

Czech University of Life Sciences Prague

Faculty of Business Administration

Department of Economics



Bachelor thesis

Economic analysis of crude oil commodity price

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CZECH UNIVERSITY OF LIFE SCIENCES PRAGUE

Faculty of Economics and Management

BACHELOR THESIS ASSIGNMENT

Olga Dzyubak

Business Administration

Thesis title

Economic analysis of crude oil commodity price

Objectives of thesis

1. Evaluate economically price and position of crude oil commodity
2. Identify and evaluate main factors behind oil price changes
3. Description of structural changes in the crude oil market during the time period studied.

Methodology

1. Methods (fundamental, technical) of economic analysis of oil market in the world.
2. Time series analysis methods
3. Regression analysis

The proposed extent of the thesis

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Keywords

Crude oil prices, commodity, forecast, prediction, monetary policy, option pricing, demand, supply, elasticities, volatility, OPEC

Recommended information sources

0. Price Formation in Oil Markets: Some Lessons from 2009. Oxford Energy Comment . Oxford Institute for Energy Studies.
1. Brooks, C. (2002). Introductory econometrics for finance. Cambridge University Press.
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Declaration

I declare that I have worked on my bachelor thesis titled “Economic analysis of crude oil commodity price” by myself and I have used only the sources mentioned at the end of the thesis.

In Prague on 9 March 2016

Dzyubak Olga

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Economická analýza ceny surové ropy

Economic analysis of crude oil commodity price

Ekonomická analýza ceny surové ropy

Economic analysis of crude oil commodity price

Abstrakt

Dzyubak, Olga. Economic analysis of crude oil commodity price. Prague, 2016. 40 p. Bachelor Thesis.

Czech University of Life Sciences Prague, Prague, Faculty of Economics and Management, Department of Economics. Thesis head: Ing. Petr Procházka, MSc, Ph. D.

Tato bakalářská práce zkoumá faktory, které ovlivňují změny cen na surovou ropu a to v rocích 1950-2014. Analýza navazuje na předešlé výzkumy determinant trhu ropy. Víme, že nejlepším způsobem výzkumu je analýza v časovém horizontu. Pomocí vymezení koeficientů můžeme identifikovat a popsat strukturní změny na trhu surové ropy v cílovém období. Naše analýza předpokládá, že účastníky, které obchodují na trhu ropy, více se soustřeďují na očekáváních a kladou menší důraz na fundamentální faktory. Také předpokládáme, že kroky a pozice finančních investorů nemohou vyvolávat velké změny na trhu ropy a do značné míry ovlivňovat cenu ropy. V bakalářské práci uvedeme, že vstup nových účastníků na trh s ropou má velký vliv na proces stanovení ceny surové ropy a, že daný proces má totožnou podobu s finančním trhem. Vybraná forma analýzy v časovém období navíc ukazuje, jaké změny v globálním hospodářství ovlivňují proces tvorby ceny surové ropy v době ekonomické recese a expanze. Také předpokládáme, že organizace OPEC byla důležitým hráčem v poslední době, V historické perspektivě OPEC vždy měl velký podíl na nabízeném množství surové ropy, ale odnedávna organizace nemá volné výrobní kapacity, proto na globálním trhu ropy vzniká obrovská nerovnováha. Cíl práce, kterým je identifikovat a ohodnotit hlavní faktory změn ceny na surovou ropu, byl dosažen. Pro dosažení cílů byly použity takové metody jako analýza změn ceny v časovém horizontu; stanovení a analýza maximálních, minimálních a středních hodnot; analýza závislosti a vzájemného působení každého z faktorů na cenu ropy pomocí korelačních a regresivních modelů.

Klíčová slova: ceny ropy , prognóza , predikce, měnové politiky , oceňování opcí , poptávka, nabídka , elasticity , faktory.

Abstract

Dzyubak, Olga. Economic analysis of crude oil commodity price. Prague, 2016. 40 p. Bachelor Thesis.

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This thesis investigates the underlying factors behind the crude oil price changes, using a time-varying approach for the period from 1950 to 2014. The analysis is an extension of previous studies of oil market determinants and is to our knowledge the only time-varying analysis for a broader set of explanatory variables. By allowing the parameter coefficients to vary over time, we are able to identify and describe structural changes in the crude oil market during the time period studied. Our analysis suggests that the crude oil market participants have been more focused on expectations, and draw less attention to fundamental factors, during the time period examined. We do not find that the positions and steps of financial investors by itself cause changes in the crude oil price significantly. However, we show that the entry of new market participants has influenced changes in the process of crude oil price setting, which has become more similar to the process in financial markets. The time-varying analysis also reveals that changes in world economic activity have a particularly strong relationship with crude oil price changes during the economic recession and expansion. We find that OPEC has been an important factor in recent years, not by virtue of being a price setter, but by the organization's diminishing ability to operate as swing producer. Lack of OPEC spare capacity in the recent years caused large imbalances in the world crude oil market, as OPEC historically has represented the only major buffer on the supply side. The aim of this thesis, which is identify and evaluate main factors behind oil price changes, was reached. For the reaching of this target we used such methods as time-varying model; determination and analysis of maximal, minimal and medium values; analysis of the mutual dependence of all significant factors that can influence crude oil price using regressive and correlation models.

Keywords: Crude oil prices, forecast, prediction, monetary policy, option pricing, demand, supply, elasticities, factors.

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1 Introduction

For many years, oil prices remain one of the most important sources of energy for mankind. All countries, one way or another, are consumers of oil and oil products. In the Community of countries which are engaged in oil production, more than 100 countries are included. The price of oil and its derivatives exists for both producers and consumers. The dynamics of oil prices has an impact on the level of costs in all production sectors. Many economies are based on oil and trade in oil and oil products, so forecasting oil prices is an urgent task. It is also worth noting that some sectors of the economy are directly dependent on the oil price forecast.

World oil prices are the most important external factor in determining the state of the economy, state budget and balance of payments. The level of world oil prices has a direct impact on government revenues, the balance of trade, the development of oil and gas sector and related industries. In this regard, the great importance is the identification of the main influencing factors determining the formation of world prices for oil, and modeling of price dynamics, allowing for the prediction of world oil prices. Such predictions are a necessary element of the assessment of the future conditions of economic development and the establishment of appropriate terms of this public policy. Therefore, this work is devoted to the definition of the main factors in the formation of world prices for oil, modeling and forecasting of the dynamics of oil prices.

As the fundamental factors that determine the level of world oil prices highlighted the factors that shape the demand and supply of oil on the world market. The work deals with factors such as the dynamics of the world economy, the structure of global demand for oil, the energy intensity of the economy, the level of world oil prices, the relative competitiveness of other fuels, geological and technological factors, the structural characteristics of the world's oil production and exports, the actions of OPEC to regulate the volume oil and influence the level of world oil prices, the policy of other oil-producing states in the oil sector.

There are sections which are devoted to the modeling and prediction of world oil prices. In these parts, the basic model of the world oil market, and ways of prediction of oil prices are described with an econometric model of supply and demand of oil that was developed in a study, made a long-term forecast of world oil prices.

I propose a method for long-term forecasting of oil prices based on a structured approach. This is modeled separately global oil demand, supply, and OPEC oil supply by non-OPEC. In the simulation, the demand for oil is taken into account the development of oil-saving technologies.

Also, in order to make this simulation more accurate, I will add and analyze which factors are more significant and which of them have a stronger influence.

Obtained results can serve as an analytical basis for the prediction of world oil prices in order to assess the impact of their changes on the state of the Russian economy and the state budget, as well as for the development of the state social and economic policy, corresponding to the conditions of future development.

Oil prices have an impact on political and economic processes that determine the value of the shares of oil companies, the level of inflation in oil-importing countries, the rate of economic growth. It is important to note the impact of oil prices on the formation of prices for alternative energy sources.

The method of predicting oil prices is the object of many researchers around the world. They use different methods and ways to predict, but none of them is perfect and has some disadvantages. In this regard, there is quite a lot of questions that you can continue to conduct during the research in an attempt to develop a method of predicting that would be the closest to reality and allowed to predict in this dynamic world.

In this way, the object of this work is oil price, and the subject - dynamics of oil prices.

2 Aims and methodology

The aims of this work are to analyze the main processes that form the level and dynamics of world prices for crude oil. Based on the goal, the following problems have been identified:

- Define the basic characteristics of world market prices of oil;
- Make a retrospective analysis of pricing on the world oil market;
- Explore current trends and dynamics in the oil markets;
- Consider the basic economic model of pricing on the oil market;
- Determine and analyze price setting factors and their influence.

The empirical methodology aims to determine significant factors influencing the oil price and to investigate their change over time. To identify the factors we want to include in the time-varying model, we employ a classical linear regression model (CLRM) with oil price return as the dependent variable and the discussed factors as explanatory variables.

1. Parameter stability of the linear regression.
2. Estimate model with time-varying parameters.
3. Empirical results.

3 Theoretical part

3.1 Retrospective analysis of pricing on the world oil market

The formation of oil prices can be divided into several historical periods:

- Era of stable oil prices before 1970;
- Era of OPEC dominance:
 - Arab oil embargo in 1973 and Iranian revolution in 1979;
 - 1980s oil glut;
- The era of oil corporations' dictates of oil prices.

3.1.1 Era of steadystable oil prices before 1970

The oil market before the beginning of the 70s was one of the most monopolized in world trade. The whole cycle of operations on this market was controlled by vertically integrated companies, also called «Seven sisters». “Seven Sisters” group dominated the global petroleum industry from the mid-1940s to the 1970s. The group was formed by the following companies:

- Anglo-Persian Oil Company (now BP);
- Gulf Oil;
- Standard Oil of California (now Chevron);
- Texaco;
- Royal Dutch Shell;
- Standard Oil of New Jersey (now Exxon);
- Standard Oil Company of New York.

These companies worked around the world and obtained oil from developing countries according to concession agreements. The bulk of oil was exported according to long-term contracts to their own companies or «independent» (in fact, these companies were affiliated with the monopoly) refineries.

Oil prices during this period were very monopolized and established by “Seven Sisters” companies unilaterally. This policy corresponded to the cartel strategy aimed at all-round expansion of the oil consumption.

In the 70th, the influence of “Seven Sisters” started to decrease due to nationalization policy in developing countries and the increasing OPEC role.

3.1.2 Era of OPEC domination

The 70s is the time of OPEC domination on the global oil market. This followed the massive nationalization of an oil producing sector of the economy in Middle East countries and countries of North Africa. Thereafter the new oil companies owned by oil exporters were founded.

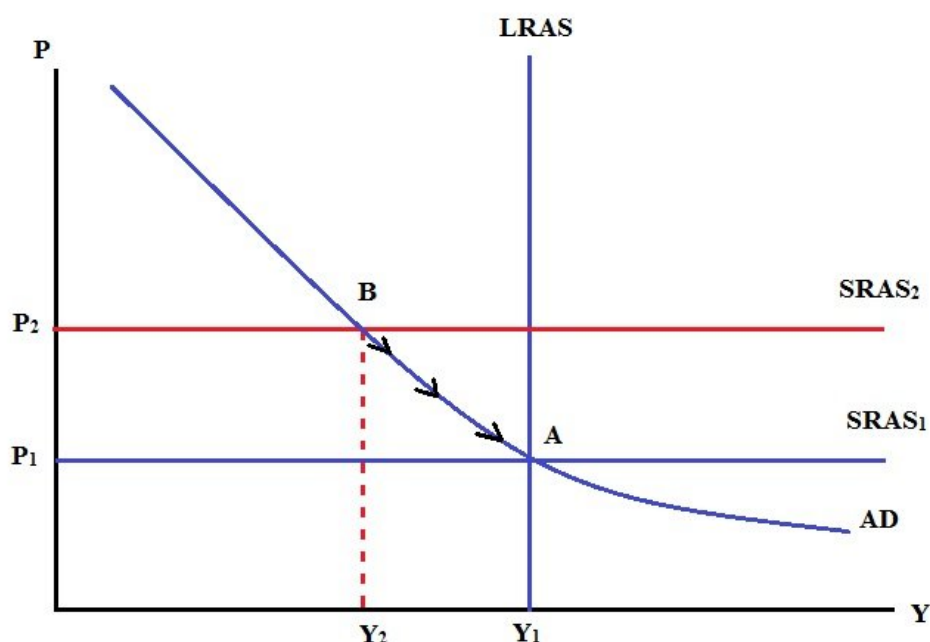
OPEC changed the structure of trading. At first, it happened inside one and big company group which sold all oil to subsidiary companies. In the 70ts, the system was changed from intra-company to commercial. As a result, it led to a decrease in the number of operations based on one-time contract. On the other hand, the global market started to attract more players, where the oil prices were determined by previous contracts.

At the end of the 70ts, the stock market trading develops and widens. Firstly it happened on New York Mercantile Exchange and then at the International Petroleum Exchange in London, UK. Today these exchanges are the main centers of global oil trading.

The growing influence of OPEC became evident in 1973 when Yom Kippur War (also known as the 1973 Arab-Israeli War) had erupted. OPEC declared an oil embargo against countries supporting Israel, especially against the USA. As a result, there was a famous oil crisis when the price of oil had risen from \$3 per barrel to nearly \$12 globally. It was the **first oil crisis** in history and still is the biggest. The current political and economic situation revealed the huge dependence of the world economy from oil and oil prices. Finally, in many countries, alternative energy sources started to develop. For example, Japan's industry shifted to gas and nuclear energy. In the USA crisis triggered a significant change in the auto industry when fuel-hungry cars were pushed out by more economy cars. And it is possible to say, that the American auto industry still suffers from this oil crisis.

For illustration purposes, we made the chart, which shows the aggregate demand and aggregate supply model in times of first oil shock (Figure 1). It is possible to see that oil shock moves SRAS curve higher. As a result unemployment growth arises; but if there is no more any oil shock, SRAS curve will return to the potential product level.

Figure №1: LRAS model for the first oil shock



Source: own representation

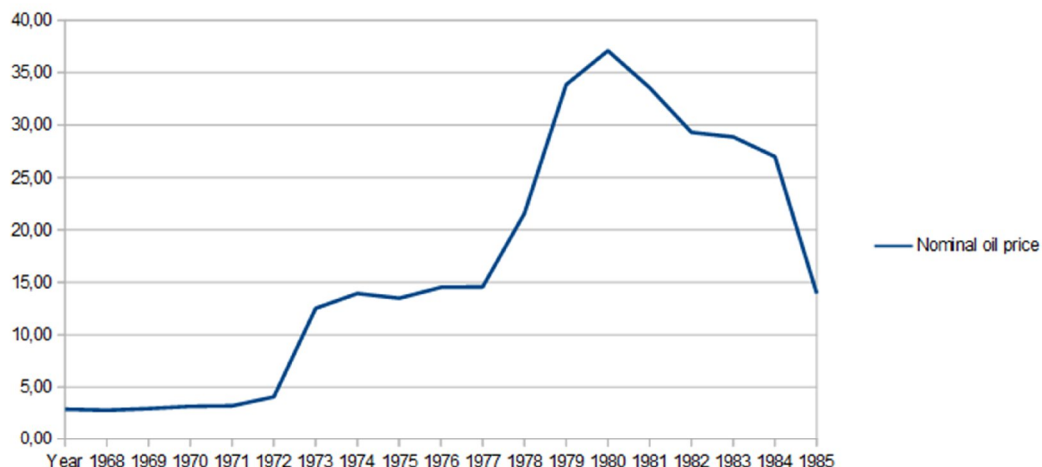
Another famous event which greatly affected the oil prices was the Iranian Revolution in 1979 when the monarchy was overthrown and the Islamic Republic of Iran was proclaimed. This revolution impacted oil price even more than OPEC embargo. This time is called as **the second oil shock**. Due to protests, all industries stopped including the oil industry. The workers of refineries, seaports, oil-producing fields protested against monarchy for several months and didn't work. According to the fact, that Iran was a second oil exporter in the world (2,5 mil. barrels in a day, 5% of world producing), it had dealt a heavy blow to the global economy. The second phase of the crisis began from the Iran-Iraq war when armies of both countries started to destroy oil infrastructure. The worldwide reaction to this decline in production of oil was very painful. Many countries started to buy oil in fear of rising oil prices but high demand for oil triggered the rise in oil price. Oil supply is very inelastic because it is impossible to make production bigger in a short time. But at the same time demand for oil is also inelastic. As a result, there was 250% increase in oil prices in the world from \$14 to \$40 for the most expensive Libyan oil (nominal prices).

The year 1980 is the year connected with the oil consumption decrease. It happened because of high oil prices which had been due to the first and second oil shocks. The nominal price of oil was about \$35 per the Arabian light crude. In 1986, the price was about \$14. The main reason causing this price reducing was the active implementation of measures which had been identifying

as a useful tool how to be energy independent in a situation of the oil shock. In three years from 1979 to 1981 oil consumption in Europe, the USA and Japan fell by 13%.

For illustration purposes, we made the chart, which shows oil price changes from 1968 to 1985 (Figure 2).

Figure №2: Changes in oil price from 1969 to 1985



Source: U.S. Energy Information Administration, own representation

3.1.3 Era of oil corporations dictation of oil prices

Up to 50 - ies of the last century, the dominant players in the global oil industry have been 7 oil companies - British Petroleum (UK), Exxon (CSHA), Gulf Oil (USA), Mobil (US), Royal Dutch Shell (Netherlands / UK), Chevron (USA) and Texaco (USA) - also known as «7 Sisters».

The local capital of the country, on whose territory where enterprises were functioning, was not involved in the exploration, production, transportation, oil and other pererabotke manufacturing or sales operations and does not have a direct impact on the price of oil, but while competing vendors licenses and oil concessions, received income in the form of royalties and income tax.

In the 80ts, there was a complete restructuring of the oil market. Today's oil market is more flexible than one that was before. By the end of the 80ts, a new system of oil trade was created. All operations of the global oil trading are concentrated in 3 main centers:

- New York (NYMEX);
- London (IPE);
- Singapore (SIMEX).

The system is organized in such a way that if one stock market closes the other opens. And thus, the market is transformed from the «physical» trading market to the financial market.

The modern market also can prevent situations such as first or second oil shocks because it has a lot of special tools, which can insure against all prices risks. The share of transactions with the actual delivery of oil and petroleum products is 1-2% of the total number of transactions made on the stock market. The remaining 98-99 % represent exchange transactions with fictitious commodity (i.e. transactions for hedging).

So it is possible to say that current oil prices depend on the situation in the stock market and that the principles and pricing patterns are shut out off today from the physical amount of supply.

3.2 Analysis of the factors influencing the formation of oil prices

The dynamics of oil prices is affected by a number of factors, which can be divided into external (general economic, political, of meteorological) and internal (technology, the position of the leading stock market players, analysis of volatility - the price variability).

The most important factor in the short term influencing oil prices is a balance of supply and demand. Global oil supply is very inelastic because it is hard to respond fast to the fast changes in oil demand. And in this way, a possible change in oil supply is a very interesting indicator for economists all over the world which is closely monitored. All other factors, which impact oil prices, arise from this balance.

A lot of factors could have an impact on **oil supply**. It is primarily the development of modern technologies which can allow extracting oil faster and mainly less expensive. It can be reduction or increase of inventories.

Global **oil demand** primarily depends on the economic situation. Oil demand is also very inelastic in the short term. If there's an economic growth in any country, there is expansion in production. It means that this country will consume more oil and oil demand will increase. So the main requirement for high oil demand is economic prosperity in the world and mainly in countries which consume a big amount of oil.

Distribution of the main factors considered in this section influencing the growth or decline in oil prices, for clarity I presented in a table (Table 1).

Table №1: Factors influencing the formation of oil prices

Price reduction	Price growth
High supply, low demand	Low supply, high demand
Scientific and technical progress	Military conflicts
The discovery of alternative energy sources	Economic recession in oil consumers countries
Improvement of reserves	
The discovery of new oil fields	Reduced inventory
Warm winter	Cold winter
Tax increase	Tax cuts

Source: own representation

The other important factors, which should be considered, are the state and pace of development of the world economy, especially the rate of change of GDP; factor of scientific and technical progress (new technologies, materials, communication tools and so on. n.); state and the forecast for reliable and potential oil reserves, prices of alternative energy sources. Institutional changes are important in the oil sector, as well as changes in the oil law. Also, among the important factors should be noted the level of stocks in bunkers and storage, changes in exchange rates and others.

At the present time and in the foreseeable future, one of the key factors which are influencing the rise in oil prices is a GDP growth. As a result, the GDP growth will increase the demand for oil in developing countries and, above all, in the demographic giants (China and India), as well as in other emerging countries. The rate of growth in energy consumption in these countries even surpasses GDP growth. These countries are in the process of industrialization and the formation of a middle class that was the reason for the high demand for energy resources, mainly oil. In addition, into these developing countries with dynamic emerging markets, people rush investments. Experts indicate the factor of growth in energy demand in China and India as crucial importance in the tendency of rising oil prices.

The level of world oil prices has a significant impact on the global demand. High oil prices increase the competitiveness of alternative energy sources - mainly gas. This leads to the replacement of oil by other fuels (such as natural gas in the generation of electricity and thermal energy). The result is a relative decline in demand for oil.

Climatic conditions also have a significant impact on demand, above all, the relative air temperature during the heating season in the northern hemisphere. The lower the temperature is lowered during the heating period, the higher the demand for oil, we can observe. This occurs due to the increase in demand for heating oil products. Conversely, during warm winter, oil demand is relatively low.

Scientific and technical achievements reduce costs of production, transportation, and storage of oil and, therefore, help in reduction of prices for it. Outstanding innovations in oil production (horizontal and directional drilling, construction of new oil platforms, gimballed way to oil extraction on the shelf) contributed to a significant reduction in costs, which was the reason for the decline of prices and forecasts, generated a lot of "low prices."

The factor of oil depletion hanging over the oil price as a problem, bringing the growth of prices; at the same time, reports of new discoveries of oil-bearing areas are in the opposite direction.

However, the impact factor of depletion became less significant. The market response calmly to reports of the exhaustion of oil resources. Numerous publications on the study of peak oil are replaced by reports of new discoveries on land and a sea shelf, about the possibilities of increasing production by some OPEC member countries, the development of technologies for the extraction of so-called unconventional oil (tar sands in Canada, bituminous shales in the US), and also optimistic forecasts of the International Energy Agency. A number of oil resources are enough. Oil will long maintain its priority although the activists from the oil complex are worrying about the change of the resource priorities in the importing countries (alternative fuel), as well as the already mentioned "resource nationalism."

List and the importance of factors may change over time. First of all, we can note the weakening of the influence of the political factor. If the earlier message about the possible landing of US army forces in Iraq has caused significant panic on the oil markets, nowadays reports of the possible influence of the US invasion of Iran or other notable political events have no effect on the players in the oil market and prices. Some experts believe that the oil market is tired of politics. Others, however, believe that the players on the International Petroleum Exchange, oil traders - are very nervous. They are sensitive to news reports, whether the Turkish invasion of northern Iraq to fight Kurdish separatists, or group outings rebellious tribes in Nigeria and guerrillas in Venezuela, which resulted in the temporarily captured individual oilfields. Oil traders worried about reports of bunker reduction in US inventories, adverse weather conditions, and so on. And they insure risks due to the increase in prices. Especially painful they are waiting for significant political events. The latter does not contradict the previously marked trend of "market tiredness from politics."

Among the factors affecting the dynamics of oil prices, there is a growing influence of financial institutions such as hedge funds, banks, investment companies. These financial institutions actively bought shares of major oil companies and are interested in maintaining high prices.

At the third summit of OPEC in Riyadh in November 2007 noted that factors shaping the global oil market, are currently outside OPEC. The analysis of factors such as the lack of spare capacity in oil production, the reduction of world reserves, political events and natural disasters, financial factors, participants in the summit came to the conclusion that financial are major factors. Oil is no longer just a commodity, and it developed into an object of speculation on the financial markets.

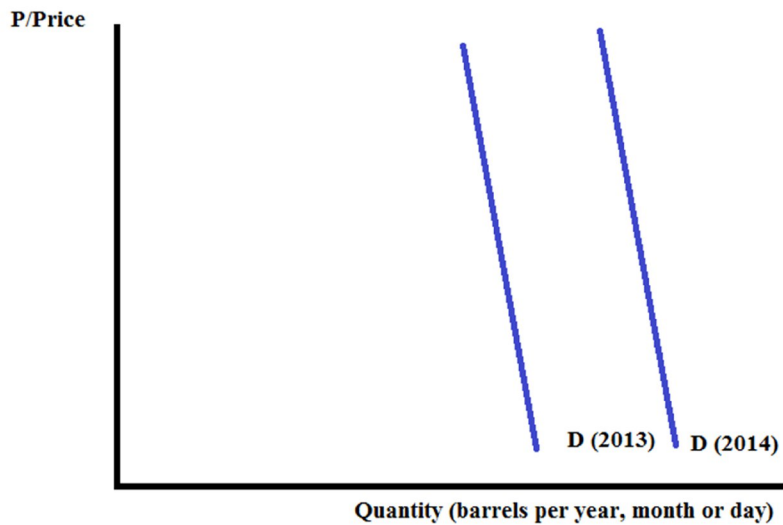
Particular attention should be paid to the relationship of oil prices with the prices of alternative energy sources. This is due to the fact that the world is constantly changing as the environmental, economic and others, and these changes affect the choice of an active power source. For example, it is interesting to note the fact that the advanced economies are moving to more environmentally friendly energy sources - hydro, solar and wind energy, nuclear power plants, while the developing countries because of rapid growth in production, on the contrary, all increase the consumption of oil and coal (and more affordable energy development).

3.3 Factors of formation of world oil demand

The world oil demand is also almost inelastic. Demand for oil is highly dependents on the economic situation in countries which consume a lot of crude oil. The biggest oil consumers according to CIA World Factbook information are:

1. United States (19 030 000 barrels per day);
2. European Union (12 530 000 barrels per day);
3. China (10 480 000 barrels per day);
4. Japan (4 297 000 barrels per day);
5. India (3 360 000 barrels per day);
6. Brazil (3 003 000 barrels per day);
7. Saudi Arabia (2 964 000 barrels per day);
8. Russia (2 800 000 barrels per day).

Figure №3: Almost inelastic demand for oil



Source: own representation

The main factor influencing the global demand for oil is global economic growth. This factor in recent decades has led to a steady rise in global oil demand. Thus, in the period of 1991-2005., that is the last 15 years, global GDP growth of 1% was accompanied by an increase in world oil consumption by an average of 0.37%. The slowdown of the world economy invariably leads to the fall world oil prices. Thus, when the rate of global GDP growth of less than 3% per year (this situation occurred in 1991, 1993, 1998 and 2001). World oil prices fell steadily, and their annual decline exceeded 10%.

The leading role in the world oil demand is played by industry developed countries. In 2005, OECD countries accounted for 59.2% of world oil consumption.

If we would like to divide the whole demand by Regions, there will be three dominant centers of the world oil consumption: North America, primarily the United States, Western Europe and the Asia-Pacific region, especially China and Japan. The leading role in shaping the global demand for oil plays North America, which accounts for 29.5% of world oil consumption. At the same time, 24.6% of world consumption accounted for the United States.

In Europe (excluding countries of the former Soviet Union) accounted for 20.2% of world consumption, including 18.3% - by the EU. Among EU countries, the main part of oil consumption (90%) are in the 15 countries that were part of the organization prior to the accession of 10 new members in 2004, and the five largest EU countries (Germany, France, Britain, Italy and Spain) account more than 2/3 of the EU oil consumption.

The third major center of world consumption are countries in the Asia Pacific region. Major Asian oil consumer is China, which accounts for 8.9% of world consumption (including Hong Kong). The development of China's economy is characterized by extremely rapid growth in demand for oil. As a result, in recent years, China has moved into first place in the region for the consumption of oil. Major customers are also Japan (6.4% of world consumption) and South Korea (2.7%).

In the leading industrialized countries - the US, EU and Japan - account for 49.3% of world oil consumption. At the same time, an increasing role in shaping the world oil demand are beginning to play the Asian countries, non-OECD countries, especially China. As the analysis of the dynamics of world oil consumption, these countries in recent years have provided most of the increase in world consumption. In general, the growth of oil consumption in the Asia-Pacific region in 2001-2005. That is in the past five years amounted to 45% of the increase in world consumption, with 33% growth in global consumption has provided China.

Analysis of the dynamics and structure of consumption of petroleum products in OECD countries in recent decades shows that the most rapidly growing consumption of petroleum products by automobile and air transport, as well as the chemical and petrochemical industry. As a result, the consumption of petroleum products in transport in OECD countries increased from 747.1 million tons in 1980 to 1.1524 billion tons in 2002, or 54.2%, while the share of transport in total consumption rose from 39.0 to 54.0% (including road transport - from 31.7 to 45.3%). Consumption of petroleum chemical and petrochemical industry, where it is mainly used as raw materials in 2002 reached 11.1% of total consumption. Also increased the consumption of petroleum products in the construction and agriculture.

At the same time, both in absolute and in relative terms, significantly reduced consumption of petroleum products to transform into other types of energy - the production of electricity and heat at power plants and autonomous generators. Also, reduce the consumption of petroleum products in the industry, railway transport, residential and service sectors.

Significant impact on the global demand for oil has an energy intensity of the world economy, ie energy consumption per unit of GDP. The energy intensity of the economy depends on the structure and level of energy efficiency. A growing share of non-energy intensive sectors, and improving the efficiency of energy-consuming technologies lead to a reduction in energy intensity of the economy. As the economy declines as its oil capacity, ie oil consumption per unit of GDP. For example, calculations show that for the period 1990-2002. oil intensity of world GDP decreased from 0.73 to 0.60 bbl. / thousand. (US. 2000).

Oil consumption per capita is determined by the level of economic development, the structure of its economy, the standard of living, as well as the presence of its own oil resources. In developed countries, the level of per capita consumption of oil is much higher than in transition and emerging economies. In countries with developed market economies, per capita oil consumption in 2002 averaged 16.6 bbl. / Person., In the emerging economies - only 2.1 barrels. / Person., Or 13% level of developed countries.

The highest level of per capita consumption of oil in the world is in the United States (24.9 per barrel. / Pers. In 2002). Canada has considerable resources of its own oil, also has a very high level of per capita consumption (24.7 bbl. / Pers.). Per capita consumption of oil in Russia currently stands at 40% of the average level of developed countries and 27% of the US level. In China, per capita consumption of oil is increasing rapidly, but remains at a low level (9% of the average level of developed countries).

Significant impact on the global demand has the level of world oil prices. High oil prices restrain consumption and increase competitiveness in relation to other types of fuel oil, especially gas, leading to the replacement of oil by other fuels (such as natural gas in the generation of electricity and thermal energy). The result is a relative decline in demand for oil. Low oil prices have the opposite effect.

A significant influence on the demand for climatic (weather) conditions, primarily in relation to the air temperature during the heating season in the northern hemisphere. Lower temperatures during the heating period in comparison with the long-term average leads to a relative increase in world oil demand (due to the increase in demand for oil products for heating). The warm winter, on the contrary, the demand for oil is relatively lower.

An integral component of global oil demand is industrial oil (oil in storage) necessary to ensure the proper functioning of the system implementation and refining. The high level of inventory data (usually with respect to the range of variation of this indicator over the previous five years) indicates a weakening of global demand for oil is a factor acting towards stabilization or decline in world prices. Reduced inventory levels, on the contrary, demonstrates the high demand for oil (or relatively inadequate supply), and is an indicator of unmet demand (at least in this segment of the market) and the possible positive dynamics of world oil prices.

Part of the oil produced is concentrated in the special reserve major industrialized countries, designed to ensure the stability of oil supply (and thus global oil prices) in the event of unforeseen sharp decline in data supply (for example, as a result of military operations in regions of oil or restriction oil supplies by - exporters for political reasons). In connection with this decision, oil-

exporting countries on the replenishment of the reserves data (primarily the US Strategic Petroleum Reserve) on the increase of the world demand for oil and can have a positive impact on the dynamics of world prices. At the same time, the implementation by States in times of crisis of the oil reserves on the market can increase the supply and reduce the world price.

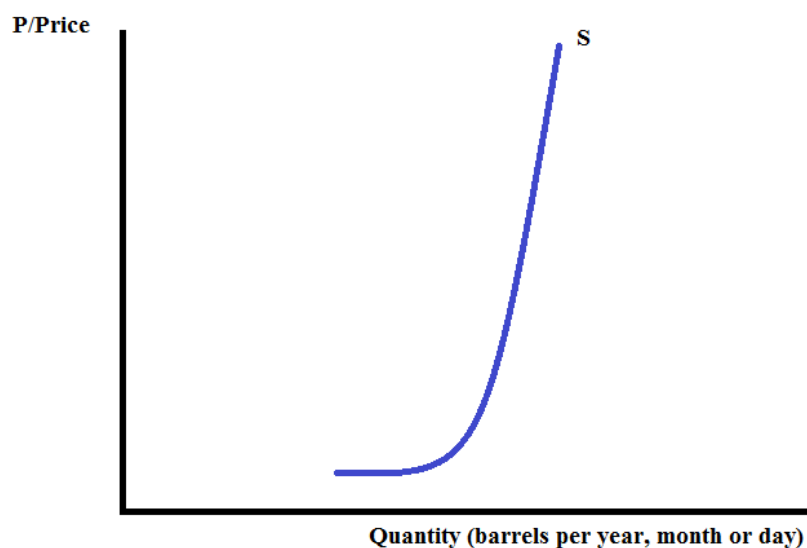
Certain influence on the demand and providing state tax policy, in particular, the total level of taxes on petroleum products. The high level of tax increases the price of refined products, ie acts on demand as well as high oil prices. In some Western European countries the share of taxes, for example, the price of gasoline up to 70-75%. In Japan, there are 9 of taxes on car owners that are imposed on the acquisition, ownership and operation of vehicles. These taxes are aimed to reduce oil imports and ensure public spending on infrastructure projects, such as support and construction of roads.

Demand can also be affected by various factors of a random character. For example, the possibility of military action in the critical areas of oil production can lead to excessive demand for oil to replenish its commercial reserves, which can be used in case of reduction of oil supplies.

3.4 Factors of formation of the world's oil supply

Supply of oil is a very inelastic indicator because oil is limited production factor and it is hard to find new deposits of oil. It is impossible to produce oil; we can only pump it from the deposit. The curve of supply is represented in figure 4.

Figure №4: Almost inelastic oil supply



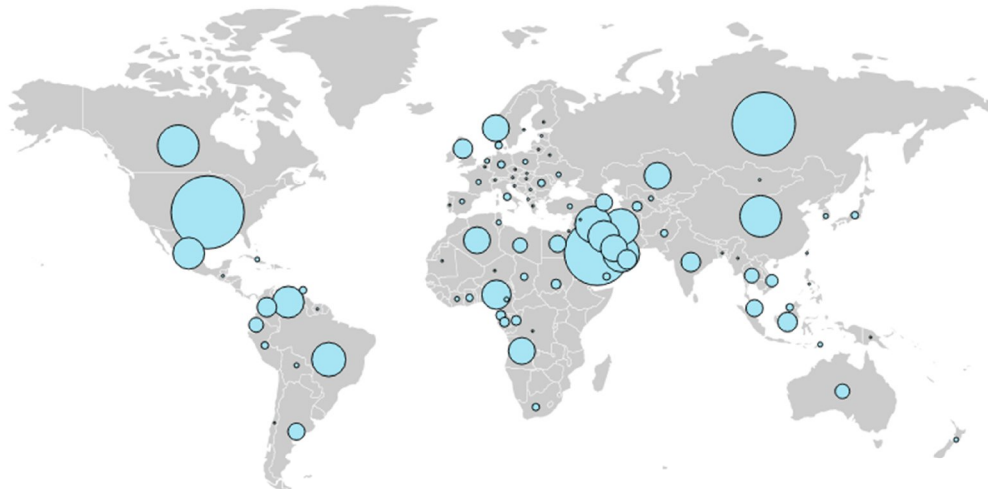
Source: own representation

The biggest suppliers of oil in 2014 according to U.S. Energy Information Administration:

1. United States (14 021 000 barrels per day);
2. Saudi Arabia (11 624 000 barrels per day);
3. Russia (10 847 000 barrels per day);
4. China (4 598 000 barrels per day);
5. Canada (4 383 000 barrels per day);
6. United Arab Emirates (3 474 000 barrels per day);
7. Iran (3 377 000 barrels per day);
8. Iraq (3 364 000 barrels per day).

Figure №5: Total Petroleum and Other Liquids Production 2014

Total Petroleum and Other Liquids Production 2014



Source: U.S. Energy Information Administration.

Supply of oil in the world market depends on the demand for petroleum products and, accordingly, the factors that shape the demand. At the same time, the volume of supply (production) of oil affect geological and technological factors reflecting the size and geological characteristics of developed and explored deposits, the state policy of oil producing countries in the oil sector, especially the policy of countries - members of OPEC, the level of world oil prices, as well as a number of factors of a random nature, such as military operations in the oil producing regions, storms, strikes, international sanctions, and others.

Geological and technological factors reflect the state of quantitative and qualitative characteristics of available geological reserves of oil and the existing technological possibilities of

their extraction (mining). Proved reserves are considered to be geological, which can be extracted with the technology available in the present economic conditions. Technological progress is changing the boundaries of the objective of geological constraints since it leads to the expansion of the technological possibilities of recovering the reserves. So, through the use of new technologies not previously used in the global oil industry, it has been mastered the major oil fields of the North Sea.

The amount of proved world oil reserves is 163.6 billion tons and generally, allow for both current and prospective global oil demand (supply of current world oil proven reserves currently stands at 40.6 years). At the same time, the geographical distribution of oil reserves is extremely uneven. Countries - OPEC countries control three-quarters (75.2% in 2005), the world's proven oil reserves. Over 60% of the world's proven oil reserves (61.9% in 2005) is concentrated in the Middle East (Gulf region). At the same time 22% of world oil reserves accounted for Saudi Arabia (see Table. 1.2.1). OECD countries account for only 6.7% of world oil reserves. In Russia, according to foreign reports, the proven oil reserves amount to 10.2 billion tons, accounting for 60.7% of oil reserves of the former Soviet Union and 6.2% of world reserves.

Availability of the current proven reserves of oil production in Russia is 21 years old. This indicator is significantly the inferior performance of leading countries of OPEC (for example, in Saudi Arabia of coverage up to 66 years in Kuwait - 105 years). However, compared to other oil-producing industrialized countries the Russian level of security stocks of oil is high enough (tab. 1.2.2). In principle, Russia's level of coverage can be regarded as normal for a market economy. For example, in the United States over the past few decades of coverage is maintained at 10-11 years. In Canada, the figure now stands at 15 years in Norway and the UK - 6-9 years.

The important thing from the point of view of the possibilities of supply (production) of oil a qualitative heterogeneity of the world's oil reserves to warrant significant differences in the unit cost of oil production. For example, the extremely low cost of oil production in most OPEC countries, primarily in the Gulf region, and very high - in the United States and Western Europe (North Sea). Accordingly, the possibility of expanding the supply (production) of oil in the different regions is extremely uneven. For example, the low level of world oil prices, the possibility of expanding oil production in high-cost regions of sharply reduced.

World oil production follows a growing demand in recent years is growing steadily. The decline of world oil production took place only in 1999 as a result of the actions of OPEC to reduce oil production and reduce investments in the sector in other regions in the fall in world oil prices in 1998 Regional structure of oil production is characterized by the data given in Table. 1.2.3. Currently, 41.7% of world oil production falls on OPEC countries, primarily in the countries of the

Middle East. OECD countries account for 23.8% of world oil production. The world's largest oil producers are Saudi Arabia, Russia, and the United States. In 2005, they accounted for 13.5, 12.1 and 8.0% of world oil production.

As the analysis of the dynamics of world oil production, leading role in the increase in world production in recent years, it belongs to the countries of the former USSR, especially Russia. They provided a significant increase in oil production in the region of Europe and Eurasia in 2001-2005. Suffice it to a significant increase in production has been achieved in Africa and the Middle East, a slight increase has taken place in South America. In other regions, there was a decline in oil production, due mainly to the natural and geological factors. In general, OECD countries in recent years there has been a steady decline in oil production.

The largest increase in oil production in 2001-2005. was observed in Russia, where during last 5 years, oil production increased by 45%. As a result, Russia's share in global oil production rose from 8.9% in 2000 to 12.1% in 2005. The significant increase in oil production in recent years has also been seen in Saudi Arabia, Canada, China, and Mexico. In the United States, Norway and the United Kingdom oil production declined.

It is important to note that most of the oil produced by OPEC countries is exported (for example, Saudi Arabia exports more than 85% of its oil), whereas, in other countries such as the United States, the oil produced either entirely or predominantly supplied to the domestic market. Therefore, the share of OPEC in the world oil market, that is in the world oil exports, is significantly higher than their share of world production. Currently, the share of OPEC in world oil exports more than 50%, which allows a certain way of OPEC to influence the formation of world prices for oil. Data on the structure of the world's oil exports are presented in Table. 1.2.8. As can be seen from the above data, the leading role in the supply of oil to the world market played the Middle Eastern countries, which account for 46% of world oil exports. Russian oil deliveries to countries outside the former Soviet Union account for about 11.5% of world oil exports.

Significant impact on the volume of oil production has a state policy of oil producing countries in relation to the oil and gas sector, in particular, the policy adjustment in production, licensing policy, tax policy, policy on access to environmentally sensitive areas, prospective for oil and gas.

OPEC, oil production in which the state-owned companies, the state directly determine the current output of oil companies in their countries on the basis of agreed upon at international level quotas. State policy, in this case, is actually the main factor determining the current level of oil production in the country and oil supplies to the world market.

OPEC countries, which now account for 42% of world oil production, 51% of the world's oil exports and 75% of the world's proven oil reserves, are able to exercise significant influence over the world oil market. OPEC regulates oil production volumes countries - members of the organization in order to maintain the desired level of world oil prices. As a result, in recent decades, it changed significantly as the volume of oil production by OPEC countries and their share of world oil production.

Almost 70% of total oil production by OPEC countries account for the Gulf region. The leading role among them is played by Saudi Arabia (32.4% of the total production of OPEC countries in 2005) and Iran (12.3%). On Iraq, OPEC quotas in recent years did not apply. Oil production in the country for a long time limited to international sanctions, and in recent years has been destabilized by military operations and carried out within the existing production capacity. A significant role played by Venezuela in OPEC, engaged in the supply of oil to the United States.

Practice shows that in recent years, at certain periods of the OPEC countries agreed on the limited amount of oil production countries - members of the organization have been effective enough. After the price crisis of 1998, OPEC moved to a strategy of maintaining world oil prices within the boundaries of the target price range of 22-28 dollars. / Bbl. for the price of oil basket OPEK1. At the same time in order to ensure a timely response to changing market conditions, OPEC conferences have been held frequently (4-5 times per year). OPEC's actions have allowed not only to overcome the price crisis of 1998 but for quite a long time to maintain world oil prices within the boundaries set price range.

In some periods, OPEC maintained other countries - oil producers, also take on certain obligations to restrict the production and supply of oil to the world market. So, after a significant drop in world oil prices in the IV quarter of 2001, OPEC action to reduce production volumes were supported by Mexico, Norway, Russia, Oman and Angola. Measures to limit production (export) oil made by OPEC and independent producers from 1 January 2002 led to a significant increase in world oil prices by the end of I quarter of 2002.

Establishing a target range of world prices for oil is OPEC countries, taking into account a number of important factors. On the one hand, these prices were supposed to ensure the maintenance of income-producing countries to the desired level. On the other hand, these prices were not to lead to a significant increase in oil production in high-cost regions (ie, countries that are not OPEC) to increase the competitiveness of other (substitute) fuels, especially gas; supported by oil prices should not have to restrain demand and economic growth that is needed to be acceptable to consumers.

A very serious impact on oil production has stated tax policy. In order to attract investment and expand production of oil states improve their tax systems with regard to the oil sector, providing favorable conditions for investments and the competitiveness of the national tax regimes internationally. For example, in the UK since 1993, it was abolished special tax on oil revenues for new fields introduced into developing and producing fields for this tax was reduced from 75 to 50%. It is possible to ensure the growth of investments and an increase in oil production in the oil fields of the North Sea. At the same time, unlike the United States, environmental considerations seriously hindered exploration in new areas.

State policy of the oil-producing countries in the oil sector in many cases, pursuing not only the current economic, but also a variety of long-term and non-economic objectives, such as achieving the desired level of national security, self-sufficiency in energy resources and the minimization of oil imports, providing security of supply, to minimize negative environmental impacts.

On the supply of oil is also influenced by many other factors, first of all, the level of world oil prices, the behavior of the oil companies, technological factors (appearance and use of new technologies in oil production), as well as a number of factors of a random nature, including military operations in regions of oil production.

In countries in the oil sector of the economy dominated by private oil companies, current oil production is determined solely by the decisions of the producers themselves operating in a specific geotechnical and economic constraints. One of the important factors determining the level of supply of oil is priced. Prices affect production decisions by companies. The level of oil prices affects the amount of income derived by an enterprise and, accordingly, financial investment opportunities. Lower prices lead to a decrease in the size of the investment because of low profitability is expected of them, and also because of budgetary constraints. At the same time, lower prices may encourage measures to reduce production costs and improve technology, resulting in investment opportunities and, consequently, oil production could increase. An important role in investment decisions plays geological conditions, tax system, political factors.

At the level of supply of oil is also influenced by various factors of a random nature, such as military operations in oil producing regions, storms, accidents, suddenly arising technical problems, strikes, political unrest, guerrilla activity, international sanctions, adverse weather conditions. Some of these factors occur infrequently (eg, reduction in supply as a result of hostilities in the region of oil production), but their impact on world oil prices can be extremely strong (for example, just such a situation occurred in 1990 after the invasion of Iraq in Kuwait).

Military operations in the regions of oil production can have both short- and long-term effects (eg, falling oil production in the region as a result of the destruction of oil infrastructure and long-term restriction of the UN oil exports by Iraq after its invasion of Kuwait).

3.5 Speculative component in oil price

In addition to the fundamental factors that determine the price of oil on the world market, there are other components, wearing casual or speculative. Factors bearing random, include natural and man-made disasters as well as political and international sanctions and military action in the mining regions. Some of these factors can occur only in rare, but their impact on world oil prices could be significant.

In recent years, a shift path of international trade flows of energy due to geopolitical factors. Political unrest in several Arab countries in 2011-2012. led to a threefold drop in national oil production in Libya and significant problems in the oil fields of Syria and Egypt. The situation in the region has also been exacerbated by the threat of closing the Strait of Hormuz, through which 35-40% of the international oil trade flows. From the Western energy geopolitics implemented in a rather rigid forms: for example, the United States, trying to make Iran one of the main producers of oil, to abandon programs for the development of nuclear power in late 2011 introduced an embargo on imports of Iranian oil, which in July 2012 . also joined the European Union and a number of companies from South Korea, Japan and India. Under US pressure, the leading insurance company «Lloyds Register» also stopped issuing conclusions on compliance with safety and environmental standards tankers and containership Iran. The ban Iranian oil purchases favored by other countries, especially Saudi Arabia, Kuwait, UAE, and Iraq, quickly mastered the market suddenly opened the empty field.

With the development of the paper oil market, some impact on the formation of oil prices are the actions of participants in the exchange market, often wearing a speculative nature. Until the mid-2000s. the main participants in this market are hedgers - players physical oil market, minimizing the risks of its physical operations through financial instruments. Players adhering to these policies are not only the oil companies but also many other organizations whose activities are dependent on fuel prices. Since the second half of the last decade, the palm turned to the players that are not directly related to the oil business - banks, pension and insurance funds - investors consider oil as an object of investments that can bring high returns. This lack of oil as an asset for long-term investments, as a strong exposure to the price impact of seasonal factors, natural and political disasters, turns into a positive characteristic for the bull market's fears and expectations. On the growth of the number of speculators is evidenced by the fact that, despite an increase in open

positions, the execution of contracts for the supply of oil is at the lowest level: the oil futures market participants close their positions before the execution of contracts, allowing them to avoid complex procedures associated physical delivery. Thus, execution of contracts on the oil futures market held by the financial settlement.

Due to the development of derivatives trading oil contracts was pouring large amounts of capital to the oil market, which has evolved from classic futures in a variety of financial market and gained high volatility inherent in the monetary and financial markets. Exchange method of oil pricing has meant that the price of oil began to determine its value as a financial asset and has become closely correlated with such factors as stocks, in particular, S & P 500, Dow Jones Index, dollar exchange rate and inflation expectations.

The appreciation of the US currency led to the growth of its purchasing power, and, consequently, to a decrease in prices expressed in dollars, and rising oil prices lead to dollar inflation and a decrease in its rate. Oil futures are instruments of protection from dollar inflation. When the real and the expected high level of dollar inflation is a growing demand for oil futures, leading to an increase in crude oil prices

Thus, the dynamics of world oil prices is largely determined by the balance of power flow of free capital of the world financial system on the oil futures market, became part of the financial market. These processes are not natural, and coordinated financial corporations and US government agencies and the EU conducting an active policy of monetary stimulus in order to overcome the debt crisis and support the global economy.

A significant outflow of speculative capital might be possible as a result of stricter regulation of financial markets in order to overcome the crisis of the world economy. In particular, one of the measures is to establish limits for speculative commodity futures contracts and swaps, such derivative financial instruments. However, in September 2012 after negotiations with OPEC, the International Energy Agency (Eng. International Energy Agency, IEA) and a number of corporations, the International Organization of Securities Commissions (Eng. International Organisation of Securities Commissions, IOSCO) rejected the reform in the field of price regulation of swap transactions. Its representatives said that increased regulation could be counter-productive and affect the representativeness of the prices.

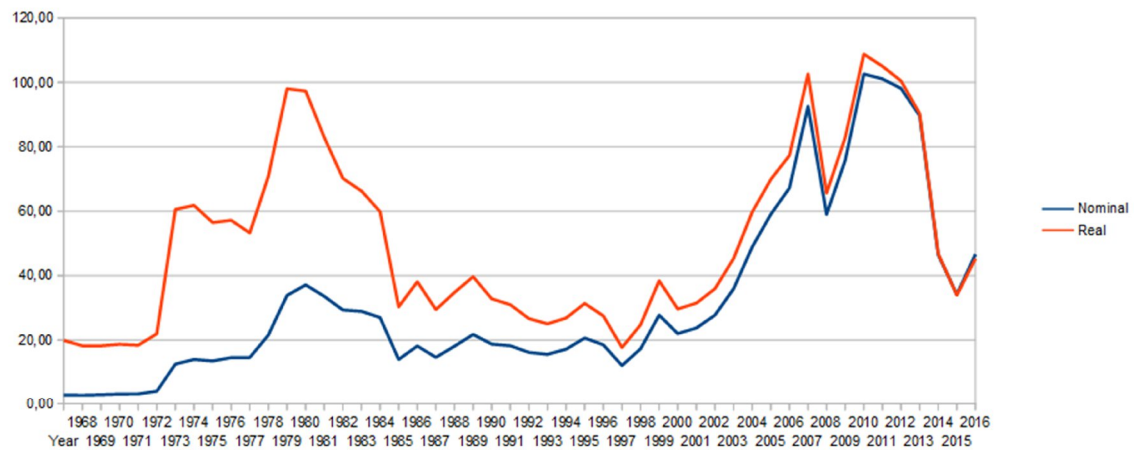
4 Practical part

4.1 Influencing factors and dynamics of oil prices

There is a lot of influencing factors for the oil prices, which about we have already talked about higher. Now we would like to see how these factors work in a practice. The best mean how to see it is the creation of the graph, which will present **oil** dynamic of oil prices development for the interested time period.

For illustration purposes, we made the chart which shows oil price development from 1968 to 2014 (Figure 6).

Figure №6: Development of oil prices from 1968 to 2014 (forecast for 2015-2016)



Source: U.S. Energy Information Administration, own representation

4.1.1 Military conflicts and political events

Military conflicts are the main reasons for the first oil shock and one of the reasons of the second oil shock. It's clear how oil price changed in 1973 when the first oil shock had happened due to the embargo of Arabian countries. Nominal oil price increased from \$3 per barrel to \$12 because of the absence of oil on the global market. Real export reducing was about 7-8% but the prices quadrupled because of panic. At that exact time, the Soviet Union rapidly increased own export of crude oil and gained market share.

The second oil shock happened in 1978 when 5% of oil production caused an increase in prices of oil from \$14,57 per barrel in 1978 to \$37,10 in 1981.

Another important war which affected the oil price was a Gulf War in Iraq. But the effects of this war didn't have a long-term process because the global community had already done conclusions from previous oil shocks. The system of oil trade on a stock market had already and it helped to adapt to the new political and economic situation due to special tools of stock market regulation.

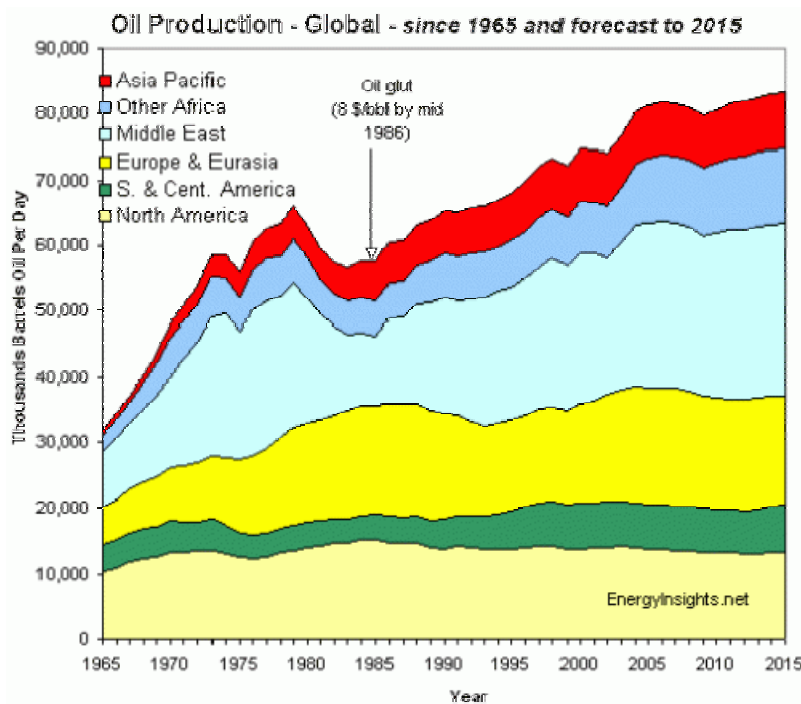
4.1.2 Supply and demand change

A good example of how the supply of crude oil influenced on oil price happened in the 80s of the 20th century. This time is called as «the 1980s oil glut». The oil price fell in 1986 from \$27 per barrel to \$10 caused by falling demand for crude oil. It occurred because of oil shocks which had happened in the 1970s. Demand was declined because of reduction of general oil dependence in many countries. The use of gas as an alternative source of energy was widespread. Some countries such as Japan, France, and others invested money in nuclear sources. Even OPEC production cuts didn't help to recover crude oil prices because other countries were increasing the oil production. The leaders were the USSR and the USA who were not among OPEC members and didn't have to reduce production of oil. And there was the next oil prices decrease. In 1985, Saudi Arabia tried to increase oil production because they understood that their market share could be occupied. But the next reaction of other OPEC members was not good for this step.

Modern price decrease is also caused by the overproduction. Many exporters countries such as Russia, Saudi Arabia, the UAE increased the crude oil production and it did not have a good influence on the oil prices which fell from \$102 per barrel in 2011 to \$30 in 2016 and there was not seen the end of this falling.

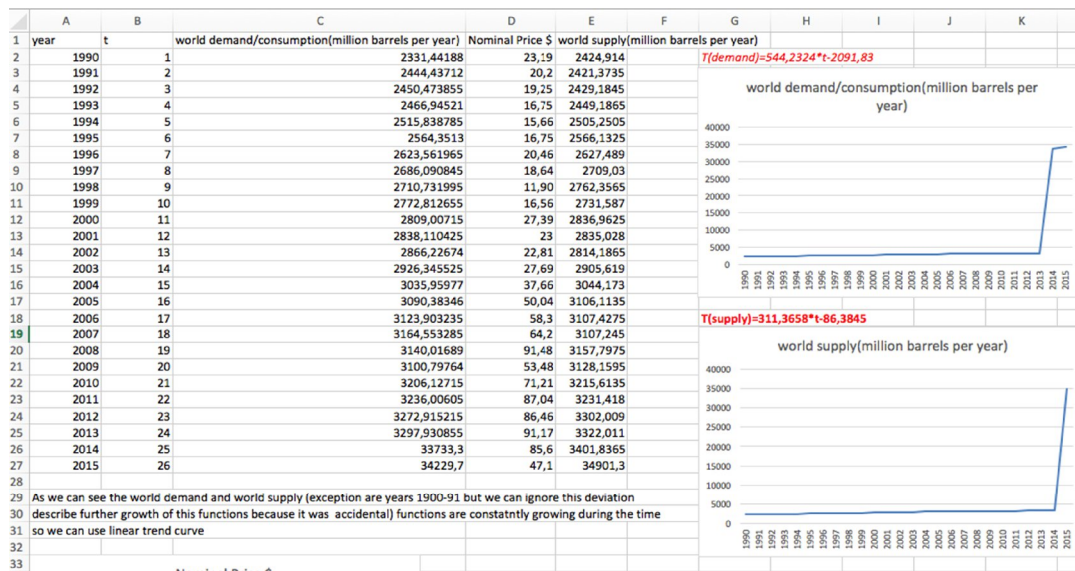
But on the other hand, if we will pay attention to the latest production and consumption trends we can notice that in the last 2-3 years both supply and demand have increased dramatically.

Figure 7: Oil production since 1965 to 2015



Sources : <http://www.financialsense.com/contributors/james-quinn/2011/09/06/%252Fwhere-is-our-oil-price-collapse>

Figure №8: Production and consumption trends



Source: own representation

In my opinion, in the future (not earlier than 2016 though) we can expect raise of crude oil price. Also, these models show how significant is the influence of time (t factor) on demand and supply.

4.1.3 The discovery of alternative energy sources

Every price is always impacted by the positive or negative news. Nowadays this factor has a fundamental impact on the oil prices. It is speculated about the depletion of oil reserves for many years, but it is still there.

Constantly new information about recently opened oil fields comes, so the total amount of oil is growing but the quality of the opened oil is decreasing and there are some problems with the using of new oil fields because they are often located on the continental shelf or in the northern regions and countries. In some countries, the production of shale oil is developed. It is relatively expensive to develop these methods and oil fields. There are high logistic costs and expensive machines. In the case of shale oil, it adds the ecological problems.

It is possible to say that oil price is reducing at the moment due to extensive use of shale technologies. A lot of companies started to use it in recent years, so the total amount of the oil production is growing. But now the situation has changed because expensive oil fields suspend their job because of low oil price which does not cover total costs.

4.1.4 PEST (STEP) analysis of global oil market

Table №2: Pest analysis

Political factors	Economics factors
<ul style="list-style-type: none"> - Geo-strategic confrontation between China and the United States; - The difference in the behavior strategies of countries in the oil market; - Political instability, most resource-rich countries lays a time bomb under the foundation of the global energy market, but at the same time creates some opportunities for Russian expansion; - Expansion of the global giants leads to increased competition; - The potential for conflict inherent in the distribution of petroleum resources on the planet; - Strengthening of political instability in the regions most rich in hydrocarbons; - Environmental problems related to the oil spill (the latest tragedy occurred in the Gulf of Mexico and brought losses of billions of dollars). 	<ul style="list-style-type: none"> - Rise in oil prices; - Large multinational corporations seeking to expand its resource base, and state-owned companies that have the basic resources, doing their best to develop processing, and trying to get a stake in the transport and marketing structures; - The main consumers - the highly developed countries and rising emerging giants, while the world's hydrocarbon reserves are concentrated mainly in the territories of a relatively small group of developing countries and countries with economies in transition; - For the main types of costs in the oil, sector includes the construction and maintenance of pipelines.
Social factors	Technological factors
<ul style="list-style-type: none"> - In the context of the ongoing economic growth of Asian countries, rapid population growth and extremely high-energy intensity of national economies increased sharply their energy needs. At the same time, there is a widening gap between the growing consumption and declining hydrocarbon production. 	<ul style="list-style-type: none"> - Limited opportunities for additional growth in production, due to outdated technology in many oil-producing industries, multiply the risks of possible market disruptions; - At the moment in this industry, there are changes associated with the development and adaptation of new technologies for extraction and processing of oil.

Source: own representation

The situation in the global energy sector is characterized by the intensification of the contradictions that persist for the entire forecast period. The primary cause of geopolitical tension is a potential for conflict inherent in the distribution of petroleum resources on the planet. The main consumers - the highly developed countries and rising emerging giants, while the world's hydrocarbon reserves are concentrated mainly in the territories of a relatively small group of developing countries and countries with economies in transition. It is this contradiction in the first scenario and determines the development of the situation on the market and the behavior of the key players.

4.1.5 SWOT analysis World oil market

Table №3: SWOT analysis

	Helpful	Harmful
	Opportunities	Threats
External origin	1. The main consumers of oil in the world are the industrialized countries; 2. The global oil market in the XXI century. It has evolved from a market previously predominantly 'physical' (trade cash oil) into the market primarily "financial" (trade oil contracts); 3. The exchange trade in oil, along with strong development of computerization, telecommunications and information technologies have provided the globalization of the world oil market; 4. New technologies in oil production and refining.	1. The economic crisis of 2008-2010. 2. Serious and effective control over the huge mining assets of the world oil industry by OPEC 3. The main competition is deployed in the global oil market between the state (national) and international (private) oil companies.
	Strengths	Weakness
Internal origin	1. High-quality oil on the world market; 2. High-sale; 3. The leadership of oil in the energy and fuel industry; 4. The high demand for oil; 5. A wide range of petroleum products; 6. Well-established distribution channels of oil on the world market.	1. The depletion of oil reserves; 2. Price volatility in the world market; 3. The high production costs; 4. The limited capacity of oil production.

Source: own representation

Conclusions:

Taking into account the current situation on the world oil market the most basic and the main problem is the depletion of stocks. To solve this problem I would like to offer the following ways to solve this problem:

- The use of technologies to improve the efficiency of oil production;
- The extension of the service life of depleted oil fields;
- Recovery of idle fund of oil wells;
- To find replacement products.

4.2 Prospects for oil prices

It is very difficult to forecast future oil price. At the present time, crude oil price decreases. The price decreased from \$101 per barrel in 2012 to \$46 in 2015. According to U.S. Energy Information Administration, crude oil prices will continue to fall until 2016. Forecasted average price will be about \$34 per barrel. We agree with this forecast because there is a big market imbalance between crude oil supply and demand for crude oil.

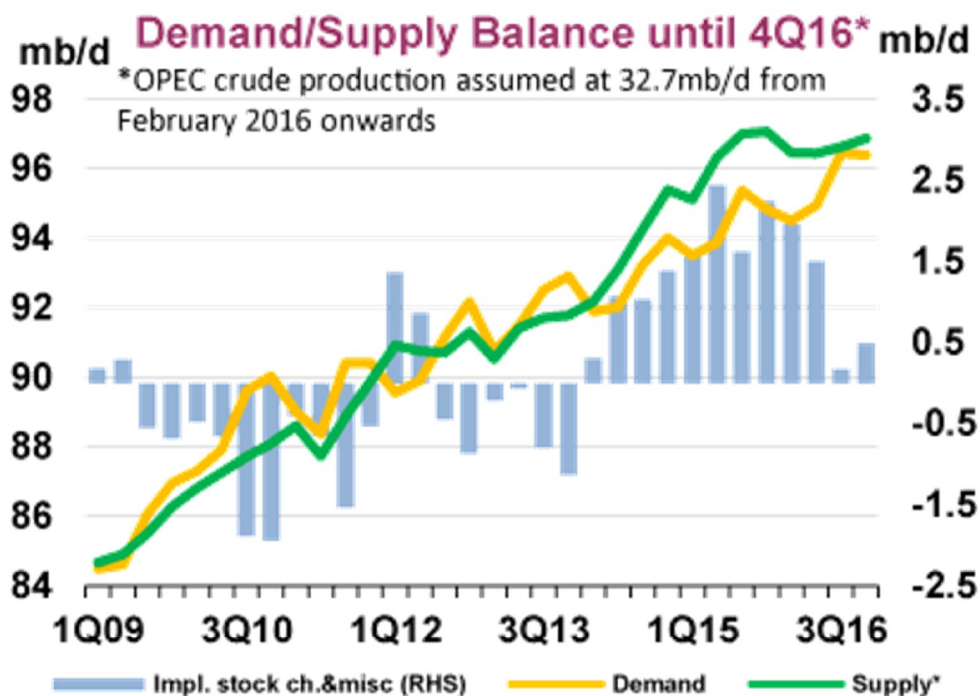
It is very difficult to forecast future oil price because there are many factors influencing the prices. But firstly we need to say about high oil prices. There was a gradual increase in oil prices from \$22 per barrel in 2001 to \$102 in 2011. This increase was motivated by powerful reasons such as:

- Iraq war and other military conflicts in core countries (Libya);
- The United States and EU sanctions against Iranian petroleum industry. Other countries such as Japan and South Korea started to reduce their import from Iran. South Korea and Japan in 2012 consumed 26% of Iranian export;
- The increase in consumption in developing countries such as China, India and other.

High oil prices allowed to producing shale oil in the US despite high costs. In Canada companies reopened to use oil sands. Production of oil from this sands is also very expensive method. Canada's oil sands are thought to be the most expensive source of crude oil in the world.

At the present time, crude oil price decreases. The price decreased from \$101 per barrel in 2012 to \$46 in 2015. According to U.S. Energy Information Administration, crude oil prices will continue to fall until 2016. Forecasted average price will be about \$34 per barrel and the increase will start in 2017 when the oil price will be \$46. We agree with this forecast because there is a big market imbalance between crude oil supply and demand for crude oil. The main reason of market imbalance is a high supply and low demand for oil.

Figure №9: Demand/Supply Balance until 4Q16



Source: U.S. Energy Information Administration. Short-term energy outlook

As we see, there is a big excess of supply over demand on the global oil market. Also, we can see big oil reserves in 2014-2016. In September 2014, some parts of reserves were disengaged and oil price falls.

The high supply of oil market on the global market is caused by several reasons:

- High productivity of oil production due to using of new technologies;
- Shale oil production increase, «shale boom». For example, the United States increased their crude oil production from the year 2008 by 4 million barrels per day due to a technology called as «horizontal drilling. The biggest shale oil fields in the United States are in the North Dakota;
- Market repartition between big players such as Saudi Arabia, Russia, Iran, Venezuela and others. Saudi Arabia as a main member of OPEC is afraid to reduce oil production because this market share can be captured by other OPEC members or by non-OPEC countries such as Russia.

Also, there is low demand for oil in the world. China which is one of the main importers of crude oil has economic problems. The economy of China slows down and it doesn't need too much oil as before. The next important crude oil consumer is Germany which also has reducing demand for oil.

We suppose that oil price will stabilize at \$50, if there will be same production and consumption will be mildly decreased. We have already known that there are factors influencing oil supply and demand. For example, there is a risk of new conflict in Iraq or Libya and as a result, there will be production decrease. Also, the economy of China can recover and increase oil consumption, so the demand for oil will be higher. The next probable factor is an agreement between OPEC members which can limit oil production caused them to increase prices.

After mentioning all these factors there is only one thing left for me to analyze and it is the level of influence on a crude oil price of such factors as supply, demand and exchange rate. In order to assess this influence, I used Correlation and Regression models based on which I can estimate the influence of this factors on crude oil price.

First one is a regression model that provides us with information about price formation and the role of exchange rate and world demand in this process. As we can (in the red square) the influence of exchange rate and world demand is rather significant – 30,5% of Nominal price variability can be explained with changings in the exchange rate and world supply. If we will take into consideration that there are a lot of other factors that influence on price, this number, 30%, is rather high.

Figure №10: Regression analysis in Excel

MODEL WITHOUT "WORLD SUPPLY"								
Summary Output								
<i>Regresni statistika</i>								
Multiple R	0,6007635							
R Square	0,3609168							
Adjusted R Square	0,3053444							
Standard Error	23,364014							
Observations	26							
ANOVA								
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>			
Regressions	2	7090,4289	3545,2145	6,4945281	0,0058064			
Rezidual	23	12555,174	545,87715					
Total	25	19645,603						
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95,0%</i>	<i>Upper 95,0%</i>
Intercept	147,45794	34,771932	4,2407176	0,000309	75,526723	219,38916	75,526723	219,3891648
exchange rate usd/e	-131,64903	41,172485	-3,1975003	0,0040025	-216,82081	-46,477259	-216,82081	-46,47725917
world demand/consi	0,0008802	0,0005523	1,593582	0,1246809	-0,0002624	0,0020228	-0,0002624	0,002022785

Source: own representation

The second model is Correlation model.

When we assess influence of one factor to another the result will be a number from -1 to 1. This result shows not only how significant influence is but also type of a dependence between two

factors. -1 means absolute inverse dependence, 0 means total independence of two factors and 1 means absolute direct dependence.

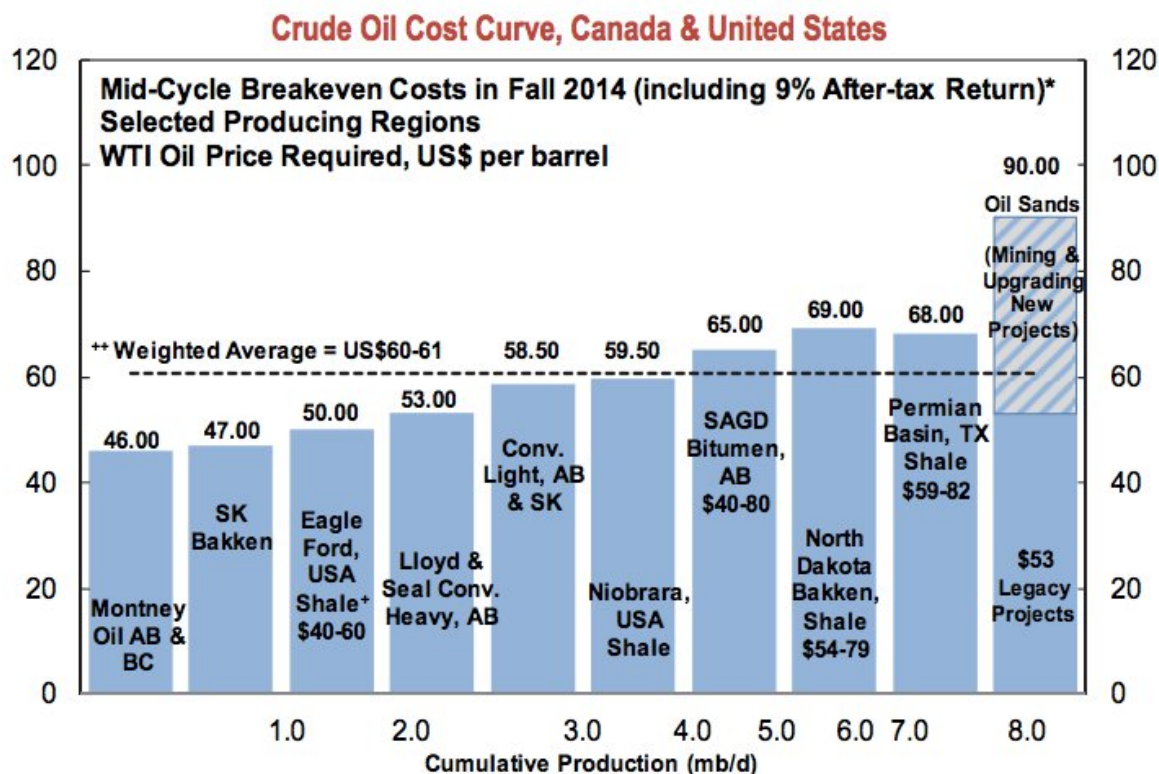
Figure №11: Correlation model

	<i>Nominal Price \$</i>	<i>exchange rate usd/euro Average Rate</i>
Nominal Price \$	1	
exchange rate usd/euro A	-0,538844707	1
	<i>Nominal Price \$</i>	<i>world demand/consumption(million barrels per year)</i>
Nominal Price \$	1	
world demand/consumpt	0,277182689	1
	<i>Nominal Price \$</i>	<i>world supply(million barrels per year)</i>
Nominal Price \$	1	
world supply(million barre	0,077271425	1
	<i>Nominal Price \$</i>	<i>balance</i>
Nominal Price \$	1	
balance	-0,312262948	1

Source: own representation

As we can see on this model the strongest influence has exchange rate USD/EURO. This dependence can be described as inverse medium strong. It means that the higher the exchange rate is the lower will be the price. The influence of world demand is pretty weak, but still rising trend of demand can cause an increase in oil price. On the other hand, the influence of world supply is absolutely insignificant. The last factor is world balance. We can say that oil price can be influenced by world balance but not as strong as by exchange rate. So, after all, we came to the conclusion, that in the future the oil price will increase, but it will proceed slowly. The main reason is a decline in oil production from expensive oil fields where it is hard to cover the costs when the price is low. Nowadays the good news for oil price come from the United States, Canada, and Europe where shale oil fields suspend their production. The main question is a real impact of low oil prices in this business. There is a special definition for this case which is called as “breakeven price”. Breakeven price is a price when oil company receives moderate profits from oil production. The Scotia Bank created a good analysis for the oil fields of shale oil in North America for 2014. Due to the analysis, we can conclude that American shale oil fields will painfully react on the price which is lower than \$60 and some players will leave this market because of high costs.

Figure №12: Crude Oil Cost Curve, Canada & United States



* Excludes 'up-front' costs (initial land acquisition, seismic and infrastructure costs): treats 'up-front' costs as 'sunk'. Rough estimate of 'up-front' costs = US\$5-10 per barrel, though wide regional differences exist. Includes royalties, which are more advantageous in Alberta/Saskatchewan.
 + Liquids-rich Eagle Ford plays, assuming natural gas prices of US\$3.80 per mmbtu.
 ++ Weighted avg. = US\$60-61 including existing Integrated Oil Sands at C\$53 per barrel.
 Saudi Arabia: US\$10-25 per barrel.
 Data source: Scotiabank Equity Research and Scotiabank Economics.

Source: ScotiaBank Commodity Price Index 2014

Low oil prices have a big impact on the global community. It is a positive situation for the major oil importers but a very bad factor for exporters and countries which specialize their economy on crude oil or petroleum products export. We have already mentioned the major oil exporters above.

For Russia, this oil prices crisis is very painful. Russian budget has 50% of incomes from oil export. Fall in oil prices caused a rise in inflation and devaluation of the national currency. According to official Russian statistics agency ROSSTAT Russian economy lost 3,8% in 2015. In addition, gas price is also declined because it is connected with the oil price. Gas is a second most important commodity in Russian export. If there aren't any changes in a structure of the economy, it will be further deepening of the financial crisis and stagnation next years.

4.3 Pricing and Tax policy

Tax policy is not only the means of obtaining budget incomes. It is also a weapon in the competitive fight which helps to win the struggle for the investment.

We would like to explore tax policy and its effect on oil price through the analysis of Russian oil economic sector because the Russian economic sector is a very important source of incomes for the country. As we have already said the incomes from oil export is 50% of the Russian budget.

There is standard severance tax in Russia. The object of a severance tax is non-renewable resources such as crude oil or gas. The tax is specific (in rubles per ton) and it is **766** rubles per ton.

The tax period is for one month and the tax base is the amount of produced oil. Produced oil has to be purified and stabilized before taxation.

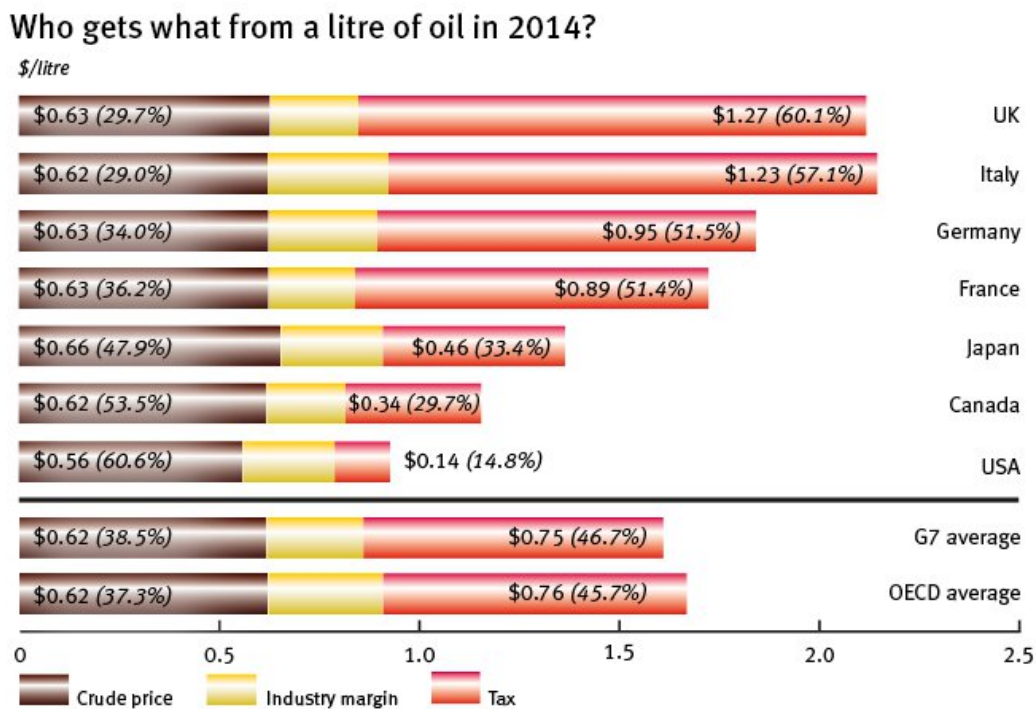
$$\text{Tax} = \text{Specific tax (rubles)} \quad \times \quad \text{Special coefficient}$$

The special coefficient is a coefficient which is characterized by the dynamic of oil prices. In 2015, it was in the range of 5,67 (December) to 10,48 (February). Special coefficient and the specific tax rate are defined by The Russian Federal Tax Service.

Also, there is a special duty for the oil exporting companies. Export duty is not the very prevalent way of taxation. In 2014 exporters used to pay \$97,1 per ton for the heavy and light crude oil. In February 2016, it amounted to \$52 per ton because of oil prices decline (Source: official information of Russian Ministry of Economical Development). And there are preferential taxes rates for some oil fields such as fields in Eastern Syberia and Caspian oil field. The export duty, in this case, amounted to \$0 because the Russian government is interested in the development of these fields.

Nowadays Russian ministry of finance has the plan to raise the specific tax due to national currency devaluation and reduce the special coefficient. In the future new specific tax will be about **950** rubles per ton. According to our opinion, this proposal is not correct because nobody in the world is exempt from incomes due to currency movement. But these taxes do not represent the real situation because there are a lot of different subsidies from the government which should help oil companies.

Figure 13: Taxes in oil



Source: http://www.opec.org/opec_web/en/data_graphs/333.htm

The graph above illustrates the inter-country variations in the average price of one liter of oil across the G7 Countries as well as the OECD average During 2014. It is Important to note That proposition price variations are Mainly due to the widely varying levels of taxes imposed by major oil Consuming nations. These can range from Relatively modest levels - like in the USA - to very high levels in Europe and the Asia / Pacific.

Every government needs to have a balance between high and low taxes. High taxes can damage the whole oil industry and destroy further development because oil companies will not be able to make investments in buying new machines and equipment. If there is no new equipment the company is not competitive.

High duties and taxes are very appropriate methods to raise budget incomes in a short time.

4.4 Evaluation of results

The historical analysis of oil prices dynamic is a very useful tool which can help to forecast future oil prices and make some conclusions. All changes in prices of oil have their own reasons which we have already analyzed.

Also, we have explained the market instruments which can help to regulate oil price. The market instrument is based on the supply of crude oil and on demand for oil.

Now we come to the conclusion that there are many factors influencing oil price, but the main factor is the market supply of oil and demand for oil. All other factors have an impact mainly on supply and demand. Demand is highly dependent on economic growth in countries that import a lot of crude oil. These countries are China, the USA, European Union countries, India. Supply is mainly dependent on oil price.

Modern crisis in oil exporters caused by low oil price has serious reasons based on market supply and demand difference. In addition, some political events demonstrated their influence on oil prices just now. That is why it is necessary to analyze changes in prices of oil only in historical retrospect.

It is hard to forecast future dynamic of oil prices but we tried to do it. Oil prices will go up but slowly because oil supply will reduce due to declining in production on expensive oil fields. Also, we talked about «shale revolution». Shale revolution in North America was one of the main reasons which had led the United States to increase their production of crude oil by 4 million barrels per day.

In our opinion, it is a good time to make investments in crude oil because the price will increase due to dwindling resources.

The main danger but also the possibility of the oil is political instability. Instability in major oil-producing countries risks increasing prices. Conversely, instability in countries such as China or India, economic recession, and stagnation can further reduce oil prices. The situation will be catastrophic in some countries such as Russia, Saudi Arabia, the UAE and Venezuela where incomes from oil export have a great impact on the state budget.

5 Conclusion

The research conducted within this work showed that the oil and gas sector remains not only basic for the economy of the Russian Federation but also considerably defining its further development.

In the course of research, the analysis of the factors forming the prices in the world market of oil was carried out and fundamental, tactical and speculative components of the mechanism of pricing are allocated. The mechanisms operating on the party of supply and demand belong to the fundamental. One of these factors promote an increase in prices for oil, others act in the opposite direction. Industrialization, the growth of world economy and increase of a standard of living of the population conduct to increase in demand for oil and oil products and stimulate an increase in prices for energy resources. The growth of the cost of oil is also connected with the need of involvement in a turn of new fields, is frequent with higher costs for production and transportation. And, on the contrary, increase of efficiency of use of oil and improvement of technologies counteract the increase in prices for oil. Along with the fundamental factors defining long-term dynamics of prices of oil in recent years more and more, the importance is got by factors of tactical character – natural cataclysms, political actions and actions of the military character, and also speculative operations on the stock exchange.

This research revealed that globalization of world economy led to the transformation of the mechanism of functioning of the oil market. If before the 70th years of last century the market of oil was characterized by the dictatorship of the international oil companies, to the middle the 80-hkh of the crucial role belonged to OPEC member countries then competitive pricing succeeded. Oil starts bargaining at the exchange where the prices are formed at the balance of supply and demand. Further development of exchange trade, in particular, trade in future contracts, increases the volume of the speculative transactions conducting to the strengthening of the volatility of oil quotations.

At the moment real prices of oil are under the influence of three major factors:

- 1) the intention of the USA to ensure own energy security by the production of slate oil which profitability is reached at the quotations exceeding 100 dollars/barrel;
- 2) movement of additional financial means as a result of the policy of U.S. Fed and European Central Bank from real production sector on the financial markets;
- 3) stagnation of economy of the developed countries and the delay of growth rates of China conducting to decrease in rates of demand for energy resources.

4) World demand and exchange rate USD/euro.

High dependence on the Russian economy on the export of raw material resources bears in itself serious risks, arising not only when falling, but also with a growth of the world prices for oil. Drop in prices on oil is followed by an imbalance of the state budget and trade balance of the country, and development of "the Dutch illness" and inflation untwisting can be the result of the price increase. The existence of similar risks demands development of adequate measures for their overcoming. At the same time during the periods of a favorable economic environment the budgetary income from oil and gas export helps to create additional resources which can be used for financing of innovative activity and strengthening of other branches of the Russian economy.

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