether through the national oil companies or through foreign direct investment. These investments will be done in an environment of relatively high oil prices, with better prospects for exports of oil, greater sales opportunities in the oil supply chain and in favourable business environment.

The influence of the environment of high oil prices is important firstly because it creates sufficient financial resources for governments to allow the investments in exploration of crude oil, production, sales and distribution and to gain higher yields. And secondly, it reevaluates the status of the oil sector in these economies - both from provider of revenue point of view and as a mean of diversification. Although nobody can predict how long the environment of high oil prices can last, it is certain to assume that the planned investment will continue. (Maitah, 2010)

Mining and production problems in major markets (including Asia) and a well-developed infrastructure in Saudi Arabia, gives a competitive advantage to extend the investments in refining and petrochemical industries. Experience and the alliance created by this investment

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<sup>42</sup> BP Energy Outlook, 2010

since the early 1980s and the willingness of government to use the comparative advantage of their economy gives prospects in increase in these investments. Investment in oil will definitely benefit from the increased role of the private sector, higher living standards and more freedom in economy. With entrance of all the Saudi Arabia to the WTO and GAFTA to deepen regional integration and economic integration within the rest of Middle East region to enable favourable business environment.

### **5.1.3 Oil Boom in Saudi Arabia**

During the period 2000-2009 the GDP of Saudi Arabia economy grew by estimated average rate of 3.7 %, while income per capita increased during the same period on average by 4.5 % - the highest growth over the last three decades. Unemployment and the budget deficit had declined in general but investment increased at the same time. Even if the economic performance appeared during the growth of oil prices and revenues, it was stigmatized by the endless political crises, especially during the last few months. The performance of Saudi Arabia economy rises a number of questions related to the main features of this boom in comparison with the oil booms in 1973 and 1980 - the sustainability of current growth pattern and prospects for further diversification of the economy and a stronger economy in general. These questions are important for policy makers, local and international companies, as well as inter-regional and international organizations interested in economic and political transformation in the Gulf States.

It is important to note that the increase in oil prices and revenues in the period 2003 - 2005 was slower than the increase in prices between 1974 and 1979 to 1980 (see Supplement 4). While in 1974 oil prices quadrupled and in 1980 doubled, in the year 2003 the price increased by 15 %, followed in 2004 to 28 % and in 2005 the increase was even up to 40 %. The regime in oil prices also differs because of the fact that the old system of fixed prices gave way to flexible prices. Furthermore, the old official system of selling prices assumed relatively better control of prices from the producers' point of view and less short-term volatility than a new system.

During the boom in years 2003-2007, Saudi Arabia has taken probably more cautious attitude toward spending than they did before. Some of the revenues from oil have been given on current and capital expenditures, while the rest was used to repay the accumulated debt of the government or to create reserves. It was observed that during that boom, was spent only about 25 % of the additional revenue, and compared with 60 % spent during the boom in 1974. The economy is now more diverse and flexible and has a greater volume of non-oil exports than during previous boom period. Labour market and the role of the state in the economy structurally differ from those in the previous booms. The financial market is now better and more deeply integrated into the world's main markets. Inter-regional trade and investment flows are more numerous and the degree of economic integration is greater at the same time. (Maitah, 2010)

To deal with fiscal imbalances associated with oil price volatility and unpredictability of oil revenues, some oil exporting countries have decided to established special funds for stabilizing the budget revenue and thus spending budget. Other oil-exporting countries, including Saudi Arabia, decided to follow conservative estimates of oil prices for the purpose of estimating the revenue from the oil and thus they adopt more careful attitude toward their spending.

When comparing the performance of the economy of Middle East region, thus economy of Saudi Arabia, with data of the economies in Asia and Latin America during the last thirty years, the results are not satisfying. The present oil boom offers many opportunities as well as many challenges. To face the challenges and other tasks, are needed several modifications:

- Transition from economy dominated by oil to more diverse economies
- Transition from the dominance of public sector to domination of the private sector
- Change from closed to open economy for better integration
- Convert passive oil industry to more active and dynamic industry

Implementation of the above ideas will require innovative policies in taxation, industry and commerce. The sector of petroleum is going to be crucial to the above innovations due to its relative share of GDP, investment, balance of foreign trade and overall growth.

#### **5.1.4 Reasons of Oil Sector in Saudi Arabia**

Oil revenues provide the necessary capital and foreign exchange to build human and physical infrastructure needed to develop non-oil sector. They contribute through various linkages, both directly and indirectly to the development of industry and service sector. Estimated 183 billion U.S. dollars to be invested in the oil sector in GCC countries over the next years and it should also contribute to growth in other sectors and thus broaden diversification. Although the share of oil sector in GDP in Saudi Arabian economy is still in the medium-term growth, its relative share in total GDP will decline because the growth of other sectors will overtake growth in sector of petroleum. Crude oil involves in economic diversification in Saudi Arabia; despite of the future views of reducing its share in government revenues through the introduction of income tax and VAT seem remote.

##### **Reducing the role of state in the economy**

Historically, revenues from oil have helped strengthen the state role in the economies of Arab oil-exporting countries, including Saudi Arabia. In the past 15 years the role of state is decreasing towards private sector, due to declining importance of government spending and growing importance of private sector in job creation and capital formation. During the period of low oil revenues, which lasted at least till 2000, the government has launched reform programs that included trade liberalization, investment and pricing reforms and restructuring or privatization of state enterprises. These activities were seen as instruments to reduce the role of the state. Today, there are concerns whether there will be an increase in oil revenues, the state returns to its original role of guardian, which would mean that the reform process in these countries will be slowed or even stopped.

However, there are some indicators that it might not happen. As previously mentioned, the government spending in Saudi Arabia is lower than before, because a part of revenues is used for paying accumulated debt. In addition to their accession to the WTO and GCC, this economy has implemented irreversible trade reforms. While the role of the state will continue to serve as a tool, mainly in the expansion of oil sector, other economic ties with crude oil will bring a guaranteed benefit to the private sector and will enhance its importance.

### **Inter-regional integration**

Surprisingly, the countries in The Middle East region including Saudi Arabia lag behind many other developing countries in terms of diversification of exports and foreign direct investment supply. While the group of oil-exporting countries have managed to diversify exports towards energy-intensive and petrochemical products, non-oil exporting countries could not built a strong export base. For various historical and political reasons, they have still relatively closed economy compared with oil-exporting countries. However, in the last few years, the economy, supported by structural reform programs and the challenges of globalization, showing an increase in openness. Signed or upcoming free trade agreements in the Arab countries both oil exporting and non-oil exporting, should support the process of liberalization and integration into the global economy. Integration process among Arab countries is likely to accelerate, especially when the import markets of the oil exporting countries will continue to grow as it is expected.

### **National oil companies**

National oil companies in Saudi Arabia have crucial importance in terms of the size of oil reserves they manage on behalf of their governments, oil production and quantity of exports and the role they have in integration of the oil industry into their national economies. There are many reasons for the poor results of many national oil companies. Some are specific for each state, related to political, legal and structural relationships that exist between national oil companies and their governments on the one hand, and international oil companies on the other. These relations have an impact on effectiveness, independence and responsibility of national oil companies. Other reasons are more general and are often linked with the

international environment in which these companies operate. A few years after the oil companies have been acquired, mainly in the mid-1970, the oil market reached turning point, which affected both policy and programs.

Today's national and international environment, which the national oil companies have contributed in, helps in growth more than ever before. The current industrial setting favours an increasing role of national oil companies through various alliances in extraction, sale and distribution between old and new international oil companies. The entry of new players into the sector from China, India, Malaysia, Norway, Russia and Brazil gives them new possibility and dimensions from their new relationships.

## 5.2 Crude oil impact on Saudi Arabian economy

### 5.2.1 Economic performance of Saudi Arabia

Fiscal policy in Saudi Arabia has great importance and its decisions have a major impact on the performance of the economy, in terms of economic growth, inflation, and current account. Due to the special characteristics of oil revenues, Saudi Arabia faces specific challenges related to fiscal policy. Exploration of oil tends to be isolated enclave, which is largely isolated from the domestic economy. However, the government uses its share of world oil resources and revenues. That is why fiscal policy plays a key role in managing the macroeconomic impact of oil revenue (see Supplement 4- Macro-economical Indicators of Saudi Arabian Economy). Revenues from crude oil only are not only exhaustible, but also tend to exhibit high volatility and uncertainty in comparison with other tax revenues due to fluctuations in oil prices. Finally, oil revenues largely come from abroad and may have a significant impact on the real exchange rate, depending on how they are controlled by the inflow of foreign currencies.

Saudi Arabian real GDP growth was below the developing markets, excluding periods when oil prices reached high levels (in early 1980 - after the second oil shock in 1979, 1990, 1991, following a sudden increase in oil prices due to the Iraq invasion in Kuwait and the beginning of this decade, mainly due to rising demand for oil). Even in these times GDP growth barely exceeded the growth of emerging economies. Average annual GDP growth since 1981 was 2.6 %, while the emerging markets reached an annual growth of 4.2 %. These values can interpret that the economies of natural resource-rich countries grow more slowly than the economies of countries with none or minimal natural resources. This phenomenon is known as “Holland disease”. (Alabdeli, 2005)

<b>Saudi Arabia (2010)</b>			
<b>Population</b>	26,131,703	<b>Population growth rate (%)</b>	1.536
<b>GDP (official exchange rate, USD billion)</b>	434.4	<b>GDP (PPP, USD billion)</b>	622.5

<b>GDP per capita (USD)</b>	24,200	<b>GDP- real growth rate (%)</b>	3.8
<b>Oil sector (% GDP)</b>	54,4	<b>Unemployment rate (%)</b>	10.8
<b>Oil revenues (% total revenues)</b>	87,5	<b>Inflation rate (%)</b>	5.7
<b>Oil export (% total export)</b>	85	<b>Public debt (% of GDP)</b>	16.7
<b>Exchange rates</b> 1 Saudi riyal (SAR) = USD 1 USD = SAR	0.26 3.75	<b>GDP- composition by sector</b> <b>Agriculture (%)</b> <b>Industry (%)</b> <b>Services (%)</b>	2.7 61.9 35.4

**Table No.5:** Basic Economic Facts of Saudi Arabia

Source: <https://www.cia.gov/library/publications/the-world-factbook/geos/sa.html>

Saudi Arabian economy grew by 2 % in average; this low growth was due to recession in 1982-1985, which was followed by the fall in oil prices in the first half of the 1980's. Economic growth has been with few exceptions (1990, 1991) very slow until 2003, when there was an extreme increase in oil prices. Oil-exporting countries can be characterized by relatively fluctuating growth performance and Saudi Arabia is considered the least stable. The change occurred in 2003, when the prices of oil started to increase and most countries have experienced significant economic growth comparable to the growth in other developing markets. (Sturm, 2009)

<b>Year</b>	<b>GDP (million SAR)</b>	<b>GDP (million USD)</b>	<b>Population (mil)</b>	<b>GDP per capita (SAR)</b>	<b>GDP per capita (USD)</b>
<b>1971</b>	30,497	7,929.74	6.00	5,083	1,355
<b>1972</b>	38,259	9,947.34	6.28	6,092	1,625
<b>1973</b>	53,530	13,917.8	6.58	8,135	2,169
<b>1974</b>	159,718	41,526.68	7.01	22,784	6,076
<b>1975</b>	163,670	42,554.20	7.30	22,421	5,979
<b>1976</b>	225,349	58,590.74	7.67	29,381	7,835
<b>1977</b>	260,959	67,849.34	8.05	32,417	8,645
<b>1978</b>	272,266	70,789.16	8.45	32,221	8,592
<b>1979</b>	375,469	97,621.94	8.88	42,283	11,275
<b>1980</b>	546,604	142,117.04	9.32	58,648	15,640
<b>1981</b>	622,175	161,765.50	9.79	63,552	16,947
<b>1982</b>	524,197	136,291.22	10.28	50,992	13,598
<b>1983</b>	445,210	115,754.60	10.80	41,223	10,993
<b>1984</b>	420,389	109,301.14	11.33	37,104	9,894

<b>1985</b>	376,318	97,842.68	11.90	31,623	8,433
<b>1986</b>	322,020	83,725.20	12.50	25,762	6,870
<b>1987</b>	320,931	83,442.06	13.12	24,461	6,523
<b>1988</b>	330,519	85,934.94	13.77	24,003	6,401
<b>1989</b>	357,065	92,836.90	14.46	24,693	6,585
<b>1990</b>	437,334	113,706.84	15.19	28,791	7,678
<b>1991</b>	491,853	127,881.78	15.95	30,837	8,223
<b>1992</b>	510,459	132,719.34	16.95	30,118	8,032
<b>1993</b>	494,907	128,675.82	17.28	28,640	7,637
<b>1994</b>	503,055	130,794.30	17.70	28,421	7,579
<b>1995</b>	533,504	138,711.04	18.14	29,410	7,843
<b>1996</b>	590,748	153,594.48	18.58	31,795	8,479
<b>1997</b>	617,902	160,654.52	19.04	32,453	8,654
<b>1998</b>	546,648	142,128.48	19.50	28,033	7,476
<b>1999</b>	603,589	156,933.14	19.98	30,210	8,056
<b>2000</b>	706,657	183,730.82	20.47	34,522	9,206
<b>2001</b>	686,296	178,436.96	20.98	32,712	8,723
<b>2002</b>	707,067	183,837.42	21.49	32,902	8,774
<b>2003</b>	804,648	209,208.48	22.02	36,542	9,744
<b>2004</b>	938,771	244,080.46	22.53	41,668	11,111
<b>2005</b>	1,182,514	307,453.64	23.11	51,169	13,645
<b>2006</b>	1,335,581	347,251.06	23.68	56,401	15,040
<b>2007</b>	1,442,572	375,068.72	24.24	59,512	15,870
<b>2008</b>	1,786,143	464,397.18	24.81	71,993	19,198

**Table No.6:** Development of GDP in Saudi Arabia

Source: Central Department of Statistics & Information, Ministry of Economy and Planning (Saudi Arabia)

GDP of Saudi Arabia shows a higher level, but less and less stable growth than in other developing economies. GDP per capita in the 1980- 1990 stagnated or even declined, which was caused by low oil prices, high population growth and economic crisis. This trend turned up at the beginning of 2000 with the rise in oil prices. (Hunter, 2004)

### **Current Account of Saudi Arabia**

Balance in current account in Saudi Arabia has as a result of fluctuations in oil prices, greater volatility than the current accounts in other developing markets. At the beginning of this century, in times of high oil prices, there were high current account surpluses. While developing economies have had an average rising current account surpluses since 2000, for

instance in Asia region. The surplus in Saudi Arabia have reached high level and then stagnated in the beginning of 2000. (Sturm, 2009)

Saudi Arabian current account is the subject of particularly strong fluctuations, with some large deficits, for example, between 1980 and 1990. Fluctuations can be explained by a high dependence on oil exports, which accounts for more than 80 % of total exports of goods and services since 1980. Today's Saudi Arabia current account balance is \$95.762 billion (IMF, 2008).

### **Inflation**

In the long run oil-exporting countries have a better inflation results than the developing economies in general. The inflation rate was much lower in the 1980's, when most developing economies, on the contrary recorded substantial growth in the price level. Saudi Arabia has seen only a low and stable inflation. Relatively low and stable inflation can be explained by a lower degree of fiscal dominance of monetary policy. Due to significantly higher oil revenues can Saudi Arabia finance public expenditure without budget deficits. They also accumulated financial assets, which may temporarily finance budget deficits and thus avoid the use of monetary policy. Another factor that contributed to the relatively low inflation, are the exchange rate regimes. Most oil exporting countries have tightly bound, or only slightly floating exchange rate to the dollar. The inflation rate in Saudi Arabia was 5.7 % in 2009.

### **State budget revenues and the ratio of public debt to GDP**

Average gross public debt to GDP in Saudi Arabia has reached 80 % the end of the 1990's. This increase reflects the problem of high costs of oil production in periods when the market price is declining. The public debt, thanks to high oil prices, dropped sharply from the year 2000. The country has used the unexpected revenues to decrease, sometimes very high public debt and reduce its fiscal vulnerability. Public debt reached its peak at the end of the 1990.

Fiscal Year	Sum		Non-paid debt at the end of year	Change %	GDP in today's prices	Public debt to GDP ratio (%)
	Loan	Payed				
2005	41,445	194,406	459,647	-25	1,182,514	38.9
2006	35,997	131,022	364,622	-21	1,335,581	27.3
2007	11,180	109,040	266,762	-27	1,442,572	18.5
2008	298	32,026	235,034	-12	1,786,143	13.2
2009	217	10,143	225,108	-4	1,409,124	16

**Table No.7:** Public debt in Saudi Arabia

Source: Ministry of Finance Saudi Arabia (2010)

Government revenues increased from approximately 30 % of GDP at the end of 1990 to 40 % in average at the time of rising oil prices and despite a concurrent sharp increase in nominal GDP. In Saudi Arabia in 2002 the ratio of government revenue to GDP remained well above the average of other oil exporters. Saudi Arabia is a country with the largest spare production capacity and is able to increase even in times of high oil prices, their production and thereby taking advantage of high prices and increased volume of production. General government expenditure reached at the turn of the millennium more than 30 % of GDP.

Year	Total revenues			Total expenditures			Deficit/Surplus	Deficit/Surplus to GDP %
	From oil	Other	Total	Current	Capital	Total		
1970	7,122	818	7,940	3,989	2,304	6,293	1,647	7.3
1971	9,685	1,435	11,120	4,756	3,374	8,130	2,990	9.8
1972	13,480	1,888	15,368	5,654	4,504	10,158	5,210	13.6
1973	39,285	2,420	41,705	8,470	10,125	18,595	23,110	43.2
1974	94,190	5,913	100,103	15,207	19,832	35,039	65,064	40.7
1975	93,481	9,903	103,384	37,931	43,304	81,235	22,149	13.5
1976	121,191	14,766	135,957	73,621	54,652	128,273	7,684	3.4
1977	114,042	16,617	130,659	71,417	66,631	138,048	-7,389	-2.8
1978	115,078	16,427	131,505	83,488	64,484	147,972	-16,467	-6.0
1979	189,295	21,901	211,196	102,447	83,277	185,724	25,472	6.8
1980	319,305	28,795	348,100	132,661	104,094	236,755	111,345	20.4
1981	328,594	39,412	368,006	113,636	171,014	284,650	83,356	13.4
1982	186,006	60,176	246,182	102,248	142,664	244,912	1,270	0.2
1983	145,123	61,296	206,419	124,052	106,134	230,186	-23,767	-5.3
1984	121,348	50,161	171,509	121,696	94,667	216,363	-44,854	-10.7

1985	88,425	45,140	133,565	119,865	64,139	184,004	-50,439	-13.4
1986	42,464	34,034	76,498	98,894	38,528	137,422	-60,924	-18.9
1987	67,405	36,406	103,811	134,419	50,500	184,919	-81,108	-25.3
1988	48,400	36,200	84,600	116,283	24,573	140,856	-56,256	-17.0
1989	75,900	38,700	114,600	118,303	36,567	154,870	-40,270	-11.3
1990	246,297	70,342	316,639	377,205	110,220	487,425	-170,786	-18.4
1992	128,790	40,857	169,647	162,350	76,637	238,987	-69,340	-13.6
1993	105,976	35,469	141,445	184,878	3,012	187,890	-46,445	-9.4
1994	95,505	33,486	128,991	161,380	2,396	163,776	-34,785	-6.9
1995	105,728	40,772	146,500	148,776	25,167	173,943	-27,443	-5.1
1996	135,982	43,103	179,085	171,258	26,859	198,117	-19,032	-3.2
1997	159,985	45,515	205,500	218,880	2,392	221,272	-15,772	-2.6
1998	79,998	61,610	141,608	171,163	18,897	190,060	-48,452	-8.9
1999	104,447	43,007	147,454	167,195	16,646	183,841	-36,387	-6.0
2000	214,424	43,641	258,065	216,958	18,364	235,322	22,743	3.2
2001	183,915	44,244	228,159	223,508	31,632	255,140	-26,981	-3.9
2002	166,100	46,900	213,000	203,500	30,000	233,500	-20,500	-2.9
2003	231,000	62,000	293,000	223,530	33,470	257,000	36,000	4.5
2004	330,000	62,291	392,291	247,649	37,551	285,200	107,091	11.4
2005	504,540	59,795	564,335	284,173	62,301	346,474	217,861	18.4
2006	604,470	69,212	673,682	322,411	70,911	393,322	280,360	21.0
2007	562,186	80,614	642,800	347,199	119,049	466,248	176,552	12.2
2008	983,369	117,624	1,100,993	388,839	131,230	520,069	580,924	32.5
2009	434,420	75,385	509,805	416,594	179,840	596,434	-86,629	-6.1

**Table No.8:** Public Finance in Saudi Arabia (in SAR)

Source: Ministry of Finance Saudi Arabia (2010)

### 5.2.2 Public Finance in Saudi Arabia

In recent years, Saudi Arabia enjoys a rising real GDP growth together with high current account and fiscal surpluses. Real GDP growth was caused by domestic consumption and investment, where public investment plays a major role. Despite private consumption, which was supported by high consumer confidence due to high oil prices, the fiscal policy was the main driver of economic growth in recent years. Fiscal expansion is a key tool for the use of oil revenues into the economy. Like in almost all large oil-exporting countries, state oil companies- in this case it is Saudi Aramco, control petroleum activities and the oil revenues go directly and entirely to the government. This means that the use of oil revenue depends on

fiscal policy decisions, and through the public spending affect economy and inflation by oil revenues the domestic economy.

The growth of public expenditure in Saudi Arabia was huge, since 2004 the real annual increase was from 5 % to 20 %. As declining public debt, interest expenditures were reduced. Saudi Arabia has seen a significant fiscal expansion, focusing on an ambitious investment program, with projects worth \$350 billion. Development of non-oil deficits also suggests an expansionary fiscal policy.

Fiscal expansion by means of increase in expenditure in recent years is focusing mainly on capital expenditure. The increase in capital expenditure between 2003 and 2008 exceeded increase in current spending and therefore total expenditure. Most significant increase reached rightly Saudi Arabia due to the highest increase in total spending. They achieved dynamic growth in current expenditure. Current expenditure grew substantially, but the capital output and nominal GDP grew even faster, and the percentage of current expenditure in total expenditure declined. The growth in expenditures on subsidies reached almost 30 % between the years 2003 and 2008. The degree and nature of fiscal expansion is also observed in the elasticity of public spending with respect to changes in incomes of public budgets. (Sturm, 2009)

Saudi Arabia has had favourable macroeconomic outcomes since 2003, but with increasing economic growth, large fiscal and current account surpluses suddenly inflation appeared. In previous years, inflation was at a lower level, but in the years 2007 - 2008 was growing. Inflation in Saudi Arabia in recent decades was between 0-2 %. Saudi Arabia followed the trend observed in the smaller Persian Gulf oil exporters like Qatar and United Arab Emirates (Hanaa, 2002). The increase in inflation was due to combination of some global and domestic factors. The global factors including rising in oil and food prices, which led to an increase in inflation around the world. A weak U.S. dollar in recent years is another factor contributing to inflation pressures in this country. A key factor was the strong domestic demand due to high oil prices, accompanied with rapid credit growth. Domestic demand was largely stimulated by fiscal expansion. (Hunter, 2004)

### **Responses to the global financial crisis**

Reinforcement of global financial crisis and the subsequent acceleration of the economic recession, with the decline in oil prices in the second half of 2008 has changed the range of problems that the fiscal policy is facing in Saudi Arabia. There is a question whether Saudi Arabia can continue its spending programs initiated in recent years or whether they will have to set up these expenses with regard to reduction in oil revenues. A key issue in the short term is how far the oil prices can fall without the fact of causing deficit in the country. The key oil price would indicate whether the budget for a given level of expenditure would be in the deficit or surplus. Saudi Arabia has relatively low oil prices. The stabilization function of the oil funds has been introduced to deal with such situations. Due to the fact that public spending policy was launched in recent years, it is economically beneficial and the spending programs should continue to achieve the stabilization of the domestic economy. Lower oil prices and budget constraints might lead to reconsideration of some already planned investment projects. Saudi Arabia has announced that they actually want to continue with the spending plans, as evidenced by the example of the 2009 budget, which, despite a sharp reduction in revenue, was significant increase in anticipated spending and planned deficit for the first time since 2004. If the oil prices remain at low levels for a longer period of time, oil exporters will have to adjust fiscal policy; otherwise there is a possibility of re-accumulation of public debt. The changes on the side of expenditure are likely to reduce current expenditure and spending on marginal investment projects but it will be reduced without affecting long-term growth. On the revenue side, the introduction or extension of taxes can ensure sustainability. Extension of the revenue base and developing an efficient tax system should be beneficial by reducing dependence on oil revenues. To avoid creating obstacles to strengthen economic diversification is crucial to minimize government intervention in all markets.

### **Allocation and transformation of oil revenues**

The Government of Saudi Arabia has difficulties to resist public pressures on the distribution of oil revenues and increasing expenditures on various items. The public might think that it is fair to contribute and want the part of the extraordinary oil profits. At the same time, when there are high budget surpluses, the government is hardly arguing for withholding the

additional expenditure. Higher food prices in 2007 - 2008 contributed to the social pressure for increasing public spending. Depending on the political system of the country, there may have been different forms of redistributive mechanisms. In countries where elections do not determine political control, as is the case of many countries in the Persian Gulf, it may be accepted that these pressures are at first sight less relevant, with absence of competing political parties, which would try to gain support through tax cuts or increases in public spending during elections. Citizens are expecting providing lucrative and well-paid jobs in the public sector. Due to the nature of the implicit social contract to the large surpluses and large public goods is difficult to resist calls for higher subsidies, higher wages in the public sector. (Hunter, 2004)

The above domestic pressure to increase public spending is strengthening by call from the international community to increase spending in the framework of global instability. In September 2006 International Monetary and Financial Committee called oil-exporting countries to increase expenditure under macroeconomic stability. In April 2006 the Annex G7 statement on global imbalances, even recommended increasing of economic diversification and to some countries even more flexibility of exchange rate. Consequently, Saudi Arabia as the world's largest oil exporter is engaged in multilateral consultations about global instability through the International Monetary Fund and started to focus on the public expenditure policies.

It is more difficult to coordinate the objectives, increase spending and maintain macroeconomic stability, with regard to inflation and macroeconomic environment in recent years. The strategy of the International Monetary and Financial Committee is explicitly recognized the potential conflict- increasing in spending should be done with regard to macroeconomic stability. With regard to long-term fiscal policy assumptions, these conflicts are between the goals of intergenerational equity and fiscal sustainability and economic diversification. While ones call for the accumulation of financial assets, the others require public investment, for example in the form of physical and social infrastructure. (Sturm, 2009)

### **Conservative estimates of oil price in creating budget**

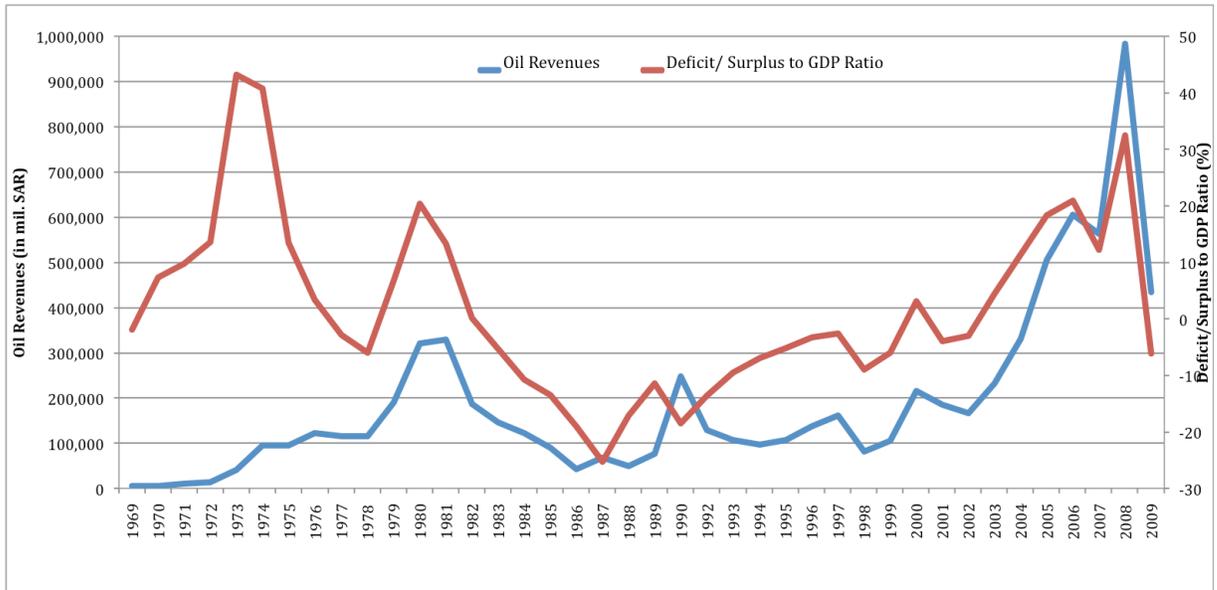
The budget in Saudi Arabia is based on very conservative assumptions about oil prices, which are often considered to be unrealistically low, for instance in the years 2004 and 2008. Although due to a boom in oil prices, there should be done some adjustments of expected price in recent years. But those changes lagged significantly behind the current price trend. It is evident that the preparation of the budget according to conservative oil price has its advantages and disadvantages.

Preparation of the budget according to conservative oil price means fiscal discretion and it is often defended by political and economic purposes. For example, setting budget based on relatively low returns help keep costs low because conservative budget shows only small deficits and surpluses. If the higher revenue are based on more realistic assumptions of oil prices and the origin budget would show a large surplus, it would be difficult to resist pressures to increase expenditures. On the other hand, establishing the budget on conservative oil price assumptions reduces fiscal transparency and increases opportunities for spending. In Saudi Arabia the actual expenditure exceeds the budget by 15 – 20 %. Published budgets and expenditure forecasts are often different from the real ones. The Government has jurisdiction over the use of additional revenue during the year.

Fiscal policy may be quantitative and provide numerical criteria for one or more key parameters to limit the political reluctance with aim to improve financial institutions and their management. Due to fluctuations in oil revenues the fiscal rules could be particularly useful for the fiscal policy (Sturm, 2009). Fiscal policy of Saudi Arabia is led without any explicit or implicit fiscal rule; therefore, it is very efficient with high decision-making in terms of public spending.

## Fiscal Rules

Introduction of fiscal rules have been brought by many experience with errors and excessive government spending caused by the politico-economic factors in developed and developing economies. Fiscal policy may be quantitative and provide numerical criteria for one or more key parameters of fiscal policy to limit the political reluctance. Due to fluctuations in oil revenues in Saudi Arabia, the fiscal rules could be particularly useful for the fiscal policy, despite the given volatility of oil prices and its impact on the state budget it will be difficult to choose the appropriate numeric indicator. (Sturm, 2009) Fiscal policy of Saudi Arabia is led without any explicit or implicit fiscal rule, therefore, is very efficient with high decision-making powers in public spending.



**Chart No.12:** Oil Revenues and Deficit/ Surplus to GDP Ratio in Saudi Arabia

Source: Ministry of Finance, Saudi Arabia/ own chart

## **5.3 Recommendations**

### **Access to the set up macro-fiscal position**

Fiscal policy In Saudi Arabia face various problems associated with uncertain, variable and finite natural resource. The larger the share of oil revenue to the total state revenues, the higher the oil sector in the economy, the bigger the problems that are mentioned. Country dependent on oil revenues solves specific problem. In the long run, the problems come mainly from the exhaustibility of oil and growing concerns about fiscal sustainability and intergenerational resource allocation.

The main solution is to store oil revenues to accumulate financial assets or to use the revenues for capital expenditure. The aim is to avoid sharp changes in fiscal policy when the oil reserves disappeared. To ensure national wealth for future generations, the country can accumulate financial assets during the period in which extracting crude oil. Accumulation of financial assets may then replace the oil revenues and the levels of expenditures may remain unchanged. Oil wealth would then be gradually converted to financial wealth, thus the total wealth of the country remains unchanged, and thus it will be preserved for future generations.

This theoretical solution is very simple and has a strong argument for the transfer of fiscal surpluses to financial assets. However, putting this simple theory into practice is very difficult but at the beginning there are discrepancies in the definition of the basic assumptions. For example, an estimate of the oil wealth is defined as the present discounted value of future oil revenues. Future developments in oil prices have some uncertainty around and the same problems occur to the cost of extraction. In the long run, there could be a rapid technological progress and significant efficiency of usage of oil or even the replacement of oil by other primary energy source, which would significantly reduce the value of oil reserves.

In principle, capital expenditures and the accumulation of physical assets could represent an alternative to the accumulation of financial assets to protect national treasures for future generations and to ensure fiscal sustainability. For the method of capital expenditure is not needed to determine the future prices of oil, it does not use permanent fiscal surpluses, and thus it allows an expansionary fiscal policy. In particular, investment in physical infrastructure

and social infrastructure, such as education and health care, is generally considered as beneficial. These expenditures may lead to economic diversification and to development of non-oil private sector, thereby broadening the base for tax revenue.

The rate of return of foreign financial assets depends on the type of investment conditions in global markets and the level of profitability of domestic capital expenditure. All these factors are difficult to predict, they are uncertain and often depends on the specifics of a country. Among other factors affecting the profitability of public investment and the impact of investment on economic growth is the quality of existing public capital, the marginal return on additional investment, government policy and in particular the level of corruption. Analysis of the effects of public capital expenditure on non-oil portion of real GDP and private investment in Saudi Arabia indicates that public investment does not always achieve the desired positive results. The uncertainty of the effects of public capital spending on productivity, future economic performance, government revenues and the difficulty in distinguishing between capital and current expenditure, show the needed discretion when deciding how far the capital expenditure could be a substitute for the accumulation of financial assets in order to achieve intergenerational equity and financial sustainability.

A third alternative for preserving the country's wealth is to keep oil in the ground and extract it later. This option would be wanted if the expected revenues from oil in the country exceeded the return on financial assets and capital expenditures. This situation could arise if the country expects increasing in oil prices, but the adverse conditions in global financial markets reduces the return of financial investments and the capital expenditures are very low. The main risk associated with the implementation of this option is uncertainty about the future price of crude oil - the technological development would increase energy efficiency and developing of alternative energy sources would reduce demand for oil and caused fall in price. If this scenario would actually come true, it would be a better option to extract oil and use the profits for accumulation of financial assets or for capital expenditure.

### **Development of fiscal positions with several indicators**

Conventional analysis of debt sustainability may not be sufficient to measure the long-term fiscal sustainability in Saudi Arabia. Traditional debt sustainability analysis focuses primarily on the level of gross debt and achievement of sustainable primary fiscal balance. The challenge for fiscal policy is the redistribution of wealth, including the oil in the ground, between the generations in the context of uncertain and exhaustible oil reserves.

Strategies aimed at stabilizing positive net debt to GDP will not be optimal because it could lead to huge debt after the exhaustion of oil, if the fiscal deficit would be higher and economic growth would be slow without the help of crude oil. Fiscal indicators, which are not based on oil, should play an important role in the conduct of fiscal policy in oil-producing economy. The primary balance without oil (PBWO) is generally defined as non-oil income (NOI), minus expenses unrelated to oil (ENO), with exclusion of net interest payments (interest payments minus interest income (I):

$$\text{PBWO} = \text{NOI} - \text{ENO} - \text{I}$$

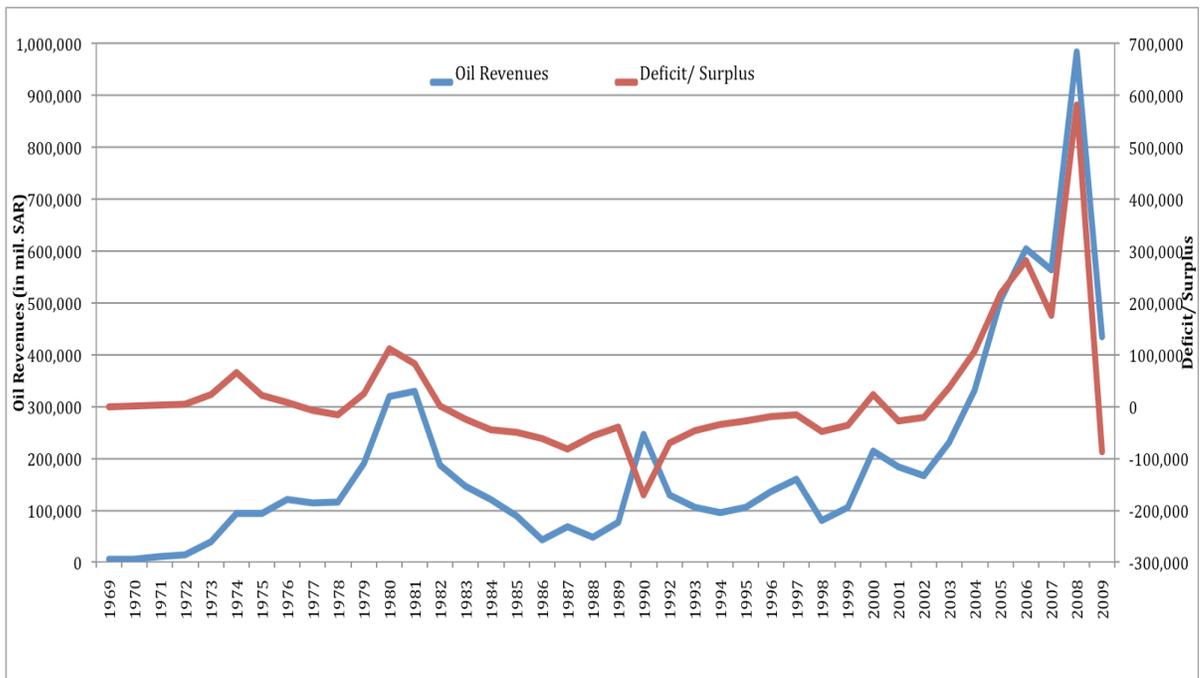
That is why non oil-based primary balance excludes oil revenues, which come from abroad, and therefore it is a better measure of the impact of fiscal policy on domestic demand than the total primary balance.

Use of other non-oil characteristics may also improve the analysis of fiscal policy. Changes in non-oil expenditures may be a useful measure of oil revenue injections to the economy. Non-oil revenues compared to GDP (without counting oil) are useful measure of tax effort face to face of non-oil revenue sources and allow comparisons between countries. Non-oil characteristics should be crucial to the long-term fiscal sustainability.

### **Determining the direction of fiscal policy changes**

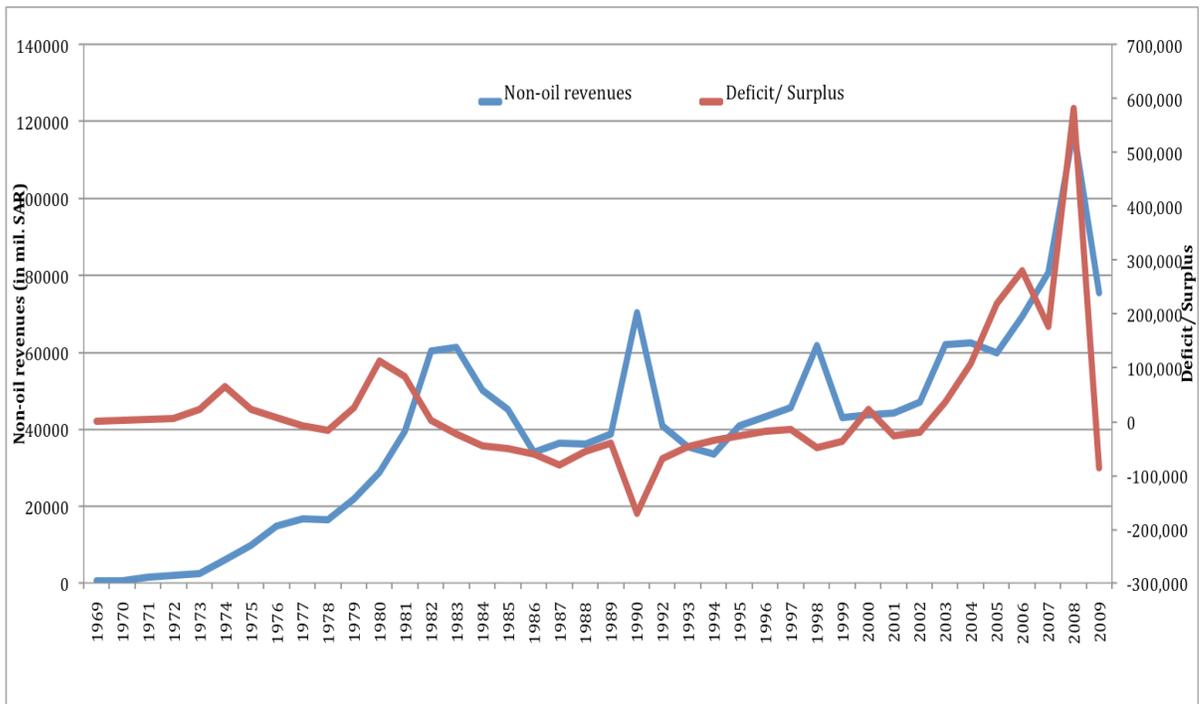
Increase of non-oil primary deficit would indicate an expansionary fiscal policy affected either through higher expenditures or mitigating uses of non-oil revenues. The short-term macroeconomic impact of non-oil primary balance is similar to externally financed growth in the total deficit in the economy. This is because of oil revenues largely come from abroad and have similar macroeconomic effects as loans from abroad. If the revenues from oil are spent and absorbed, non-oil primary deficit and non-oil current account will continue to expand with a marginal impact on inflation. However, if oil revenues are spent, but not completely absorbed, non-oil current account is widening but inflation pressures may come up with effects of "Dutch disease", if the accumulation of reserves are not regulated by the central bank.

Reducing of non-oil primary deficit would indicate fiscal consolidation. It can be decided to replace oil revenues for domestic or external financing of non-oil primary deficit and thereby reduce the public debt. Payment of external debt from oil revenues can help to achieve the wanted regulations of foreign inflows related to oil. Development of some fiscal indicators in Saudi Arabia is seen in following charts. (see Chart 13 and 14)



**Chart No.13: Oil Revenues and Balance Sheet in Saudi Arabia**

Source: Ministry of Finance, Saudi Arabia/ own chart



**Chart No.14: Non-oil Revenues and Balance Sheet in Saudi Arabia**

Source: Ministry of Finance, Saudi Arabia/ own chart

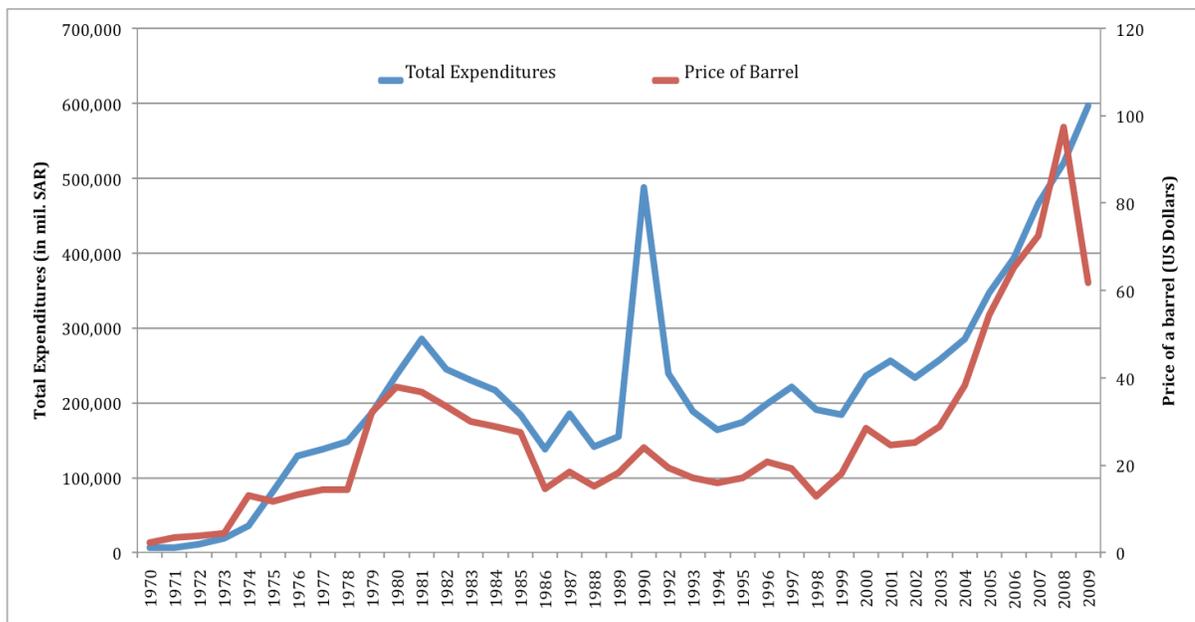
Non-oil fiscal indicators should complement, not substitute usage of conventional indicators. While non-oil-based balance is useful in measuring experimental changes of governments, or impact of fiscal policy on domestic demand, the overall balance is important for assessing the net funding requirements and aspects of fiscal vulnerability. Financing of overall balance is a key part of the analysis of liquidity constraints and impact of government demand for loans in the private sector. External financing may be costly, while the rapid increase of domestic funding may lead to inflation, or it can displace private investment.

The definition of non-oil balance depends on the purposes for which the indicator is used. If the objective is to assess fiscal sustainability, it should be used the definition of non-oil primary balance, which excludes all income and expenditure related to oil, as well as net interest payments. Non-oil-based household balance may be useful additional indicator, when the short-term impact of fiscal policy on domestic demand is analyzed. Non-oil-based household balance may be generally defined as the total balance sheet without revenues from oil exports, without public expenditure on import and without net interest payments on foreign debt.

This non-oil based balance should be expressed as a percentage of GDP without income and expenditure of oil revenues. The reason is that the total GDP in the oil economy with a large petrochemical sector tends to fluctuate with the prices of oil and oil extraction, causing a significant change in ratio of non-oil fiscal variables over time. Using the total GDP to set the position of non-oil balance can complicate the estimation of fiscal position. For instance, exchange rate depreciation can increase the share of oil in total GDP and may result in lower non-oil deficit to GDP ratio without significant changes in the position of fiscal policy. Using GDP that excludes income and expenditure from the crude oil to measure non-oil revenues, provide an accurate estimation of the revenue, which also allows watching, how many changes (or loans) would be needed in case of unavailability of oil.

### Managing volatility of oil revenues

The volatility of oil revenues is a challenge for macroeconomic management in Saudi Arabia. Exchange revenues associated with revenues from oil have often resulted in appreciation of real exchange rate through nominal appreciation or higher inflation, depending on the exchange rate regime. Exchange rate appreciation may threaten other tradable goods sectors by reducing their competitiveness, leaving the economy vulnerable to sudden changes in oil prices. This loss of competitiveness, combined with higher inflation can have potentially serious negative consequences for non-oil economy. This trend is evident from Chart 15. Due to the strong fiscal dominance in Saudi Arabian economy these fiscal decisions have key role in promoting external shocks associated with fluctuations in oil prices in the non-oil economy.



**Chart No.15:** Total Expenditures and Oil Price Development in Saudi Arabia

Source: Ministry of Finance , Saudi Arabia, BP (2010) / own chart

There are several methods to achieve reductions macro-fiscal costs associated with the volatility of oil revenues:

Gradually eliminate the relations between decisions about spending and the instability of oil revenues. With regard to the fact that fiscal policy is in most cases primary channel for the transmission of price shocks to the non-oil economy, the elimination of relations between annual budgets from the current instability in oil expenditures may help to eliminate instability in public expenditure. This would require saving of certain revenues from oil during the oil boom, which will allow government to take savings during fall and continue to offer the same level of public services during a temporary drop in oil prices. It would contribute to the greater macroeconomic stability with current maintaining of fiscal sustainability.

Decisions about spending should be based on the quality and profitability analysis - especially in periods of high prices when there may be downward pressure on quality. Financial management system is important for ensuring productivity and efficiency of public spending. In time of low oil prices, Saudi Arabia faces difficulties in access into financial markets and the enforcement of strict control over expenditure. Under these circumstances, the effective expenditure management is critical. In addition, effective project selection, implementation, monitoring and evaluation procedures essential in ensuring that the government gets back the proper value for their money.

Partial sterilization of inflows of foreign exchange by reducing the external debt, investment of oil revenues abroad, or redirection of government purchases of imports would help in reducing upward pressure on domestic demand and exchange rate. However, these arrangements may be politically difficult to implement (in developing countries). High spending needs to be carefully considered, because of the strength of institutions ensuring macroeconomic stability and fiscal sustainability.

### **Approaches to sustainability**

Determining long-term sustainability policy is critical as well as complex, due to the high degree of uncertainty, particularly regarding the economic value of oil reserves. As described

above, the traditional analysis of sustainability may not be a sufficient tool to determine the long-term sustainability in oil-producing countries.

This part deals with the key factors that should be taken into account when judging whether the current measures are sustainable, including the challenges associated with a high degree of uncertainty. It affects benefits and limitations of the more used models of stable income to determine the fiscal sustainability.

The main issues, they have to follow, are for instance decisions how conservative country should be in managing the oil wealth, with respect to the uncertainty and long-term projections. Possible approaches to long-term management of oil wealth are divided into three main groups:

1. According to the theory of the "bird in the hand", all countries would impose oil revenues into financial assets and would only spend income from accumulated financial assets. This is usually considered as the most conservative approach. This rule tends to be restrictive, especially in the first years, and is more suitable for countries where there is a strong preference for maintaining a substantial share of oil reserves for future generations, or in states with problems of sustainability.
2. Countries may focus on level of expenditures managed by yield from the total government net wealth (financial assets and oil wealth). In this approach the government, according to various criteria, annually consume a constant share of net wealth. If governments have greater social and infrastructure needs, it would be preferable and probably politically more viable to spend more from the net worth of income than from financial assets. The level of expenditure would also be with maintaining macro-stability.
3. Another option might be the case that the country has no restrictions and would have spent all current revenues from crude oil. However, following this approach would undergo significant risks and the formation of changes in spending - the budget would become very dependent on annual changes in oil revenues. Unlike previous

approaches, this approach ignores the government net wealth, which is a key indicator to set the long-term fiscal sustainability.

### **Approach to the definition of non-oil balance**

Depending on the objectives of fiscal policy, it may be considered different approaches to specific revenues from oil and expenditures in the non-oil balance.

- **Domestic oil revenue**

When comparing the impact of short-term fiscal policy on economy, oil revenues can be included in the balance of non-oil balance. Because changes in income such as income tax, have an impact on consumer purchasing power and domestic demand. However, if the main interest is the sustainability of public expenditure in terms of exhaustibility of oil revenue, then all the oil revenues, including domestic revenues, should be excluded from the definition of non-oil balance. This is because domestic oil revenues may not be available to finance government spending as far as oil supplies decline significantly.

- **Fuel subsidies**

Fuel subsidies should be included in the non-oil fiscal balance for the sustainability of their impact on domestic demand and its contribution to fiscal vulnerability. Considering the sustainability argument whether the government's policy of domestic retail prices of petroleum products will keep below their levels in the market is sustainable if the oil revenues run out. The energy subsidies have a direct impact on domestic demand. Moreover, explicit subsidies must be financed, and therefore affect the financial needs of the private sector. Finally, it should be noted that the choice to not set up retail prices with oil prices on the world market is the government's discretionary policy and therefore it should be included in the measurement of fiscal effort.

- **Consumer and other taxes on refined products**

Although these revenues, derived from oil should be included in the definition of non-oil balance. The main reason for the behaviour of such non-oil revenues is the fact that the government would continue to collect taxes, regardless whether a country is a producer or importer of crude oil.

Non-oil indicators, as well as other fiscal indicators, could be more useful and informative if they will be: firstly, well-defined in the case of budget and institutional net, secondly, easy monitored, third simple, transparent and be helpful as an effective tool to communicate with the objectives of government policy.

#### **Access to the frameworks of fiscal rules**

The recent growth in oil revenues increased spending pressures in Saudi Arabia with often changes in numerical fiscal rules because of higher costs. This experience demonstrates the need for strong political consensus to become fiscal policy more effective. Furthermore, the experiences have shown that the orientation of the budget on the artificially low price of oil has little chance for long-term low costs, because legislation and pressures are able to adapt quickly. In addition, this practice may threaten the quality and transparency of budget expenditure, because oil revenues, which exceed the budget projections, can be used to finance extra-budgetary expenditures, which are not often undergoing the same verification as budget expenditures.

On the other hand, legislation regarding the fiscal responsibility can enhance transparency and accountability. Experience has shown that such legislation may be an important factor in strengthening the overall institutional quality and fiscal management. However, as the International Monetary Fund in 2007 recommended political commitment to fiscal discipline and willingness to accept the key structural reforms are crucial to the success of fiscal responsibility legislation.

## **6. Conclusion**

Petroleum is used to produce most of necessary products in our everyday life and it powers almost of all vehicles on the Earth. And therefore it became one of the most important global strategic commodities. As a non-renewable resource its reserves have been narrowing down gradually with contrast to its consumption, which has been steadily increasing. Crude oil price is related to supply and demand and it is also influenced by additional qualitative, geographical, geopolitical and other factors.

The economies of oil-exporting countries have usually been highly dependent on crude oil revenues, which are unstable thank to crude oil price volatility. Certain stability in the oil market is sustained by regulative measures set by OPEC. Saudi Arabia represents the largest producer and exporter of crude oil in last decade. It possesses also the largest world proven oil reserves.

The economy of Saudi Arabia is dominated by oil sector, and therefore it is very sensitive to fluctuations of the oil market. During the past decades interventions have been proposed and implemented to increase resilience to such influences. There are three possible ways how to influence the development of Saudi Arabian economy. First option is to have crude oil as a source of financing, which means redistributing oil revenues through government expenditures including privatization of state enterprises, setting up conservative prices of oil or diversification of government revenues. Second way is to use crude oil as an input for further use in petrochemical industry, to use the real output from the oil sector into refineries or into production of electricity. And finally the last option is to see crude oil as a determining factor of foreign trade.

Due to increasing demand for oil it is expected that the oil consumption will grow by 30 million barrels per day in 2025. Current Saudi Arabian production capacity of about 12.5 million barrels per day and that seems to be sufficient to meet global demand until 2020 but afterwards, the only modest expansion is expected. That is why the investments in oil

production will increase. This fact is important firstly because it will create financial resources for government investments and secondly it reevaluates the status of oil sector in the economy.

To deal with fiscal imbalances associated with oil price instability and unpredictability of oil revenues, some of the oil-exporting countries have decided to establish special funds for stabilizing spending budget. However Saudi Arabia decided to follow conservative estimates of oil prices and have not established such funds yet. That is why the sector of petroleum is going to be crucial due to its relative share of GDP, investment, balance of foreign trade and overall economic growth.

The fiscal policy in Saudi Arabia is of substantial importance and its decisions have major impact on its economic growth. It tends to play a key role in managing the macro economical impact of oil revenues which are not only exhaustible but also exhibit high volatility, uncertainty as well as they mainly come from abroad and may have significant impact on real exchange rate. Saudi Arabia uses those revenues to decrease sometimes very high public debt. As in the majority of oil exporting countries state oil companies - in this case Saudi Aramco, control all petroleum activities and its revenues go entirely to the government. It means that oil revenues depend on fiscal policy decisions.

Public finance in Saudi Arabia faces various problems such as fiscal sustainability and inter-generational resource allocation that both result from exhaustibility of oil. The main solution is to store oil revenues to accumulate financial assets or to use them for capital expenditure. The aim is to ensure national wealth for future generations. This solution seems to be simple but fulfilling it into practice will be difficult. However, capital expenditure and accumulation of physical assets could be a sufficient alternative. The last option is to preserve the country's oil wealth under ground and extract it later. It could be desired when the oil revenues will exceed the return on financial assets and capital expenditure. The only disadvantage of this option is uncertainty about future crude oil prices.

Strategy of fiscal improvements will be done by several indicators that are not based on oil. The non-oil indicators should complete (not substitute) the conventional ones. It excludes oil

revenues from abroad for better measure of domestic demand. Another useful indicator, when analyzing short-term impact of fiscal policy on domestic demand, could be non-oil based balance. It should be expressed as a percentage of GDP without income and expenditure from oil revenues. Reducing of non-oil primary deficit would indicate fiscal consolidation by replacing oil revenues to reduce the public debt. Thus the payment of external debt will help to achieve wanted regulations of foreign inflows that are related to oil.

The instability of oil revenues is a big issue for macro economic management in Saudi Arabia. Therefore there are several methods discussed how to achieve reduction of costs related to this volatility. Firstly, eliminate the relations between decision about spending and instability of oil revenues. It will help to eliminate those imbalances in public expenditures. Secondly, the decisions about spending should be based on the quality and profitability analysis. Thirdly, there would be the partial sterilization of foreign exchange inflows by reducing external debt or investment from oil revenues abroad will help to reduce pressure on domestic demand and exchange rate.

Determining long-term sustainability is as critical as well as complex due to high degree of uncertainty regarding the economic value of oil reserves. There are two main factors that should be taken into account when deciding on current measures of sustainability- first one is the country would impose oil revenues into financial assets and should spend income from accumulated financial assets. And second factor is that country may focus on level of expenditure managed by yield from financial assets and oil wealth.

Depending on the objectives of fiscal policy, there are different approaches to specific oil revenues and expenditures in non-oil balance. First one is to exclude oil revenues (with oil domestic revenue) from the definition of non-oil balance with the main interest on sustainability of public expenditures. Second one is to include fuel subsidies from the non-oil balance because energy subsidies have direct impact on domestic demand. Last one is to include revenues from taxes on refined products because government will keep collecting taxes no matter if the country is a producer or an importer of oil.

The economies of oil-exporting countries are highly dependent on revenues from the crude oil, which are uncertain and fluctuate due to current situation on the oil market. In this thesis were discussed several possibilities, how Saudi Arabia can deal with such situations and problems that arise from exhaustibility of crude oil and problem of volatility of oil revenues and ensuring sustainability and stability of the economy.

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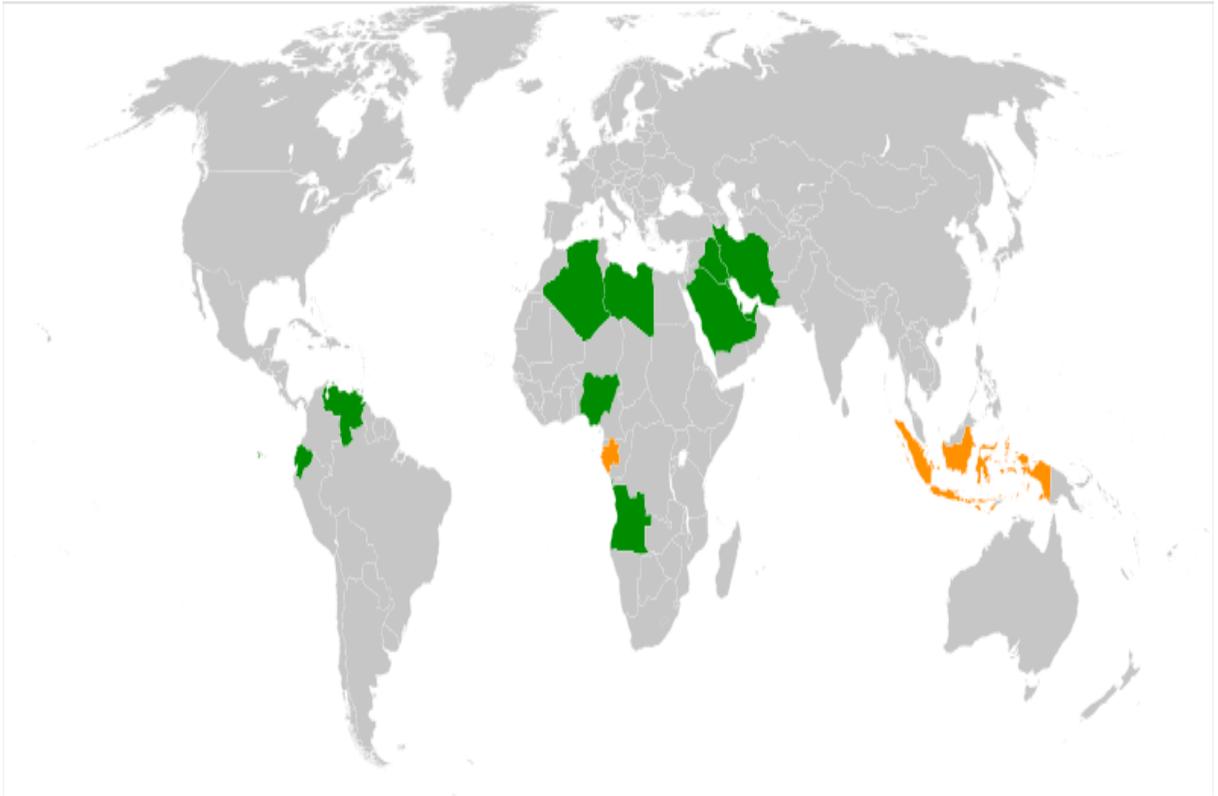
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## 8. Supplements



### **Supplement No.1: OPEC Member States**

Source: <http://lyricsdog.eu/s/opec%20map>

### **Joined OPEC:**

1960: Iran, Iraq, Kuwait, Saudi Arabia, Venezuela

1961: Qatar

1962: Libya, Indonesia (left OPEC 2008)

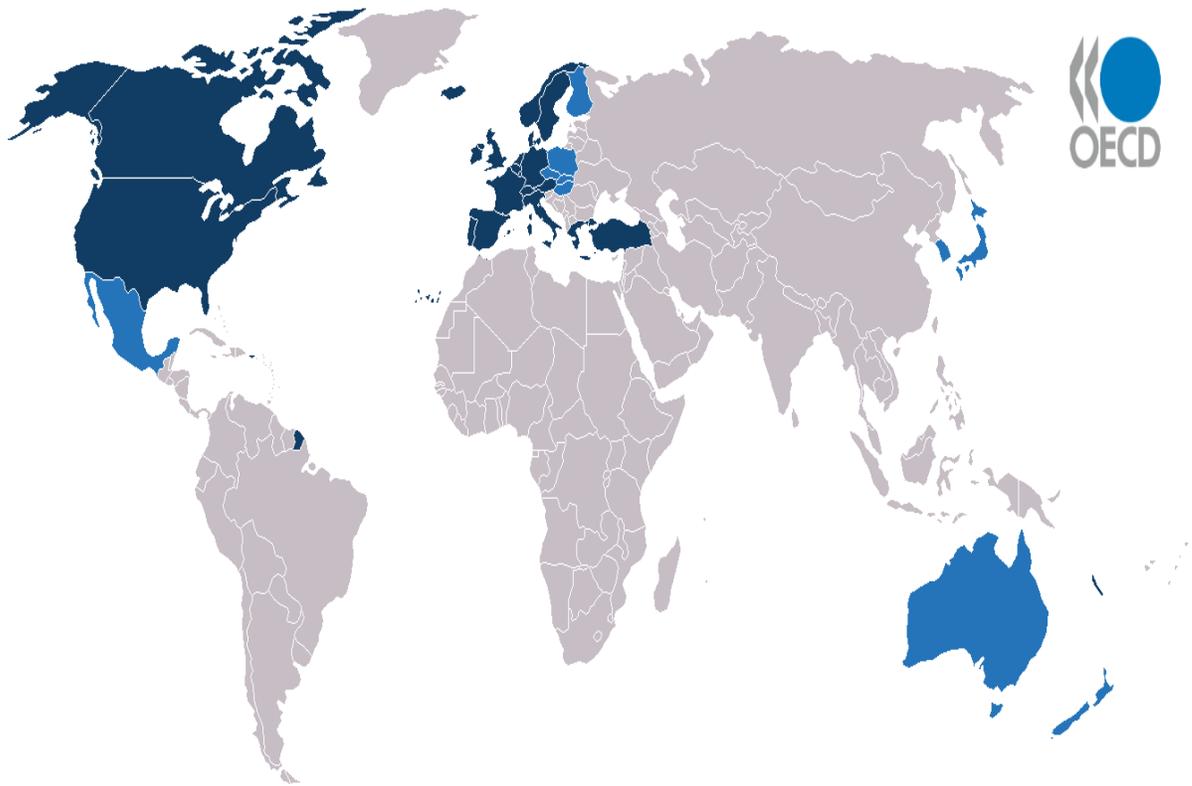
1967: United Arab Emirates

1969: Algeria

1971: Nigeria

1975: Gabon (left OPEC 1994)

2007: Angola, Ecuador



**Supplement No.2: OECD Member States**

Source: <http://www.zemepis.com/moecd.php>

**Joined OECD:**

1961: Austria, Belgium, Canada, Denmark, France, Germany, Greece, Iceland, Republic of Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, United Kingdom, United States

1964: Japan

1969: Finland

1971: Australia

1973: New Zealand

1994 Mexico

1995 Czech Republic

1996: South Korea, Hungary, Poland

2000: Slovakia



**Supplement No.3: Map of Saudi Arabia**

Source: <https://www.cia.gov/library/publications/the-world-factbook/geos/sa.html>

Year	Current prices					Stable prices - year 1999					deflators (1999=100)		
	GDP	oil sector	Non-oil sector			GDP	Oil sector	Non-oil sector			GDP	Non-oil sector	Oil sector
			total	private	public			total	private	state			
1968	18,599	8,572	10,027	6,159	3,868	121,888	76,360	45,528	17,366	28,162	15.26	11.23	22.02
1969	19,915	8,885	11,030	6,753	4,277	129,216	80,445	48,771	18,855	29,916	15.41	11.04	22.62
1970	22,279	10,390	11,889	7,270	4,619	145,037	95,362	49,675	18,753	30,922	15.36	10.90	23.93
1971	30,124	17,031	13,094	8,016	5,078	173,772	117,466	56,306	22,511	33,795	17.34	14.50	23.26
1972	37,819	22,450	15,369	9,629	5,740	215,107	146,886	68,220	30,385	37,835	17.58	15.28	22.53
1973	53,047	33,217	19,831	12,935	6,896	271,336	183,796	87,540	43,442	44,098	19.55	18.07	22.65
1974	159,276	126,320	32,956	24,580	8,376	347,508	205,987	141,521	88,400	53,121	45.83	61.32	23.29
1975	163,156	104,876	58,280	46,879	11,401	365,829	171,508	194,321	130,689	63,632	44.60	61.15	29.99
1976	224,441	137,999	86,442	70,469	15,973	412,825	211,494	201,330	135,643	65,687	54.37	65.25	42.94
1977	259,548	146,758	112,789	90,227	22,562	441,024	225,530	215,494	142,758	72,736	58.85	65.07	52.34
1978	270,439	130,552	139,888	109,812	30,076	437,054	205,812	231,241	157,504	73,737	61.88	63.43	60.49
1979	373,309	203,623	169,686	132,474	37,212	480,784	235,341	245,443	172,677	72,766	77.65	86.52	69.13
1980	544,069	341,641	202,428	155,724	46,704	512,403	245,843	266,560	187,841	78,719	106.18	138.97	75.94
1981	619,538	380,798	238,739	181,436	57,303	537,048	243,580	293,468	209,124	84,344	115.36	156.33	81.35
1982	520,949	254,737	266,213	199,035	67,178	476,916	167,454	309,461	222,289	87,172	109.23	152.12	86.02
1983	441,533	163,118	278,414	206,288	72,126	437,023	122,932	314,090	223,020	91,070	101.03	132.69	88.64
1984	416,416	140,671	275,745	200,507	75,238	423,111	112,160	310,950	214,356	96,594	98.42	125.42	88.68
1985	372,408	104,451	267,957	188,756	79,201	404,685	92,525	312,160	208,543	103,617	92.02	112.89	85.84
1986	318,775	72,666	246,109	167,301	78,808	425,166	131,162	294,004	190,879	103,125	74.98	55.40	83.71
1987	317,478	78,775	238,703	160,486	78,217	408,752	116,103	292,649	190,081	102,568	77.67	67.85	81.57

**Supplement No.4** (first part): Macro-economical Indicators of Saudi Arabian Economy  
Source: Central Department of Statistics & Information, Ministry of Economy and Planning, Saudi Arabia, (mil SAR)

Year	Current prices					Stable prices - year 1999					deflators (1999=100)		
	GDP	oil sector	Non-oil sector			GDP	Oil sector	Non-oil sector			GDP	Non-oil sector	Oil sector
			total	private	state			total	private	state			
1988	322,283	76,738	245,545	163,120	82,425	437,192	140,769	296,423	193,481	102,942	73.72	54.51	82.84
1989	350,325	98,652	251,672	167,118	84,554	439,238	136,966	302,272	196,827	105,445	79.76	72.03	83.26
1990	430,334	158,693	271,641	175,387	96,254	476,225	170,076	306,149	197,041	109,108	90.36	93.31	88.73
1991	484,853	179,572	305,281	186,754	118,527	520,999	207,911	313,088	200,866	112,222	93.06	86.37	97.51
1992	501,359	199,856	301,503	197,270	104,233	542,726	214,109	328,617	208,908	119,709	92.38	93.34	91.75
1993	485,630	170,012	315,617	205,637	109,980	542,927	207,491	335,436	212,868	122,568	89.45	81.94	94.09
1994	494,766	169,438	325,328	213,191	112,137	547,799	207,889	339,910	215,719	124,191	90.32	81.50	95.71
1995	526,004	187,718	338,285	218,599	119,686	549,962	206,972	342,990	217,644	125,346	95.64	90.70	98.63
1996	581,873	226,476	355,397	230,509	124,888	567,550	211,879	355,671	228,397	127,274	102.52	106.89	99.92
1997	608,802	228,250	380,552	241,304	139,248	582,438	208,724	373,713	238,705	135,008	104.53	109.35	101.83
1998	536,635	152,829	383,805	245,603	138,202	598,154	215,357	382,796	244,891	137,905	89.72	70.97	100.26
1999	593,955	198,988	394,967	255,200	139,767	593,955	198,988	394,967	255,200	139,767	100.00	100.00	100.00
2000	697,007	289,165	407,842	264,873	142,969	623,237	212,652	410,585	266,437	144,148	111.84	135.98	99.33
2001	679,163	255,509	423,654	275,118	148,536	629,265	204,365	424,900	276,254	148,646	107.93	125.03	99.71
2002	699,680	263,511	436,169	285,682	150,487	629,772	189,112	440,660	287,667	152,992	111.10	139.34	98.98
2003	796,561	330,389	466,172	298,985	167,187	678,183	221,545	456,638	298,970	157,668	117.46	149.13	102.09
2004	929,946	424,104	505,842	321,299	184,543	713,899	236,459	477,440	314,924	162,516	130.26	179.36	105.95
2005	1,172,399	618,291	554,108	346,487	207,621	753,532	251,191	502,341	333,307	169,034	155.59	246.14	110.31
2006	1,324,556	720,664	603,892	373,991	229,901	777,249	249,281	527,968	353,696	174,272	170.42	289.10	114.38
2007	1,430,771	788,823	641,947	404,963	236,984	792,813	240,224	552,588	373,075	179,513	180.47	328.37	116.17
2008	1,771,203	1,081,226	689,978	440,263	249,715	826,478	250,227	576,250	390,081	186,169	214.31	432.10	119.74
2009	1,396,227	671,131	725,096	456,237	268,859	831,356	233,462	597,894	403,592	194,302	167.95	287.47	121.28

**Supplement No.4** (second part): Macro-economical Indicators of Saudi Arabian Economy  
Source: Central Department of Statistics & Information, Ministry of Economy and Planning, Saudi Arabia (mil SAR)