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Capstone Project

Oil supply and demand dynamics

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ABSTRACT

Over the history oil has been playing a very important role in terms of shaping the world economy and is considered to be one of its drivers. It is a source of revenue for countries that possess oil reserves and are oil exporters. It has an equal importance for those countries that are heavily dependent on oil imports. The performance of many industries is dependent on oil price dynamics. It is one of the most important energy sources in the world. Even with the emerging of alternative sources of energy the role of oil continues to be unquestionable. It is hard to imagine our lives without so cold “black gold”.

The purpose of our Capstone project titled “Oil supply and demand dynamics” is to analyze oil industry, dynamics of supply and demand, to see whether oil prices have an impact on stock market, as well as conduct analysis on major oil producing companies in order to find out how they perform and how oil price volatility affects them. We will also give recommendations to the investment companies whether to invest in this industry or not.

INTRODUCTION

Oil industry is divided into 3 sectors: upstream, midstream and downstream.

The upstream oil industry, which is also known as exploration and production sector, includes exploration, finding and production of crude oil. Crude oil is the oil that comes from the ground and which is not yet refined.

The midstream oil industry includes processing, storing, marketing and transporting crude oil. It is the link between oil producers and consumers.

The downstream oil industry is distributing crude oil to final consumers.

Oil can be of the following types: onshore, offshore, fracking, pre-salt, etc.

Onshore drilling includes drilling under the surface of the earth for oil extracting.

Offshore drilling is the process of extracting natural resources which are lying beyond the rock formations of sea bed. This includes drilling on the continental shelf, but also this term is used for drilling beyond lakes.

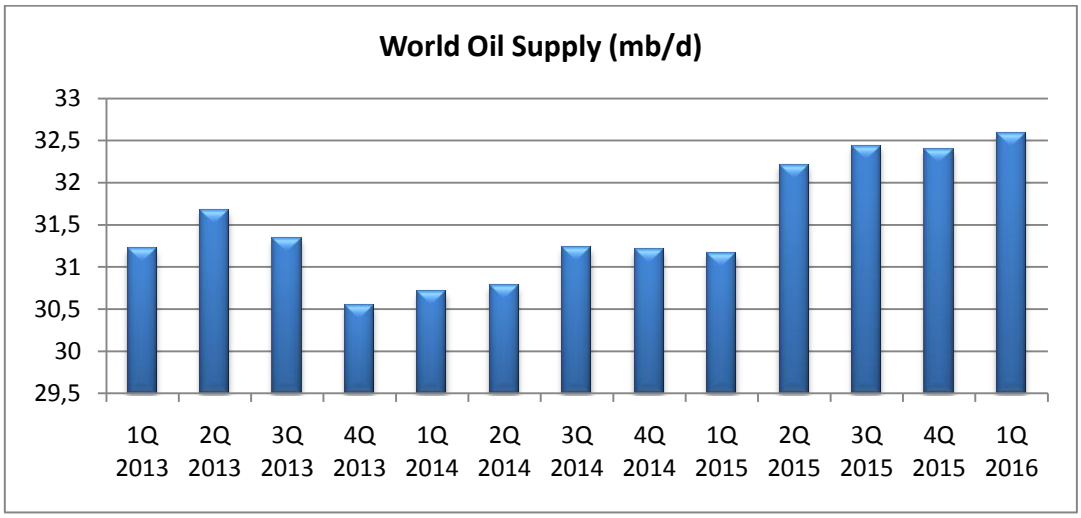
Fracking oil, which is a relatively new type of oil, is mainly used in USA. It has increased USA oil production greatly since 1990.

Finally, pre-salt oil reservoirs were discovered just a decade ago. Pre-salt oil is of an excellent quality, and it is of a great value. Currently, pre-salt oil comprises 20% of the total oil production, and its production is expected to grow significantly in future. This type of oil is especially common in Brazil.

Chapter 1. Supply

In the first quarter of 2016 the world supply was 96.35 million barrels per day. Compared to the first quarter of 2013 it has increased by 0.06% (see graph 1).

Graph 1 World Oil Supply[1]



The largest suppliers of oil worldwide are OPEC countries as well as several non-OPEC countries like Russia, China, USA, and Canada. In the table below you can find the top oil producing countries with their level of production as well as share in global oil supply in 2013.

Table 1 Level of production of top oil producing counties[2]

Country	Production (million barrels per day)	As % of Total
United States	12.31	13.67%
Saudi Arabia	11.59	12.87%
Russia	10.53	11.70%
China	4.46	4.95%
Canada	4.07	4.52%
United Arab Emirates	3.23	3.59%
Iran	3.19	3.54%
Iraq	3.06	3.40%
Mexico	2.91	3.23%
Kuwait	2.81	3.12%

[1] International Energy Agency
[2] International Energy Agency

USA

The United States is a significant producer of both natural gas and crude oil, among the top world producing countries. In 2013 US was the largest oil producer with 12.31 million barrels per day and 13.67% of share in global oil production. With these numbers it surpassed Russia and Saudi Arabia. In 2015 US produced 3,442,205 thousand barrels of oil which was almost 2 times more compared to the level in 2010 (1,998,583 thousand barrels). Texas and North Dakota, California, Alaska and Oklahoma are considered the top five oil producing states in the U.S. The largest US oil companies by market value in 2015 were Exxon, Chevron, ConocoPhillips, etc.

Russia

The petroleum industry in Russia is one of the largest in the world. Russia produced an average of 10.83 million barrels of oil per day in December 2015. It produces 12% of the world's oil and has a similar share of global oil exports. In 2013 Russia was the third largest oil supplier. It is also the main transit country for oil from Kazakhstan. The main regions of oil production in Russia are Western Siberia, Urals-Volga, Krasnoyarsk, Sakhalin, Komi Republic, Arkhangelsk, Irkutsk and Yakutiya. The prominent companies engaged in oil production in Russia are Rosneft, Lukoil, TNK-BP, Surgutneftegaz, Gazprom Neft and Tatneft.

China

China consumes more oil than produces, which makes it a net importer country. As we can see from the table above it is the fourth largest oil producer country with production of 4.46 million barrels per day which comprises 4.95% of total oil supply worldwide. Most of the Chinese production capacity is onshore (81%) with the remaining 19% coming from shallow offshore reserves. The largest oil producing companies in China are China Petroleum and Chemical Corp. known as Sinopec, China National Petroleum Corporation, China National Offshore Oil Corporation, etc. In December 2015 China produced 4293 thousand barrels per day.

Canada

Canada is at the fifth place with 4.1 million barrels produced and 4.52% share in worldwide oil production. According to the EIA International Energy Outlook 2014 Canadian production could grow to 6.6 million barrels per day by 2035 due to an expansion of unconventional output from the oil sands. The major oil fields in Canada are the oil sands of Alberta, Atlantic offshore fields and WCSB (Western Canada Sedimentary Basin). The largest oil producing companies in Canada are Suncor Energy, Inc., Enbridge, Inc., Imperial Oil, Ltd., etc. In the 2015 the oil production in Canada comprised 3870 thousands of barrels per day.

The Organization of the Petroleum Exporting Countries (OPEC)

The Organization of the Petroleum Exporting Countries (OPEC) is a permanent, intergovernmental Organization, created at the Baghdad Conference on September 10–14, 1960, by Iran, Iraq, Kuwait, Saudi Arabia and Venezuela. The five Founding Members were later joined by nine other Members: Qatar (1961); Indonesia (1962); Libya (1962); United Arab Emirates (1967); Algeria (1969); Nigeria (1971); Ecuador (1973); Angola (2007) and Gabon (1975–1994).

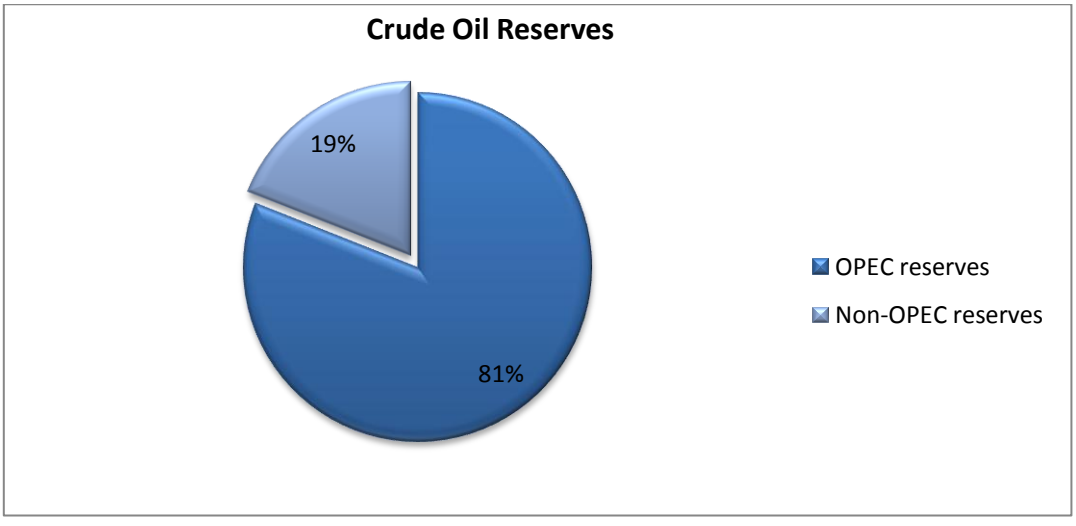
OPEC's objective is to co-ordinate and unify petroleum policies among Member Countries, in order to secure fair and stable prices for petroleum producers; an efficient, economic and regular supply of petroleum to consuming nations; and a fair return on capital to those investing in the industry.

Today we can list thirteen OPEC members - Algeria, Angola, Ecuador, Indonesia, Iran, Iraq, Kuwait, Libya, Nigeria, Qatar, Saudi Arabia, United Arabian Emirates and Venezuela.

More than 40% of oil production in the world is covered by OPEC. Crude oil production by the OPEC is an important factor that affects oil prices. This organization seeks to actively manage oil production in its member countries by setting production targets.

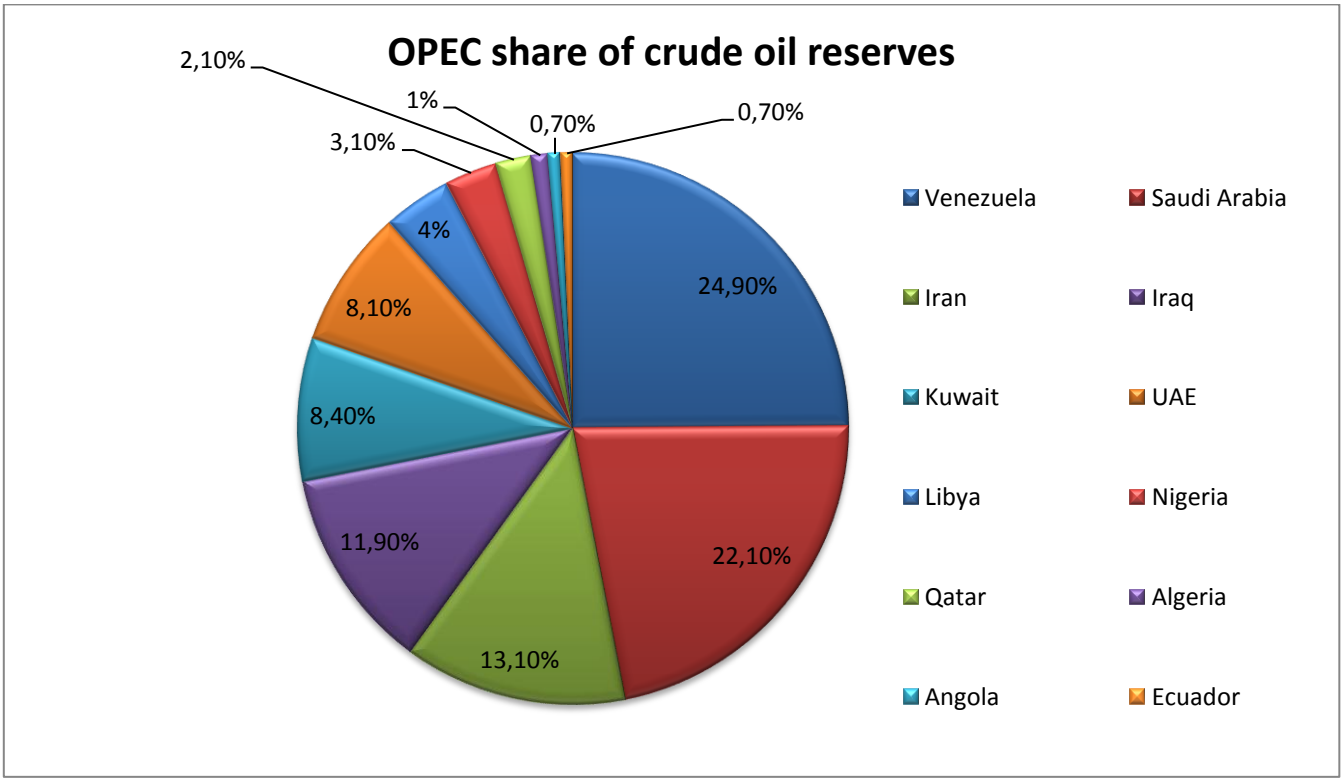
As we can see from Graph 2 more than 80% of the world's proven oil reserves are located in OPEC Member Countries, with the bulk of OPEC oil reserves in the Middle East, amounting to around 66% of the OPEC total. OPEC's proven oil reserves currently stand at 1,206.00 billion barrels. The remaining 19% of oil reserves (286.9 billion barrels of oil) are located in non-OPEC countries.

Graph 2 Crude Oil Reserves[3]



[3] www.opec.org

Graph 3 OPEC's Share of Crude Oil Reserves[4]



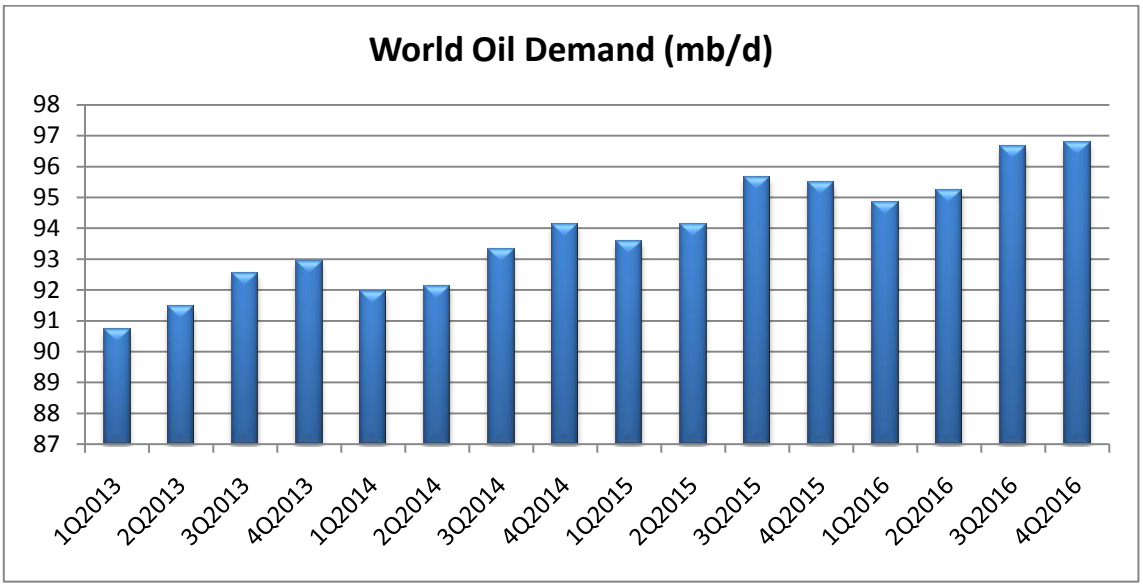
Power shifts are taking place in oil supply market. This is mainly conditioned by the increase of the presence of US as a supplier country which is due to the new technology fracking oil. From 2010 to 2015 US production of crude oil has almost doubled. Fracking oil comprises half of the oil produced by the US. This shifted the power from OPEC which was setting the rules in the market by changing the supply to influence prices. Now they are gradually concealing their position to US.

[4] www.opec.org

Chapter 2. Demand

In the fourth quarter of 2016 the world oil demand was estimated to be 96.78 million barrels per day. Compared to the fourth quarter of 2013 it has increased by 0.04% (see graph 5).

Graph 4 World Oil Demand[5]



As for today, the major consumers of oil are USA, China, Japan, India and Germany.

USA

USA is the largest one in terms of oil consumption. Its share in global oil consumption is 19.9%. Approximately 19 million barrels of oil are consumed in the USA daily, which comprises almost 7 billion barrels on a yearly basis. Half of it is imported.

China

China is on the second place in terms of oil consumption. It consumes 12.4% of global oil consumption. This country consumes 10.5 million barrels of oil on a daily basis, which comprises approximately 4 billion barrels in a year. At the same time it is important to mention that still oil makes 20% of China's energy, the rest is supplied by coal.

Japan

Japan is the third largest consumer of oil in the world with 4.7% share of oil consumption worldwide. Daily consumption of oil in Japan is 4.5 million barrels. Hence, during the year Japan consumes 1.7 billion barrel of oil. Japan is extremely dependent on crude oil import.

India

[5] International Energy Agency

India is on the forth place as a large oil consumer consuming 4.3% of global oil consumption. This country consumes almost 4 million barrels a day which comprises 1.5 billion barrels of oil on a yearly basis. As in case of Japan, India also uses coal as an energy source, but in India only 30% of total energy demand is satisfied by coal, and 70% is oil-driven.

Germany

Germany's share in global oil consumption is 2.6%. In 2014 Germany consumed about 2.4 million barrels of oil per day. This comprises 876 million barrels of oil on a yearly basis. Oil contributed 35% to Germany's primary energy use in 2014. Germany imports 97.2% of oil consumed.

Oil demand has an increasing trend and will continue to increase. According to the forecast conducted by the International Energy Agency the demand is going to increase for the next 3 quarters of 2016 (graph 4). There are three main reasons that contribute to the growth of demand for oil:

- Population growth

The population growth is mainly taking place in the emerging countries. According to demographers it is going to increase by 1 billion people and peak to 9 billion people in 2035. This growth will lead to a higher demand of oil.

- Expanding economies

The emerging markets will drive the increase in the oil demand. This is mainly due to the BRICS countries which are large developing economies. China which is also part of BRICS is the second largest oil consumer in the world. With the expansion of these economies the demand for oil will continue to grow.

- Transportation sector development

Transportation sector is one of the key drivers of oil demand. It is the largest oil consuming sector and has expanding patterns. This is mainly observed in emerging markets such as China and non-OECD countries. As a result the oil demand continues to increase. [6]

[6] Oil Demand: What Are the Driving Forces? Thomas A. Petrie, CFA Vice Chairman, Bank of America Merrill Lynch Denve

Chapter 3. Oil Industry and financial markets

The stock market of U.S. consists of stocks from numerous sectors and industries, and thus it is affected by many factors. Stock and oil prices usually have not been strongly correlated with each other. Before 2009 the correlation was negative. Now, we can observe a positive correlation between these two variables.

In the past decade oil prices were very volatile, and it was interesting to observe stock prices move along with their ups and downs. During that period we faced some crashes in the financial market such as financial crises of 2008 and Great Recession.

Financial stocks have become one of the major drivers of the increased correlation between oil and equity markets. This happened because of the fact that energy sectors borrowed lots of money from banks, not only in the U.S. but also all over the world. So, bank stocks become much more sensitive to the crude oil price fluctuations. Almost 16% of the S&P 500 Index is comprised of financial stocks, making them a big driver of the returns of the index, and the correlation between S&P 500 Index and financial stocks is even higher than the correlation of S&P 500 Index with energy stocks. Many other sectors also have shown increased correlation with equity markets, such as industrial or consumer stocks.

So, in order to understand how oil price volatility affects S&P 500 Index, we conducted a regression analysis.

We have taken daily data both for crude oil prices and S&P 500 Index from the period of 1986 up to 2015. Here is the summary statistics:

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. summarize
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Variable	Obs	Mean	Std. Dev.	Min	Max
SP	7649	975.4384	515.3953	203.49	2130.82
OIL	7396	42.72836	30.9651	10.25	145.31

The results of the regression are as follows:

Variable	Coefficient	p-value
OIL	11.40515	0.000
cons	485	0.000

As we can see from the table above the R squared is equal to 0.4681 which means that volatility of S&P 500 Index is explained by the crude oil prices by 46.81%.

We can also derive the equation of the regression from the table above:

S&P 500 = 485 + 11.40515*Oil + 1.0480e+0.9

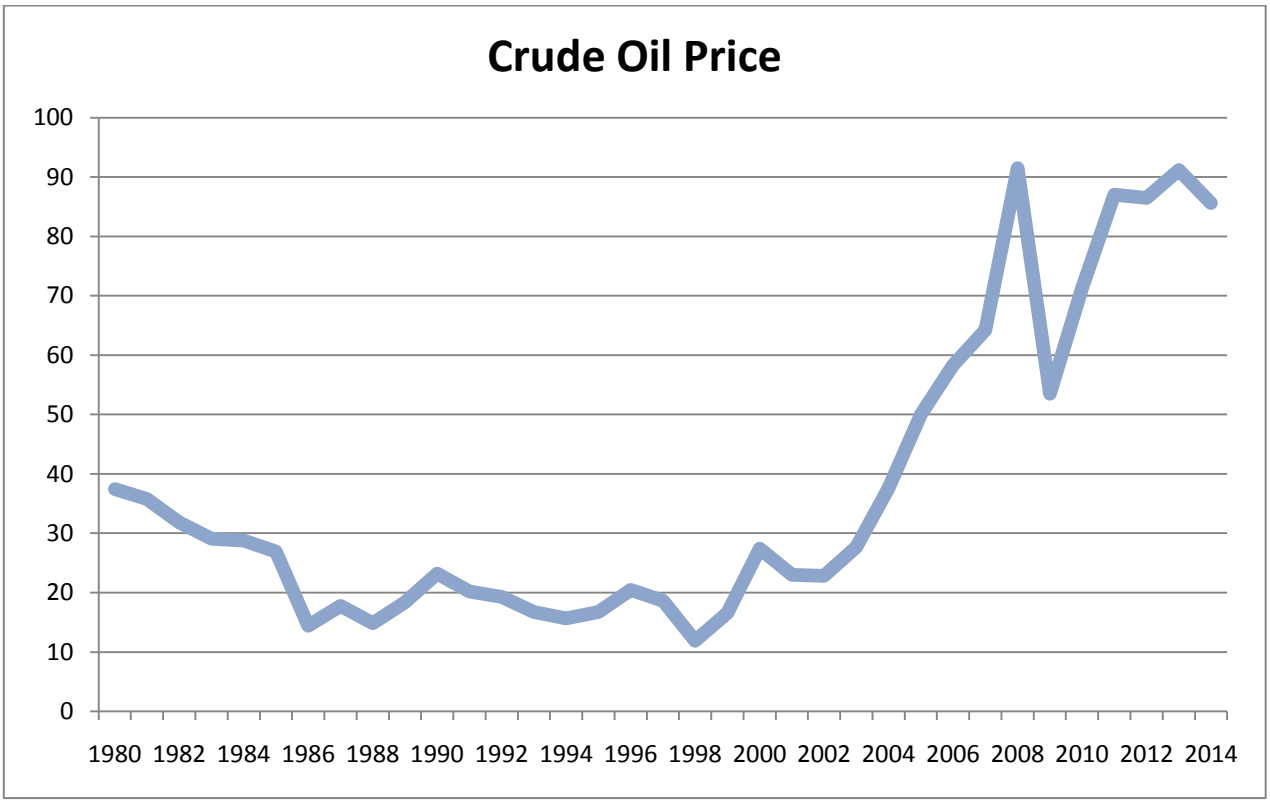
The coefficient of crude oil price is significant at any level of significance as its p-value is equal to 0.000. Hence, one dollar increase in crude oil price causes an 11.40515 unit increase in S&P 500 Index.

From the results of the regression analysis we can conclude that the correlation between crude oil price and S&P 500 Index is not so strong, but there is still a correlation. More than that, the strength of the correlation has improved for the past years. Before 2009 the correlation was barely observed. We can also see that the correlation between two variables is positive meaning that they are moving in the same direction. This can be explained by the fact that both are driven by world demand. When the economy is doing well the demand for investments and for oil is increasing.

Chapter 4. Crude oil price determinants

Oil prices as compared to any other commodities are more volatile and behave differently. You can see the historical figures for oil prices in the graph 5.

Graph 5 Crude oil prices 1980-2015[7]



According to some researchers, because of certain structural transformations oil price determinants have gone through some changes over the past decade. For that reason the factors behind oil price volatility are on a new path nowadays, causing oil price cycles. This cyclical structure of oil market makes it difficult to deal with it and manage the risk associated with that. The length of these cycles varies from period to period, and the underlying factors affecting oil price are also different in the corresponding cycles.

It is proved that the volatility of oil prices causes imbalances in global economy. It has an impact on inflation and economic growth. This is a challenging factor for countries, companies and

[7] https://www.quandl.com/data/BP/CRUDE_OIL_PRICES-Crude-Oil-Prices-from-1861

investors, who are taking great risks when dealing with oil market. Oil price volatility affects the amounts of investments in this industry.

The reasons for oil price ups and downs have always been a subject of debate. Some of the analysts are sure that supply and demand of oil are shaping the price, others think that other factors are important such as speculations in financial markets (particularly oil futures market), the power of OPEC, geopolitical factors and so on. They claim that all these factors together are important when explaining oil price volatility.

The developments in oil market for the past two decades were very dramatic. It became obvious that oil price volatility is not merely affected by supply and demand but there are other reasons behind. One of those factors is financial speculations. Some researchers argue that the oil price is determined in oil futures market with speculators becoming a major determinant of prices. This interpretation led to calls from politicians to regulate oil futures markets. Oil futures have been traded on New York Mercantile Exchange (NYMEX) starting from 1974. In 1983 crude oil futures were introduced, and nowadays they are considered to be one of the most traded contracts among the nonfinancial contracts.

An oil futures contract is a binding agreement that gives one the right to purchase oil by the barrel at a predefined price on a predefined date in the future. Under a futures contract, both the buyer and the seller are obligated to fulfill their side of the transaction on the specified date.

The following are two types of futures traders: hedgers and speculators.

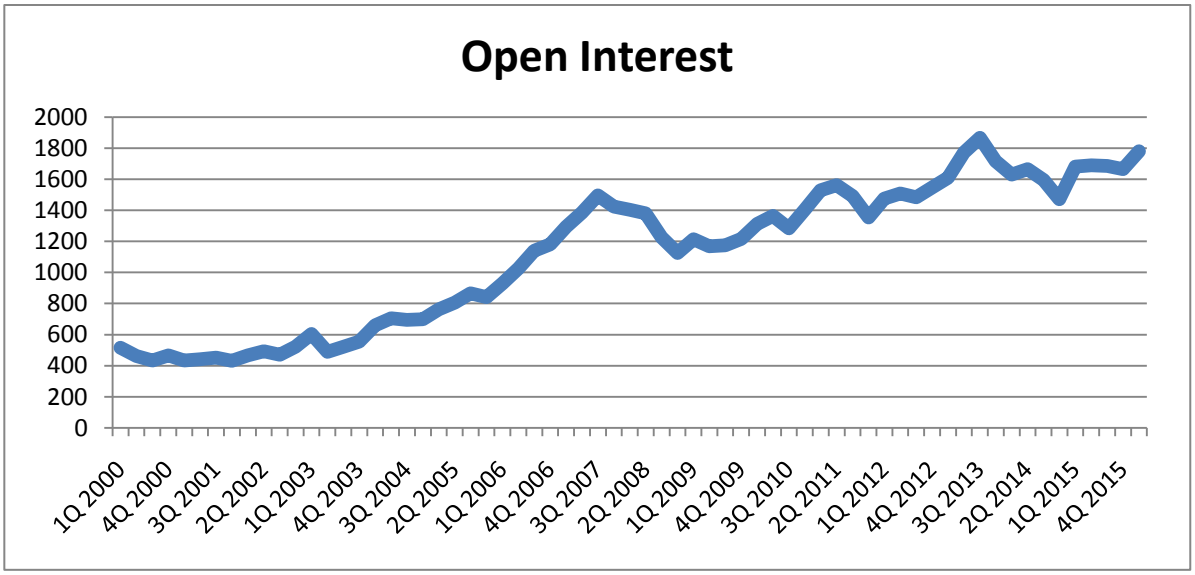
An example of a hedger would be an airline buying oil futures to guard against potential rising prices. An example of a speculator would be someone who is just guessing the price direction and has no intention of actually buying the product. According to the Chicago Mercantile Exchange (CME), the majority of futures trading is done by speculators as less than 3% of transactions actually result in the purchaser of a futures contract taking possession of the commodity being traded.

The other key factor in determining oil prices is sentiment. The mere belief that oil demand will increase dramatically at some point in the future can result in a dramatic increase in oil prices in the present as speculators and hedgers alike snap up oil futures contracts. Of course, the opposite is also true. The mere belief that oil demand will decrease at some point in the future can result in a

dramatic decrease in prices in the present as oil futures contracts are sold (possibly sold short as well).[8]

Below we can see average open daily interest in crude oil futures on US exchange.

Graph 6 Open Interest[9]



On this graph we can see the number of futures contract on daily basis at the end of the each trading day on NYMEX for the past 5 years. As we can notice the trading of oil futures increased in the period from 2003 to 2007. This is because of the fact that investments in this industry grew.

Interestingly, the greatest part of oil is produced by the countries which historically have been experiencing instability such as Russia or Middle East. And as history shows geopolitical factors greatly affect oil prices. Because of Gulf War Brent oil prices doubled in the beginning of 1990 and after that dropped by 30% during the same year. The war between USA and Iraq also affected oil prices. The price of Brent oil rose by 7%, and after that dropped by 12% when the war ended. However, the situation in Middle East in 2013 did not affect oil prices much because at that time USA increased its production of oil. Recent situation between Russia and Ukraine also affected also prices. As we know because of the tensions between these two countries Russian economy worsened significantly. As a result of that oil supply decreased which consequently affected oil

8 Determinants of crude oil prices 1997-2011, Nourah AlYousef, Associate professor of Economics, King Saud University, Riyadh, Saudi Arabia

9 U.S. Commodity Futures Trading Commission

prices. One of the reasons the oil price slumped down to $30 in 2016 was the increase of oil supply by Iran after the sanctions against the country were lifted and it entered the market.

In order to understand what drives oil prices, or at least has some impact on it, we run a regression model. Our objective is to understand whether oil prices are driven by such factors as demand and supply dynamics, simulations in the market, geopolitical factors, and so on. It will provide us with valuable information about the correlations between the chosen variables so that we can make some conclusions.

In the model crude oil prices (in USD) are taken as a dependent variable, which is explained by five independent variables which are as follows: OPEC crude oil annual production (in thousand barrels), average of USA GDP growth and China GDP growth (taken together these two variables represent demand for crude oil), non-OPEC production, crude oil futures prices and dummy variables indicating geopolitical events(1 in case there was a war or another event that could have affected crude oil prices, and 0 otherwise). Yearly data is taken for all the variables, and there are 35 observations in the model (starting form year 1980 up to 2014).

Here is the regression output:

Variables	Coefficients	P-value
lnopec	-2,08	0,045
gdp	1,33	0,000
lnnonopec	-3,29	0,049
opecgr	0,55	0,298
fut	0,22	0,000
dummy	10,2	0,047
cons	38,17	0,019

The regression formula is as follows:

Oil price = 38.167 – 2.08399*lnopec + 1.3315*gdp – 3.297*lnnonopec +0.5594*opecgr + 0.224 * fut + 1.102*dummy,

where:
lnopec- OPEC crude oil annual production(in thousand barrels per day)

gdp- average of USA and China GDP growth

lnnonopec-crude oil annual production by non-OPEC countries.

opecgr – annual GDP growth in OPEC countries

fut – crude oil futures contract on a yearly basis

dummy – variable indicating 1 in case there was a geopolitical event that could have affected crude oil price and 0 otherwise.

R-squared in our model is equal to 0.9583 which means that 95.83% variation of oil price is explained by our independent variable. This proves that the model is quite accurate. Also F-value is equal to 0.000 which indicate that the model is significant as a whole.

According to the regression analysis the coefficient of lnopec is equal to -2.083. P-value is less than 0.05, which indicates that the coefficient is significant at 5% significance level. This means that 1% decrease in OPEC crude oil production decreases crude oil price by 2.083%. As crude oil production represents the supply the increase in supply leads to decrease in demand.

The coefficient of USA and China GDP growth average is equal to 1.33 and the correlation between this indicator and crude oil prices is positive. P-value of the coefficient is less than 0.05, so the indicator is significant at 5% significance level. So, 1% increase of this coefficient brings 1.33% increase of oil price. This variable represents the demand side. As the demand increases the crude oil price increases as well.

The coefficient of non-OPEC crude oil production is equal to -3.23 and it is significant at 5% significance level as its p-value is less than 0.05. The regression result suggests that 1% increase in non-OPEC crude oil production brings 3.23% decrease in oil price (as the correlation is negative). This is again a supply side factor therefore negative correlation is logical.

The coefficient of OPEC GDP growth is equal to 0.55. It is not significant at 5% significance level as its p-value is more than 0.05. So, according to our model OPEC GDP growth does not affect crude oil prices.

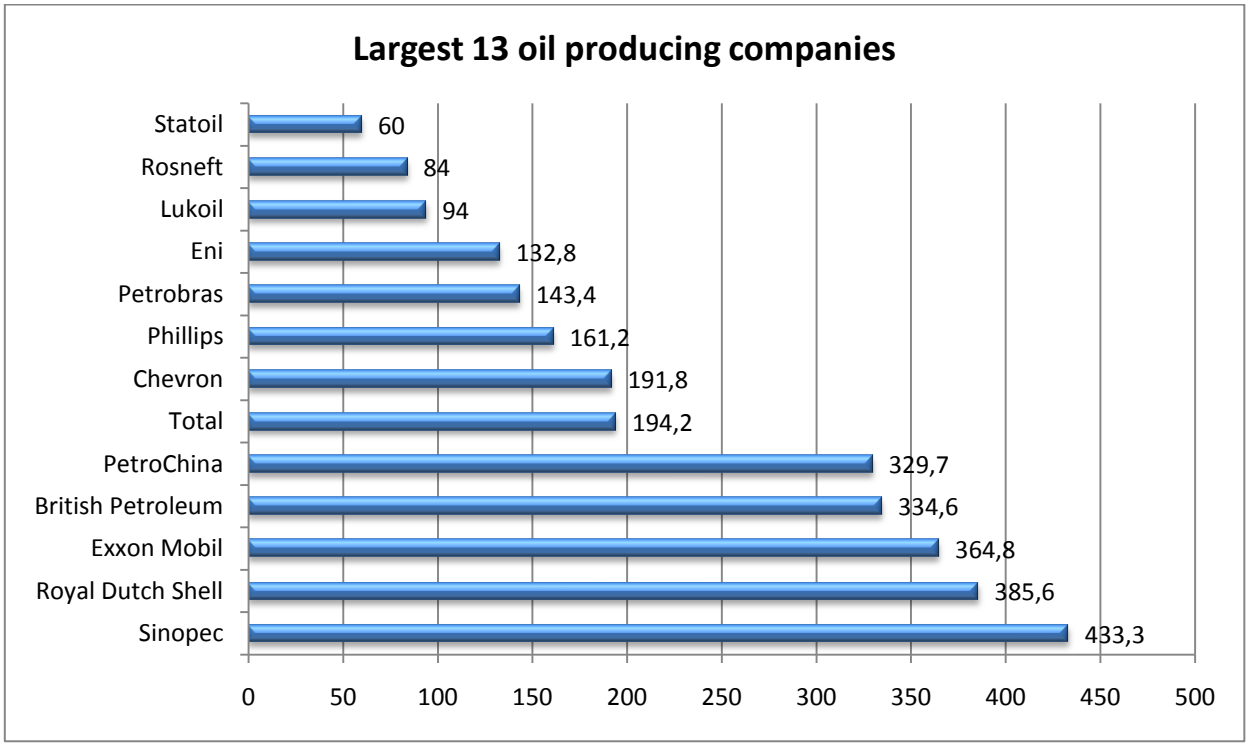
The coefficient of crude oil futures contracts is equal to 0.022 and it is significant at 5% significance level. This means that 1 unit change in crude oil futures brings $0.022 change in crude oil prices.

And finally, the coefficient of dummy variable is equal to 1.102 and it is significant at 5% significance level. This means that in case there is a war or an unexpected event that can affect oil prices, crude oil price would increase by $1.102.

Chapter 5. Company-level analysis

In the graph below you can see the 13 largest oil producing companies by revenue in 2015. We will represent the background information as well as calculation of some important indicators and analysis for all these companies.

Graph 7 Largest 13 oil producing companies [10]



Exxon Mobil

ExxonMobil is a United States-based multinational oil and gas corporation. In 2011, ExxonMobil's revenue amounted to approximately 467 billion U.S. dollars. From 2009-2014, ExxonMobil was the largest, second-largest, or third-largest company in general, worldwide, measured by revenue. In 2015, however, ExxonMobil was the sixth-largest company worldwide by revenue.

ExxonMobil's delivered projects include conventional, heavy oil, tight gas, shale gas, deep water and liquefied natural gas (LNG), Arctic and sour gas. The net income, operating cash flow, capital expenditures, crude oil production and proved reserves from 2004 to 2015 can be found in the table below. In 2015 net income ($16 billion) has decreased by almost 2 times compared to the level in 2014. It was even lower than in 2004. The level of capital expenditures and operating cash has also

[10] Company FS

decreased compared to the previous year. The production and reserves of oil in 2015 have increased compared to 2014. However, they were lower than in 2004.

Table 2 Exxon Mobil's Selected Financial Data[11]

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Net income (million $)	25,330	36,130	39,500	40,610	45,220	19,280	30,460	41,060	44,880	32,580	32,520	16,150
Operating cash (million $)	40,551	48138	52,366	56,206	65,710	29,983	51,674	66,478	63,825	47,621	49,151	32,733
Capex (million $)	11986	13839	19,855	20,853	26,143	27,092	32,226	36,766	39,799	42,489	38,537	31,051
Production (million barrels)	938	920	978	954	877	871	884	843	797	803	770	855
Proved reserves (million barrels)	11651	11229	11568	11074	12006	8905	8890	7081	7152	7551	7419	8091

British Petroleum (BP)

BP is one of the world's leading integrated oil and gas companies – based on market capitalization, proved reserves and production. The company provides customers with fuel for transportation, energy for heat and light, lubricants to keep engines moving and the petrochemicals products used to make everyday items as diverse as paints, clothes and packaging.

Through its two main operating segments, Upstream and Downstream, the company finds, develops and produces essential sources of energy, turning them into products that people need. It also buys and sells at each stage of the hydrocarbon value chain. In renewable energy, its activities are focused on biofuels and onshore wind. BP also has a 19.75% shareholding in Rosneft. BP has three reportable operating segments: Exploration and Production; Refining and Marketing; and Gas, Power and Renewables. The net income, operating cash flow, capital expenditures, crude oil production and proved reserves from 2004 to 2015 can be found in the table below. The net income of British Petroleum was negative in 2015. The operating cash flow and capital expenditures have

[11] Company FS

also decreased but not dramatically. A slight increase is also noticed in production levels. Proved reserves almost remained the same.

Table 3 BP's Selected Financial Data[12]

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Net income (million $)	17,262	22,632	22,286	21,169	21,666	16,759	-3,324	26,097	11,816	23,758	4,003	-6,400
Operating cash (million $)	23,378	26,721	28,172	24,709	38,095	27,716	13,616	22,154	20,397	21,100	32,754	19,133
Capex (million $)	12,286	12,281	15,125	17,830	22,658	20,650	18,421	17,845	23,078	24,520	22,546	18,648
Production (million barrels)	923	938	903	881	876	925	866	787	750	696	665	710
Proved reserves (million barrels)	9,934	9,565	9,781	10,073	10,353	10,511	3,750	4,305	4,540	4,527	4,283	4,254

Royal Dutch Shell

Royal Dutch Shell commonly known as Shell, is an Anglo-Dutch multinational oil and gas company headquartered in Hague, Netherlands and incorporated in the United Kingdom. Created by the merger of Royal Dutch Petroleum and UK-based Shell Transport & Trading, it is the seventh largest company in the world as of 2016, in terms of revenue, and one of the six oil and gas "super majors". Overall, Royal Dutch Shell is one of the top five oil and gas companies worldwide, operating in every segment of the oil and gas industry.

In 2005, the company generated total revenue of around 306.7 billion U.S. dollars and in 2015 this number was 264.96 billion U.S. dollars. The net income, operating cash flow, capital expenditures, crude oil production and proved reserves from 2008 to 2015 can be found in the table below. In 2015 the net income of the company has decreased 7 times compared to 2014 level. Operating cash

[12] Company FS

and capital expenditures have also shown decreasing trend. The production and reserves have slightly declined.

Table 4 Royal Dutch Shell's Selected Financial Data[13]

	2008	2009	2010	2011	2012	2013	2014	2015
Net income (million $)	26,476	12,718	20,474	31,093	26,960	16,526	14,730	2,200
Operating cash (million $)	43,918	21,488	27,350	36,771	46,140	40,440	45,044	29,810
Capex (million $)	35,065	26,516	26,940	26,301	32,576	40,145	31,676	26,131
Production (million barrels)	1,160	1,147	1,210	1,173	1,194	1,168	1,124	1,078
Proved reserves (million barrels)	10903	14132	14249	14250	13556	13932	13081	11747

ENI

Eni is a multinational company headquartered in Rome, Italy. It operates in 79 countries all over the world. Based on its market capitalization it is ranked as world's 11 largest company. The market capitalization of Eni is 70 billion U.S. dollars. 30.3% of share of the company is owned by the Italian government, approximately 4% is owned by state Treasury and 26.7 is held by Cassa Depositi e Prestiti. People's Banks of China possesses 2% of the share of Eni. The net income, operating cash flow, capital expenditures, crude oil production and proved reserves from 2008 to 2015 can be found in the table below. In 2014 Eni's profit has almost doubled compared to 2013. Operating cash also has increased while capital expenditures nearly remained the same. Production level decreased by almost 2 times, while reserves have slightly increased.

[13] Company FS

Table 5 ENI's Selected Financial Data[14]

	2008	2009	2010	2011	2012	2013	2014
Net income (million $)	14059.82	7821.307	12683.47	9103.22	12282.03	6372.315	12712.14
Operating cash (million $)	32069.27	19077.14	18763.78	19130.57	15877.46	14642.53	20096.3
Capex (million $)	21420.7	19077.14	18405.49	18678.82	17369.35	16998.4	16279.2
Production (million barrels)	550	899	496	897	481	857	498
Proved reserves (million barrels)	4770.453	9152.01	8625.5	9855.1	9213.45	8632	8778

Total

Total is considered to be one of the six largest oil and gas companies in the world. It is a French multinational company, which covers oil and gas chain, starting from crude oil and gas exploration to transportation, marketing and trading. Besides, Total is a big manufacturer of chemicals. The net income, operating cash flow, capital expenditures, crude oil production and proved reserves from 2004 to 2015 can be found in the table below. In 2014 and 2015 the net income was almost 2 times lower than in 2013. Operating cash and capital expenditures have also decreased but not that dramatically. Proved reserves and production increased compared to previous year but were lower than in 2004.

[14] Company FS

Table 6 Total's Selected Financial Data[15]

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Net income (million $)	13,936	15,677	15,290	18,543	16,101	12,081	14,327	17,513	13,929	11,521	4,250	4,786
Operating cash (million $)	18328	18190	20237	24230	27443	17304	24516	27194	28859	28,513	25,608	19,946
Capex (million $)	11130	13882	14934	16059	20051	18689	21573	34161	29477	34,431	30,509	28,033
Production (million barrels)	618	591	549	550	531	504	489	447	445	425	377	451
Proved reserves (million barrels)	7,003	6,592	6,471	5,778	5,695	5,324	5,198	4,800	4,647	4,325	4,158	4,495

Chevron

Chevron is an American multinational energy corporation. It has branches in more than 180 countries. The company is engaged in all the aspects and stages of oil production. It is one of the largest oil companies in the world. The net income, operating cash flow, capital expenditures, crude oil production and proved reserves from 2005 to 2015 can be found in the table below. Chevron's net income in 2015 is almost 5 times lower than in 2014. Operating cash flow and capital expenditures have also decreased. The production and reserves remained almost the same.

[15] Company FS

Table 7 Chevron's Selected Financial Data[16]

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Net income (million $)	14,099	17,138	18,795	24,031	10,563	19,136	27,008	26,336	21,597	19,310	4,710
Operating cash (million $)	20,105	24,323	24,977	29,632	19,373	31,354	41095	38,812	35,002	31,475	19,456
Capex (million $)	8,701	13,813	16,678	19,666	19,843	19,612	26,500	30,938	37,985	35,407	29,504
Production (million barrels)	609	632	640	601	673	701	674	643	631	623	636
Proved reserves (million barrels)	8000	7806	7,087	6973	7350	6,503	6,455	6,481	6,345	6,249	6262

Rosneft

Rosneft is a Russian petroleum company, which is the leader of the Russian petroleum industry. It is one of the largest publicly traded petroleum companies in the world. The main activities of the company include exploration of oil gas and condensate products, processing and also marketing and selling activities. Almost 70% of the equity of the company belongs to Russian government, and almost 20% of the shares belong to BP. The rest of the shares is floating. The net income, operating cash flow, capital expenditures, crude oil production and proved reserves from 2007 to 2015 can be found in the table below. For Rosneft net income in 2015 decreased to the 5 billion dollars compared to 9 billion dollars in 2014. The decrease is also noticed for capital expenditures and operating cash as well as production levels.

[16] Company FS

Table 8 Rosneft's Selected Financial Data[17]

	2007	2008	2009	2010	2011	2012	2013	2014	2015
Net income (million $)	12,862	11,120	6,514	9,911	10,854	11,000	17,425	9,109	5,823
Operating cash (million $)	12,627	10,499	6,620	18,176	19,326	18,688	38,178	42,321	36,007
Capex (million $)	3,714	4,344	3,499	8,692	13,304	14,988	17,582	13,872	9,760
Production (million barrels)	740	776.3	796.4	847.4	868.6	892.6	1547	1687	1502
Proved reserves (million barrels)	17513	17694	18058	18,110	18,351	18,328	39,330	40,607	-

Lukoil

Lukoil is the second Russian oil company. In terms of proven oil and gas reserves Lukoil is the sencd largest in the world (following Exxon). The company operates in more than 40 countries of the world. The company accounts for the 2% of the world's production of oil and approximately 1% of the world's crude oil reserves. Lukoil is the biggest privately owned Russian company. The net income, operating cash flow, capital expenditures, crude oil production and proved reserves from 2004 to 2015 can be found in the table below. Net income in 2015 is 2 times lower than in previous year. It is even lower than in 2004. Operating cash and capital expenditures have also decreased. Production and reserves are almost the same as a year ago.

[17] Company FS

Table 9 Lukoil's Selected Financial Data

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Net income (million $)	4,248	6,443	7,484	9,511	9,144	7,069	9,119	9,826	10,925	7,627	4,714	2758
Operating cash (million $)	4,180	6,097	7,766	10,881	14,312	8,883	13,541	15,514	18,997	16,449	15,568	11649
Capex (million $)	3,248	3,982	6,419	9,071	10,525	6,483	6,596	8,249	11,647	14,957	14,545	8241
Production (million barrels)	604	661	698	708	698	716	704	685	677	684	713	738
Proved reserves (million barrels)	10,651	10,583	10,176	10,059	9,170	8,628	8,608	8,594	8,377	8,101	8,484	8,226

Petrobras

Petróleo Brasileiro (Petrobras) is a semi-public Brazilian multinational corporation in the oil and petroleum industry headquartered in Rio de Janeiro, Brazil. The company was ranked #28 in the most recent Fortune Global 500 list. Petrobras controls significant oil and energy assets in 16 countries in Africa, North America, South America, Europe, and Asia. The Brazilian government directly owns 54 % of Petrobras' common shares with voting rights, while the Brazilian Development Bank and Brazil's Sovereign Wealth Fund (Fundo Soberano) each control 5 percent, bringing the state of Brazil direct and indirect ownership totaling to 64 percent. The net income, operating cash flow, capital expenditures, crude oil production and proved reserves from 2008 to 2015 can be found in the table below. For the last 2 years Petrobras has negative net income. The operating cash have almost remained the same, while capital expenditures showed a decrease. The proved reserves have decreased while production is almost the same as in previous year.

Table 10 Petrobras's Selected Financial Data[18]

	2008	2009	2010	2011	2012	2013	2014	2015
Net income (million $)	18879	15504	19184	20121	11034	11094	-7367	-8450
Operating cash (million $)	9149	9397	30110	33698	27888	26289	26632	25913
Capex (million $)	14293	16488	19621	20405	21959	26692	25500	19131
Production (million barrels)	719	769	783	789	722	704	742	776
Proved reserves (million barrels)	9105.5	10269	10731.2	10782.8	10953.3	11040.9	11117.6	8774.4

Sinopec

Sinopec Corporation is among the largest energy and chemical company in China. The company covers all the stages of oil production. The company is China's largest supplier of oil, as well as chemical products. Also SINOPEC is the second largest crude oil producer in China. The net income, operating cash flow, capital expenditures, crude oil production and proved reserves from 2008 to 2015 can be found in the table below. For Sinopec the net income has decreased in 2015 compared to 2014. Operating cash has slightly increased, while capital expenditures have decreased. Production has not changed significantly while reserves have declined.

[18] Company FS

Table 11 Sinopec's Selected Financial Data[19]

	2008	2009	2010	2011	2012	2013	2014	2015
Net income (million $)	3282.27	9473.214	11774.96	11621.36	10162.91	10846.82	7593.724	4995.38
Operating cash (million $)	9732.391	22271.61	25719.57	23904.84	22652.14	24913.15	24243.67	25535.6
Capex (million $)	14711.03	15342.4	18868.44	21850.85	26882.51	30364.61	25272.1	17286.25
Production (million barrels)	296.8	301.15	898	881	899	921	989	958
Proved reserves (million barrels)	2841	2820	2888	2848	2843	3130	3048	2243

Petrochina

PetroChina Company Limited is a Chinese oil and gas company and is the publicly listed part of state-owned China National Petroleum Corporation (CNPC), which is headquartered in Dongcheng District, Beijing. It is China's largest oil producer. Traded in Hong Kong and New York, the company issued stock in Shanghai in November 2007, and subsequently entered trading on the Shanghai index. The net income, operating cash flow, capital expenditures, crude oil production and proved reserves from 2004 to 2015 can be found in the table below. Petrochina also has a significant decrease in net income from 2014 to 2015. The same can be said for operating cash and capital expenditures. Production has not changed significantly while reserves have declined.

[19] Company FS

Table 12 PetroChina's Selected Financial Data[20]

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Net income (million $)	13061	17122	18838	21265	18552	15605	22768	23164	20781	23335	19452	6481
Operating cash (million $)	17189	25136	25425	28429	25234	39251	48136	46049	38069	47323	58257	40241
Capex (million $)	11240	12557	18751	25008	34000	39078	41706	45134	56084	52271	47675	31144
Production (million barrels)	814.2	822.9	830.7	846	871	843.5	857.7	886.1	916.5	932.9	945.5	971.9
Proved reserves (million barrels)	11,501	11,536	11,618	11,706	11,221	11,263	11,278	11,128	11,018	10,820	10,593	8,521

Statoil

Statoil is a multinational oil and gas company headquartered in Stavanger, Norway. It is also a refining petroleum company with operations in 36 countries. Statoil is ranked by Forbes Magazine (2013) as the world's eleventh largest oil and Gas Company by revenue and the 26th largest company, regardless of industry, by profit in the world. As of 2015, the Government of Norway is the largest shareholder in Statoil with 67% of the shares, while the rest is public stock. The shares are managed by the Norwegian Ministry of Petroleum and Energy. The net income, operating cash flow, capital expenditures, crude oil production and proved reserves from 2007 to 2015 can be found in the table below. Statoil has incurred a loss in 2015. Operating cash and capital expenditures have declined compared to the previous year's levels. However, the production and reserves have increased.

[20] Company FS

Table 13 Statoil's Selecteed Financial Data[21]

	2007	2008	2009	2010	2011	2012	2013	2014	2015
Net income (million $)	7.609623	7.678666	2.81408	6.221354	13.98527	11.94733	6.672	3.491454	-4.62567
Operating cash (million $)	16.03822	18.26565	11.60609	14.09732	21.22764	22.00371	37.24065	33.13707	20.56128
Capex (million $)	11.60212	11.52687	11.76508	13.79949	16.4648	19.32201	19.55645	19.45692	15.46436
Production (million barrels)	252	232	283	263	252	342	298	306	324
Proved reserves (million barrels)	1,604	1,396	1,351	2,124	2,276	2,389	1,877	1,942	2,091

Conoco Phillips

Conoco Phillips was founded in 1875. It is an American multinational company with its headquarters in Texas, USA. Based on its proved reserves Conoco Phillips is the largest independent oil exploration and production company in the world. The net income, operating cash flow, capital expenditures, crude oil production and proved reserves from 2007 to 2015 can be found in the table below. ConocoPhillips has negative profit in 2015. It has a significant decrease in operating cash and capital expenditures. The crude oil production and reserves almost did not change.

[21] Company FS

Table 14 Conoco Phillips's Selected Financial Data[22]

	2007	2008	2009	2010	2011	2012	2013	2014	2015
Net income (million $)	11,891	-16,998	4,858	11,358	12,436	8,428	9,156	6,869	-4,428
Operating cash (million $)	24,550	22,658	12,479	17,045	19,646	13,922	16,087	16,735	7,572
Capex (million $)	11,791	19,099	10,861	7,535	11,214	14,172	15537	17,085	10050
Production (million barrels)	854	856	968	763	650	595	581	595	605
Proved reserves (million barrels)	2,321	5,017	4,904	2763	2741	2,779	2,749	2,708	2,363

Break-even price calculations

The Brent crude oil price has changed significantly during the 3 year period. In 2015 it decreased to the level of $37 which was almost 3 times lower compared to 2013 level.

This was a result of demand growth being outpaced by continued supply growth, which has led to crude oil and oil products inventory levels to be well above their historical five-year averages.

Looking ahead, significant price volatility can be expected in the short and medium term. Crude oil prices may rise if the following scenarios take place: if the global economy accelerates, if supply tightens as a result of a further deceleration in non-OPEC production growth due to the current price decrease, if OPEC countries reduce their production levels, or if supply disruptions occur in major producing countries. Alternatively, crude oil prices may decline further if economic growth slows or production continues to rise, for example because of Iran entering the market after the lifting of sanctions.

[22] Company FS

As we have seen oil prices have changed significantly during the last year that is why it is important to see how these changes have affected the performance of the companies. For that reason we calculated the break-even prices for 5 major oil producing companies and compared to the crude oil price levels to see whether they operate below break-even or not. Here are the formulas that we used to calculate the break-even prices:

Contribution margin = Revenue – Variable costs

Contribution margin (%) = Revenue/Variable expenses

Break-even Sales = Fixed Costs/Contribution margin (%)

Variable costs include Purchases, Production expenses, Operating expenses, and Taxes other than income.

Fixed costs include Selling, General and Administrative expenses, Depreciation, and Exploration expenses.

In the table below you can see the results of calculations.

Table 15 Break Even

	Break Even			
	2013	**2014**	**2015**	**Average**
Total	30	29	38	32
BP	30	43	48	41
Exxon Mobil	16	17	19	17
Royal Dutch Shell	29	32	52	38
Chevron	19	22	27	23
Brent Crude Oil Price	109,95	55,27	36,61	67

We took data for upstream sector from consolidated financial statements of each company. For our calculation we made an assumption that all production expenses are variable and all

exploration and depreciation costs are fixed. We calculated contribution margin for Royal Dutch Shell, ExxonMobil, Total S.A, Chevron and British Petroleum. Contribution margin was calculated by dividing variable costs to the revenue. Afterwards we divided contribution margin in % to the fixed costs to get break-even price for each year based on production level of that year. As the cost structure of each year was different, we calculated average break-even price for each company taking three-year data. The calculations can be found in the appendix.

As we can see from the results presented above in 2015 only two companies Exxon Mobil and Chevron have break-even prices lower than the actual crude oil price. The main reason is that ExxonMobil and Shell have the largest production capacity. As the main cost in this industry is depreciation (fixed cost) large levels of production give the advantage of economies of scale to these companies. For the rest the crude oil price is lower than their break-even prices. However if we look at the numbers in 2013 we can see that the price is more than 3 times higher than break-evens of the companies. This shows how seriously the price change affects the performance of the companies.

(Net income-Capital Expenditures)/Production calculations

Besides calculating the break-even price we conducted another type of analysis to see how effectively the companies operate. For that analysis we used the following formula: (Net income-Capital Expenditures)/Production. This calculation compares company's net income to capital expenditures and gives per barrel indicator of whether the company operates with losses or not. We calculated this indicator for 13 companies. The results are shown in the table below. The numbers used in calculations are taken form companies' financial statements and are provided for each company above with their backgrounds. Looking at the numbers we can see that in 2015 the results are negative for all the companies meaning that the net income is lower than capital expenditures. However, looking at the overall picture we can see that for the majority of companies the results are negative in other years as well. This can partly be explained 2008 financial crisis. In absolute terms the lowest result is obtained for Statoil which is actually very close to 0, meaning that the company is operating at its break-even. This is the best results compared to others in the scope of this indicator.

Table 17 (Net income-Capital Expenditures)/Production calculations

		(Net income-Capital Expenditures)/Production							
		2008	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
1	**Total**	-7.432	-13.109	-14.816	-37.204	-34.917	-53.785	-69.577	-51.488
2	**British Petroleum**	-1.132	-4.205	-25.095	10.481	-15.007	-1.094	-27.868	-35.264
3	**Exxon Mobil**	21.732	-8.966	-1.998	5.088	6.371	-12.329	-7.809	-17.409
4	**Royal Dutch Shell**	-7.404	-12.030	-5.344	4.085	-4.704	-20.222	-15.077	-22.199
5	**Chevron**	7.252	-13.773	-0.678	0.753	-7.148	-25.938	-25.805	-38.950
6	**Statoil**	-0.017	-0.032	-0.029	-0.010	-0.022	-0.043	-0.052	-0.062
7	**Rosneft**	8.729	3.786	1.439	-2.821	-4.468	-0.101	-2.823	-2.621
8	**Lukoil**	-1.979	0.818	3.584	2.302	-1.066	-10.716	-13.788	-7.430
9	**Conoco Philips**	-42.169	-6.201	5.010	1.880	-9.654	-10.983	-17.170	-23.931
10	**PetroChina**	-17.741	-27.828	-22.080	-24.794	-38.519	-31.018	-29.851	-25.376
11	**Eni**	-0.912	-6.530	-2.388	-4.830	-2.566	-7.496	0.948	-
12	**Petrobras**	6.373	-1.279	-0.558	-0.360	-15.117	-22.131	-44.271	-35.510
13	**Sinopec**	-105.498	-53.395	-21.642	-31.812	-50.953	-58.060	-48.973	-35.150

(Net income-Capital Expenditures)/Production calculations

In order to get results on cash basis we conducted the same analysis taking operating cash flow instead of net income and comparing it to capital expenditures dividing by production to get figures per barrel. The numbers can be found in the table below. The numbers used in calculations are taken form companies' financial statements and are provided for each company above with their backgrounds. According to this indicator the majority of analyzed companies in 2015 have positive results. Those are British Petroleum, Exxon Mobil, Royal Dutch Shell, Statoil, Rosneft, Lukoil, PetroChina, Petrobras and Sinopec. The overall picture is also much better as for the majority of companies during the 8 years period the results are positive indicating that operating cash is higher than capital expenditures. We can state that this indicator is a better measure as in this case both operating cash flow and capital expenditures are on cash basis and it is more appropriate to compare them. The best result in this list is performed by the Sinopec which has the highest number. In 2015 Sinopec was the largest oil producing country by its revenue.

Table 18 (Net income-Capital Expenditures)/Production calculation

		(Operating cash flow- Capital expenditures)/Production							
		2008	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
1	**Total**	13.911	-2.747	6.017	-15.569	-1.388	-13.893	-12.986	-17.911
2	**British Petroleum**	17.615	7.637	-5.545	5.473	-3.573	-4.908	15.341	0.683
3	**Exxon Mobil**	45.074	3.318	21.999	35.209	30.126	6.385	13.775	1.965
4	**Royal Dutch Shell**	7.632	-4.384	0.339	8.926	11.360	0.253	11.893	3.413
5	**Chevron**	16.558	-0.698	16.729	21.626	12.229	-4.721	-6.303	-15.785
6	**Statoil**	0.029	-0.001	0.001	0.019	0.008	0.059	0.045	0.016
7	**Rosneft**	7.929	3.919	11.192	6.933	4.145	13.314	16.864	17.475
8	**Lukoil**	5.426	3.352	9.865	10.606	10.857	2.181	1.435	4.617
9	**Conoco Philips**	4.158	1.671	12.464	12.972	-0.420	0.947	-0.588	-4.096
10	**PetroChina**	-10.068	0.205	7.497	1.032	-19.655	-5.304	11.191	9.360
11	**Eni**	19.330	0.000	0.721	0.503	-3.100	-2.747	7.664	-
12	**Petrobras**	-7.149	-9.217	13.391	16.830	8.204	-0.572	1.525	8.732
13	**Sinopec**	-45.957	63.039	20.902	6.387	-12.892	-16.217	-2.849	23.592

Proved reserves/Production (years) calculations

Finally to understand how many years these companies can survive with their proved crude oil reserves without obtaining new reserves we divided the reserves by the annual production. The results are shown in the table below. The numbers used in calculations are taken form companies' financial statements and are provided for each company above with their backgrounds. In 2015 the highest numbers are obtained for Lukoil and Petrobras who can survive with their reserves and current rate of production for over 11 more years. The worst result is shown by ConocoPhillips which is just almost 4 years. Comparing to numbers in 2008 we can notice a decreasing trend for this indicator.

Table 19 Proved reserves/Production (years) calculations

		Proved reserves/Production (years)							
		2008	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
1	**Total**	10.716	10.562	10.628	10.726	10.436	10.154	11.017	9.956
2	**British Petroleum**	11.814	11.360	4.328	5.468	6.050	6.497	6.437	5.989
3	**Exxon Mobil**	13.677	10.221	10.056	8.391	8.968	9.395	9.629	9.453
4	**Royal Dutch Shell**	9.399	12.321	11.776	12.148	11.353	11.928	11.638	10.897
5	**Chevron**	11.585	10.908	9.265	9.565	10.066	10.042	10.018	9.837
6	**Statoil**	6.017	4.774	8.076	9.032	6.985	6.299	6.346	6.454
7	**Rosneft**	22.793	22.675	21.371	21.127	20.533	25.423	24.071	-
8	**Lukoil**	13.138	12.050	12.227	12.546	12.374	11.844	11.899	11.146
9	**Conoco Philips**	5.861	5.066	3.621	4.217	4.671	4.731	4.551	3.906
10	**PetroChina**	12.887	13.353	13.149	12.558	12.022	11.598	11.204	8.767
11	**Eni**	8.660	10.175	17.357	10.981	19.146	10.067	17.624	-
12	**Petrobras**	12.654	13.348	13.700	13.652	15.156	15.665	14.975	11.297
13	**Sinopec**	26.225	25.655	8.811	8.857	8.664	9.311	8.444	6.415

By combining the results of all the 4 types of analysis conducted we can see that different companies are performing better according to one indicator and worse according to another. It is difficult to distinguish a company that is outperforming all others. The overall conclusion can be that the oil price sharp decrease hit the companies strongly. According to break-even calculations the best result was obtained for Exxon Mobil. In terms of (Net income-Capital Expenditures)/Production indicator the best result was for Statoil which however was negative. The numbers of (Operating cash flow- Capital expenditures)/Production formula showed the best results for Sinopec. And finally in terms of crude oil reserves the highest figure was obtained for ConocoPhillips. The company can consider investing in one of the above mentioned oil companies however taking into account their overall performance and making a decision based on which indicator is more important for them.

CONCLUSION

As a result of our analysis we came to the following conclusions.

The demand for oil continues to increase as it was in the past. The reasons for this are the population growth, expanding economies and transportation sector development mainly in the emerging markets and particularly in China.

In the supply side the power is shifting from OPEC to US. OPEC countries that were traditionally the ones who set the rules in the market and influenced oil prices are concealing their position due to the increase of oil production by US. The reason for this increase is the new technology of fracking oil which comprises half of US oil production.

In order to find out how oil price movements are affecting stock market we conducted a regression analysis. As independent variable we took S&P 500 index and as dependent variable we took crude oil prices. This was aimed to see how oil price movements are influencing the performance of non-oil companies and whether it is important for an investment company to consider these movements while investing in non-oil industries. As a result we found out that there is a positive correlation which is not strong but has strengthened compared to pre-crisis period when the correlation was barely observed. The positive relation can be explained by the fact that both variables are driven by world demand.

It is also important to understand the factors that are determining the oil price and explaining its volatility. The analysis showed that the main factors are supply, demand, speculations in oil futures market and geopolitical factors. In order to empirically estimate the impact of these variables on price we conducted a regression analysis where oil price was the dependent variable and supply and demand factors, oil futures prices and geopolitical factors (dummy variable) were included as independent variables. As a result it was proved that unlike other commodities oil price movements are not only merely explained by fundamentals – supply and demand, but also such unpredictable factors as geopolitics and speculations. Hence, this is the reason for its volatility.

In order to analyze the performance of major oil producing companies, to see how recent changes in oil price affected their performance and whether it is worth to invest in this industry or not we calculated several indicators. Firstly we calculated break-even prices for 5 biggest oil producers and compared to the crude oil price. As a result we found out that in 2015 only for two companies Exxon Mobil and Chevron break-even prices were lower than the crude oil price. This proved that the sharp decrease in oil price strongly hit the performance of companies. For 13 oil companies we calculated (Net income – Capital Expenditures)/Production to compare net income to

capital expenditures on a per barrel basis. In 2015 the results were negative for all of them; the best result was obtained for Statoil which has the lowest number in absolute value. To conduct the same analysis but on cash basis we used the following formula - (Operating cash flow– Capital Expenditures)/Production. Here for 2015 the results were better as for the majority of the companies the numbers were positive. The best result was shown by Sinopec who has the highest number. Finally to see for how many years the companies can operate at their current levels of crude oil reserves and current level of crude oil production we divided the annual reserves by the annual production. For 2015 the average number was 8.5 years. The highest result was obtained for Petrobras (11 years). Overall we can say that based on the fours indicators calculated no single company can be distinguished as outperforming all the others. For each indicator we have different best performers which are the following Exxon Mobil, Statoil, Sinopec and Petrobras. The investment company can consider investing in one these companies based on which indicator is more important for them.

Appendix

Chevron

Table 1

	2015	**2014**	**2013**
Crude Oil Production (million barrels)	1,700	1,699	1,731
Crude Oil Sales (million $)	39,827	69,825	75,558
Expenses (million $)			
Purchased crude oil	21,381	41,677	46,228
Operating expense	7,061	8,806	8,452
Selling general admin	1,362	1,565	1,548
Exploration expense	1,024	691	639
Depreciation	6,449	5,848	4,869
Taxes other than income tax	3,688	4,367	4,483
Contribution margin (million $)	7,697	14,975	16,395
Contribution margin (%)	19%	21%	22%
Break- even sales (million $)	45,711	37,792	32,515
Break-even price	**27**	**22**	**19**

Royal Dutch Shell

Table 2

	2015	**2014**	**2013**
Crude Oil Production (million barrels)	1,078	1,124	1,168
Crude Oil Sales (million barrels)	58,245	101,830	99,648
Expenses (million $)			
Purchased crude oil	13,303	23,039	22,379
Production and manufacturing expense	18,016	20,093	18,471
Selling general admin	1,010	1,055	1,194
Depreciation	23,001	17,868	16,949
Taxes other than income tax	1,166	2,625	3,079
Interest expense	881	953	910
Contribution margin	25,760	56,073	55,719
Contribution margin (%)	44%	55%	56%
Break- even sales	56,282	36,095	34,074
Break-even price	**52**	**32**	**29**

Exxon Mobil

Table 3

	2015	**2014**	**2013**
Crude Oil Production (million barrels)	1,496	1,448	1,524
Crude Oil Sales (million $)	51,899	92,612	106,152
Expenses (million $)			
Exploration expenses	1,574	1,971	2,436
Production and manufacturing expense	15,797	18,174	17,498
Selling general admin			
Depreciation	14,719	13,913	14,410
Taxes other than income tax	7,054	13,059	17,333
Contribution margin (million $)	29,048	61,379	71,321
Contribution margin (%)	56%	66%	67%
Break- even sales (million $)	29,110	23,967	25,073
Break-even price	19	17	16

Total S.A.

Table 4

	2015	**2014**	**2013**
Crude Oil Production (million barrels)	652	575	588
Crude Oil Sales (million $)	36,786	56,969	66,705
Expenses (million $)			
Operating expense	21,851	21,235	31,875
Depreciation	10,857	10,938	9,484
Contribution margin (million $)	16,954	40,036	37,518
Contribution margin (%)	44%	65%	54%
Break- even sales (million $)	24,850	16,739	17,542
Break-even price	38	29	30

British Petroleum

Table 5

	2015	**2014**	**2013**
Crude Oil Production (million barrels)	1,137	1,007	1,083
Crude Oil Sales (million $)	43,235	65,424	70,374
Expenses (million $)			
Purchased crude oil	31,528	51,421	52,992
Production and manufacturing expense	7,087	4,993	4,889
Production and similar taxes	198	540	1,252
Exploration expense	450	662	611
Depreciation	2,912	2,766	2,400
Distribution and admin	2,210	2,237	2,240
Contribution margin (million $)	4,423	8,470	11,242
Contribution margin (%)	10%	13%	16%
Break- even sales (million $)	54,473.93	43,760	32,870
Break-even price	**48**	**43**	**30**

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