Czech University of Life Sciences Prague

Faculty of Economics and Management

Department of Economics

Bachelor Thesis

Crude oil price analysis and its impact on world economy

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CZECH UNIVERSITY OF LIFE SCIENCES PRAGUE

Faculty of Economics and Management

BACHELOR THESIS ASSIGNMENT

Violetta Hamidulina

Business Administration

Thesis title

Crude oil price analysis and its impact on world economy

Objectives of thesis

The purpose of this bachelor thesis is to analyze the main processes that form the level and dynamics of world prices for crude oil. Based on the goal, the following tasks were identified:
- determine the main characteristics of the world price in the oil market;
- produce a retrospective analysis of the pricing system in the world oil market;
- study current trends and dynamics in oil markets;
- consider the main economic models of pricing in the oil market;
- explore the mechanisms of the possible impact of prices on world oil markets on the Russian economy.

Methodology

The thesis is divided into two parts. The first one is a theoretical part where we look at the overall and global situation of crude oil prices, what constitutes the prime cost of oil and the price of oil brands and how the low price of oil leads to deflation. The second part of the thesis will be a practical part. The thesis will contain comparative and descriptive methods of research.

The proposed extent of the thesis
40 pages

Keywords
Crude oil, shale, gas, prices analysis, OPEC,

Recommended information sources
Black Brian C. Ph.D. "Crude Reality" (2014)
Braginskiy O.B., professor in Gubkin Russian State University "Cena na neft, istoriya, prognoz, vliyanie na ekonomiku" (2008)
Bushuev V.V., Konoplyanik A.A., Mirkin Y.M. and others "Ceny na neft: analyz tendencii, prognoz" (2013)
Salvatore Garollo "Understanding oil price: A guide to what drives the price of oil in today's market" (2011)

Expected date of thesis defence
2017/18 SS – FEM

The Bachelor Thesis Supervisor
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Electronic approval: 13. 3. 2018
prof. Ing. Miroslav Svatoš, CSc.
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Electronic approval: 13. 3. 2018
Ing. Martin Pelikán, Ph.D.
Dean

Prague on 15. 03. 2018

Declaration

I declare that I have worked on my bachelor thesis titled "Crude oil price analysis and its impact on world economy" by myself and I have used only the sources mentioned at the end of the thesis. As the author of the bachelor thesis, I declare that the thesis does not break copyrights of any their person.

In Prague on 14th of March   _____

Violetta Hamidulina

Acknowledgement

I would like to thank doc. Ing. Mansoor Maitah, Ph.D. et Ph.D. for his support during my work on this thesis, all his comments and useful advice, for his responsiveness and for his separate approach to each of his student. I am very grateful to my parents and friends, especially to my father, who at the time of writing my work shared with me his experience in the field of oil refining and studied with me all sources and gave good advice. Also, I would like to thank all my professors, who thought me during whole study period of Bachelor Degree.

Crude oil price analysis and its impact on world economy

Abstract

This thesis is a study of the factors that underlie the changes in crude oil prices, analysing the period from 1965 to 2016. For today, the prices for a huge number of different products, one way or another, directly depend on the price of oil. Analysis of the time gap clearly shows that changes in world economic activity have a profound impact on the change in the prices of crude oil during economic recession and expansion. The role of OPEC countries in the world oil market in modern conditions is conditioned by the fact that the organization of the countries of oil exporters is the main regulator of quotas for the extraction of hydrocarbons. It shows the average price of oil, which is supplied to the world market of the country by an international organization of oil exporters. OPEC has significant influence over pricing, production levels and the degree of capacity utilization. The economic policy of the OPEC countries not only has a significant influence on the international economic system, but also directly depends on the rate of its development.

In the course of the research, the analysis of the factors that formed prices on the world oil market was carried out, and the fundamental, conjuncture and speculative components of the pricing mechanism were identified.

Keywords: Crude oil, Prices Analysis, Shale, Gas, OPEC

Analýza cen ropy a její dopad na světovou ekonomiku

Abstrakt

Tato bakalářská práce zkoumá faktory, které jsou základem změn cen ropy a analyzují období od roku 1965 do roku 2016. Dnes ceny obrovského množství různých produktů přímo či nepřímo jsou závislé na ceně ropy. Analýza časové mezery jasně ukazuje, že změny ve světové ekonomické aktivitě mají hluboký dopad na změnu cen ropy v době hospodářské recese a expanze. Úloha zemí OPEC na světovém trhu je hlavním regulátorem kvót pro těžbu uhlovodíků. OPEC Ukazuje průměrnou cenu ropy, která je dodávána na světový trh země mezinárodní organizací vývozců ropy. Hospodářská politika zemí OPEC má nejen významný vliv na mezinárodní ekonomický systém, ale také přímo závisí na míře jeho rozvoje.

V průběhu výzkumu byla provedena analýza faktorů, které vytvářely ceny na světovém trhu s ropou, a byly zjištěny základní, konjunkturální a spekulativní složky cenového mechanismu.

Klíčová slova: Ropa, analýza cen, břidlice, plyn, OPEC

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1 Introduction

In the 21st century, oil continues to be the largest object of international trade. With significant reserves of energy resources, Russia has a powerful fuel and energy complex, which serves as an instrument for carrying out foreign and domestic policies. The level of world oil prices is the most important external factor determining the state budget, the balance of payments and the state of the Russian economy. The cost of oil on world markets directly affects the trade balance and state revenues of the country and determines the development of the oil and gas and other sectors of the economy.

To date, oil and oil products form a significant share of Russian exports, which largely depends on the dynamics of prices in world commodity markets. Oil and gas revenues account for about half of the federal budget of the Russian Federation, which is formed taking into account the projected cost of a barrel in the relevant period.

The close interconnectedness of the price dynamics in the world oil markets, the volumes of Russian exports and the revenues of the Russian Federation's budget as a source of financial support for the domestic economy, makes the topic of work urgent and is of interest not only to economists and theoreticians, but also to people engaged in economic activities on the territory of the Russian Federation.

The importance of oil for energy, transport, national defense, for a variety of industries and for satisfying the everyday needs of the population in our age is extremely high. The oil industry is the engine of the world economy and constitutes a gigantic industry that brings huge money to the budgets of countries and goods to the homes of every person. Oil is one of the non-renewable fossils. This combustible material was formed millions of years ago from the petrified remains of animals and plants. The need of people for energy is so great that they constantly extract and use this type of fuel. With the further development of energy in the world, the share of oil in the fuel balance will be reduced in future, and oil will increasingly serve as a source for the synthesis of various industrial products. Under the assumptions of geologists, by 2034 all the available oil reserves will run out, if the speed of its consumption remains the same as it is now. That is why the importance of natural gas, associated gases of oil and products of its processing, as well as of coal, grows steadily every day for the implementation of the most important industrial syntheses

2 Aims and Methodology

The purpose of this paper is to analyze the main processes that form the level and dynamics of world prices for crude oil. Based on the goal, the following tasks were identified:

- determine the main characteristics of the world price in the oil market;

-produce a retrospective analysis of the pricing system in the world oil market;

-to study current trends and dynamics in oil markets;

- consider the main economic models of pricing in the oil market;

-explore the mechanisms of the possible impact of prices on world oil markets on the Russian economy.

The practical significance of this research, which is the object of the world oil market, and the subject - the components of the mechanism of oil pricing, is determined by the fact that its results can be taken into account when determining sources of financing innovative processes in the Russian economy.

The research used scientific materials and economic studies conducted by Russian and foreign theorists, databases of Russian and foreign organizations and various Internet resources.

3 Theoretical part

3.1. Retrospective analysis of the pricing system in the world oil market

3.1.1.The era of price dictates of oil TNCs

Until the 1950s, the dominant players in the global oil industry were the seven oil companies - British Petroleum (UK), Exxon (USA), Gulf Oil (USA), Mobil (USA), Royal Dutch Shell (Netherlands / Great Britain), Chevron (USA) and Texaco (USA) - also known as "7 Sisters" (7 Sisters).

The local capital of the countries in whose territory these enterprises functioned did not participate in the exploration, production, transportation, processing of oil and other production or marketing operations, and did not directly influence the formation of oil prices, but as competing sellers of licenses and oil concessions, received income in the form of royalties and income tax. Each of the companies in the "seven sisters" cartel was vertically integrated and controlled both on operations for the development of deposits and upstream operations, as well as the processing, transportation and sale of finished products (downstream operations). Vertical and horizontal links allowed multinational oil companies to control the export of major oil producing countries and prevent the accumulation of large amounts of raw materials in the world market, minimizing the risk of undesirable competition leading to a reduction in oil prices.

The mechanism of oil pricing, associated with the system of concessions, until the mid-70's. The last century was based on the concept of officially declared prices (posted price), calculated in such a way that the price of oil CIF (cost, insurance, freight) regardless of geographical location was determined on the basis of FOB (free on board) in the Gulf of Mexico and the cost of delivery, including tanker freight, insurance, oil spill, customs clearance, etc.

Price CIF = Price FOB Gulf of Mexico + Freight for delivery of oil from Mexico to consumers

Based on this price, the amount attributed to the payment to the oil owner state was calculated, while spot prices, transfer prices or long-term contract prices did not have a similar

fiscal function. The vertically and horizontally-integrated structure of the oil market hindered the functioning of free market trade, which significantly hampered the development of spot markets. Transfer prices formed in transactions between subsidiaries of oil companies did not reflect the real state of the market and were established based on the goal of minimizing the tax deductions of the organization by transferring profits from jurisdictions with higher tax rates in jurisdictions with liberal taxation. Information on the prices of long-term contracts concluded between oil TNCs was not disclosed and was a commercial secret of enterprises.

Thus, the calculation of royalties and income tax that belonged to the payment of oil exporting countries was carried out on the basis of prices officially established by TNK oil companies. As a fiscal parameter, these prices were not a point of equilibrium between supply and demand in the oil market and did not have the function of distributing income and resources.

By the end of the 50's. XX century the emergence of new enterprises with the necessary resources for investment in the development and production of oil, shattered the dominant position of the vertically integrated cartel "7 Sisters." In the mid-1950s, Venezuela granted oil concessions to several (mostly American) independent oil companies, whose share reached 15% of the total Venezuelan oil production by 1965[1]. The discovery of new oil fields in Libya also strengthened the role of independent enterprises: if in 1965 non-cartel companies produced 580 000 barrels of Libyan oil (or 47% of the total production of oil in Libya), then in 1968 their share increased to 11 000 000 barrels[2]. Competitors appeared everywhere: in the late 1950s Iran signed two agreements for the exploration and development of independent oil wells offshore the Persian Gulf, Saudi Arabia transferred the right to oil production to the Japan Petroleum Trading Company in the offshore zone of the Neutral Zone. The discovery of huge oil reserves in the territory of the former USSR increased the supply of Russian oil to the world market from 100 000 barrels in 1956 to almost 700 000 barrels in 1961[3].

All of the above and other events led to the creation of uncontrolled markets for crude oil and changes in the pricing system. According to the new rules, the price of crude oil was calculated as if it were already delivered from two points - the Mexican and Persian Gulfs.

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[1] Parra, F. (2004), Oil Politics: A Modern History of Petroleum, London: IB Tauris., p. 75

[2] Parra, F. (2004), Oil Politics: A Modern History of Petroleum, London: IB Tauris., p. 76

[3] Parra, F. (2004), Oil Politics: A Modern History of Petroleum, London: IB Tauris., p. 82

However, the price of the fob was still determined in the Gulf of Mexico, the discrepancy was only in the cost of supplying the oil to the consumer. The calculation formulas began to look like this:

1)   west of the neutral point:
Price CIF = Price FOB Mexico. Gulf + Freight for real oil delivery from Gulf of Mexico

2)   east of the neutral point
Price CIF = Price FOB Mexico. Gulf + Freight for real oil delivery from Gulf of Mexico

Neutral points were locations in which prices calculated by any of the methods coincided. Initially, such a neutral point was in the Mediterranean, then (as the price of the fob in the Persian Gulf decreased), it shifted to the East Coast of the United States.

The dominance of the international oil cartel continued until the late 50's. XX century. By that time, oil exporting countries, dissatisfied with the decline in reference prices by major oil companies, had organized the Organization of the Petroleum Exporting Countries (OPEC), the main objectives of which were the coordination and unification of the oil policy to protect the interests of countries exporters, ensuring the stabilization of prices in the world oil market, efficient and regular oil supply, as well as a fair return on capital for investors in the oil industry.

3.1.2. Development of the oil pricing system under the administration of OPEC

In the period from 1965 to 1973, daily oil consumption increased at a rapid pace - by more than 3 million barrels per year (Graph 1).

Graph 1. World oil consumption, 1965 – 1973
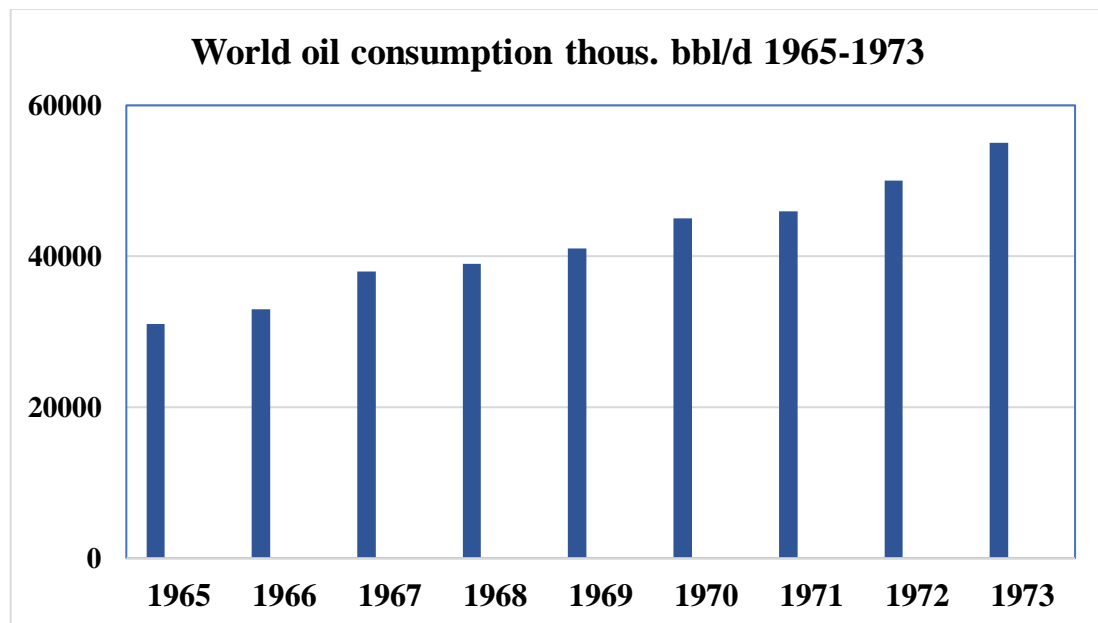
World oil consumption thous. bbl/d 1965-1973

Source: author's calculations based on statistical data Statistical Review of World Energy 2017, BP

(https://www.bp.com/content/dam/bp/en/corporate/pdf/energy-economics/statistical-review-2017/bp-statistical-review-of-world-energy-2017-full-report.pdf)

Most of the increased demand was met by OPEC member countries[4], which increased their production from 13 million bbl / day in 1965 to 30 million bbl / d. in 1973, and their share in world oil production increased from 44% to 51%, respectively (Graph 2).
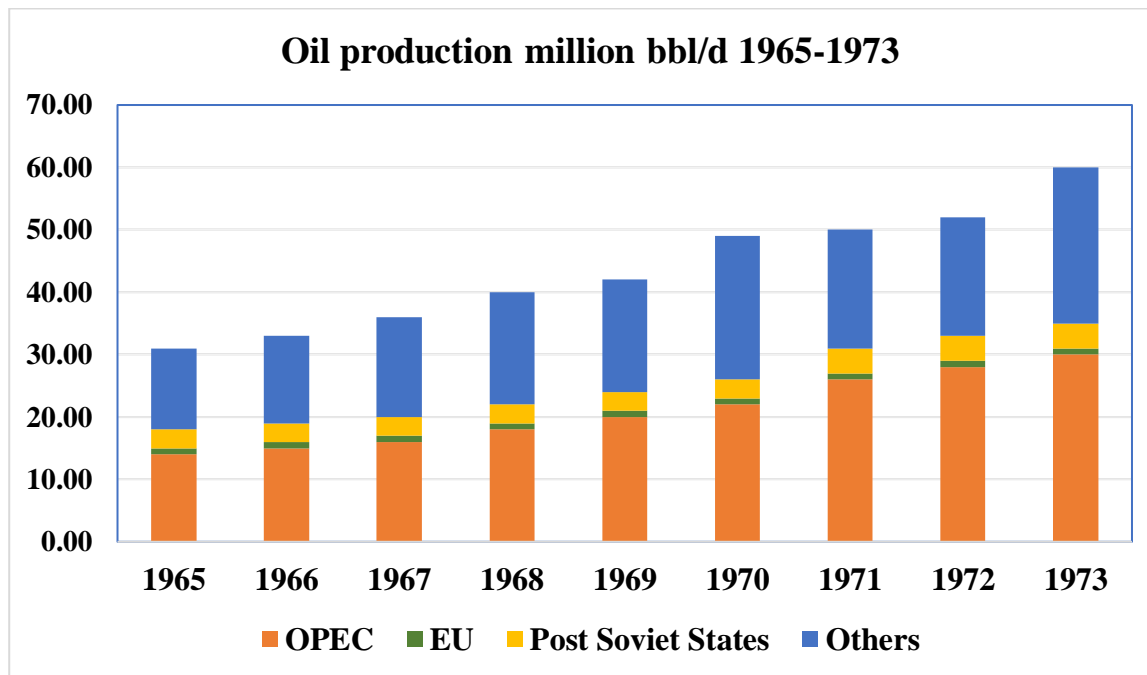
Graph 2. World production of oil, 1965-1973

Source: author's calculations based on statistical data Statistical Review of World Energy 2017, BP

(https://www.bp.com/content/dam/bp/en/corporate/pdf/energy-economics/statistical-review-2017/bp-statistical-review-of-world-energy-2017-full-report.pdf)

The current conditions on the world oil market significantly strengthened the market power of the OPEC member states, the capacity of which was relevant to the capacity of oil TNCs. In September 1970, the Libyan government ordered the company Occidental to increase the amount of payments paid to the treasury and to compensate for the amount of funds received by the state from 1965. Following Occidental, the Libyan establishment also had to comply with other oil companies operating in Libya. Referring to the principle of

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[4] In 1960, OPEC included Iraq, Iran, Kuwait, Saudi Arabia and Venezuela; Later joined by Qatar (1961), Libya (1962), Indonesia (1962-2009), the United Arab Emirates (1967), Algeria (1969), Nigeria (1971), Ecuador (1973-1992, 2007), Gabon (1975), Angola (2007), Equatorial Guinea (2017)

most favored nation, Libya's example was followed by other oil-producing countries, adopting a collective decision at the Tehran talks to increase the official reference price and tax rate. In September 1973, the OPEC member countries decided to revise the Tehran agreement in order to further increase the reference price of oil. The refusal by the oil companies only aggravated the situation: on October 16, 1973, members of the Trustees from the Gulf Basin unilaterally decided to increase the price of Arabian Light oil from $ 3.65 to $ 5.119[5],and on October 19, members of the OAPEC (with the exception of Iraq) - The Organization of Arab Petroleum Exporting Countries (OAPEC) announces a monthly 5% reduction in oil volumes until the complete evacuation of the Israeli forces that occupied the Arab territories in June 1967 and the restoration of the legitimate rights of the Palestinians. In December 1973, Arabian Light oil prices rose to $ 11,651[6].

Another transformation of the oil sector in this time period was the transition from the system of oil concessions to the direct participation of the state in the share capital of oil enterprises, including their complete nationalization (Kuwait 1976, Qatar 1976-1977). Direct control over oil resources and oil production allowed the OPEC countries to independently set oil prices.

After the Iranian revolution of 1979, which led to a deficit of oil, OPEC began to move to a more indirect but no less effective regulation of oil prices - through the allocation of quotas for the member countries of the organization. In parallel with the adjustment of supply and demand mechanisms, the oil sector also observed a reorganization of the old market of long-term contacts, which violated the stability of oil supplies in the conditions of sharp fluctuations in oil prices and force majeure circumstances. As a result, oil prices began to be established on the basis of short-term and spot-contracts.

The decline in demand for oil due to the recession of the world economy in the mid-1980s. and an increase in the supply of oil from non-OPEC countries, caused by the increase in raw materials prices and the improvement of technology prevented the further development of the oil pricing system under the administration of OPEC and were a trigger for its subsequent collapse. New discoveries of oil fields outside the territory of OPEC led to increased competition in the market and a forced decline in prices in the spot markets.

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[5] Fattouh Bassam: An anatomy of the crude oil pricing system., Oxford Institute for Energy Studies, 2011 p. 16

[6] Fattouh Bassam: An anatomy of the crude oil pricing system., Oxford Institute for Energy Studies, 2011 p.16

Diversification of world oil producers allowed consumers to conclude contracts with suppliers offering raw materials at the most competitive prices. Thus, the share of OPEC in the world oil production in just a little more than a decade decreased almost twofold: from 51% in 1973 to 28% in 1985 (Graph 3).

Graph 3. World production of oil, 1983-1990.
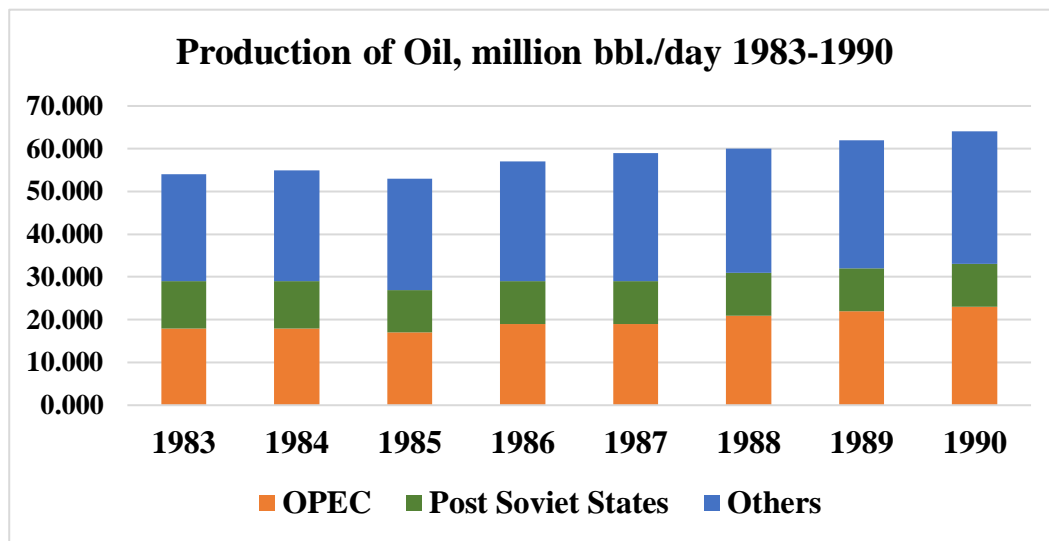
Source: author's calculations based on statistical data Statistical Review of World Energy 2017, BP

https://www.bp.com/content/dam/bp/en/corporate/pdf/energy-economics/statistical-review-2017/bp-statistical-review-of-world-energy-2017-full-report.pdf

Aware of the lack of prospects for a pricing system under the administration of OPEC and trying to regain its share of the crude oil market, in 1986 Saudi Arabia, and then some other OPEC countries adopted the netback pricing system - a formula for guaranteed oil sales, where the price FOB is calculated based on the price of oil products in the importing countries. However, the functioning of the netback system turned out to be short-term: the supersaturation of the oil supply in the world market resulted in a three-fold price collapse during 1986, which served as the beginning of the development of the market pricing system in the oil market.

4. Marketing pricing mechanisms

The collapse of the oil pricing system under the administration of OPEC in 1986-1988. was a transition to a new stage of development, in which the decisive role in setting oil prices shifted from OPEC to market forces. For the first time used by the Mexican national oil company PEMEX in 1986, the market method of pricing has spread widely in other oil exporting countries and is still the main method of pricing in the world crude oil trade. The oil market was ready for such a transition: the abandonment of the concession system and the waves of nationalization that undermined the supply of oil TNCs increased the number of transaction transactions without direct participation of transnational companies, which led to the development of a complex structure of interconnected oil markets consisting of spot markets, and forward, futures, options and other markets for derivative securities.

At the present stage, on the world oil market, stock exchange pricing and the over-the-counter market stand out.

4.1. Exchange pricing

The appearance and development of exchange trade in oil in many respects caused a change in the pricing principles. For the first time, trading in crude oil futures began in 1986 on the New York Mercantile Exchange (NYMEX). A few years later, crude oil contracts began to be traded on the ICE-Intercontinental Exchange and on the SIMEX-Singapore International Monetary Exchange. In April 2013, crude oil trading was also launched at the St. Petersburg International Commodity Exchange (SPMMEX).

To date, the prevailing part of transactions on the exchange are speculative operations with fictitious goods and hedge contracts. The total volume of operations for the purchase and sale of oil is many times greater than the number of transactions with the actual delivery of the goods.

Unlike the spot price of oil, the value of futures contracts is determined not so much by the ratio of supply and demand as by the expectations of the participants in the transaction regarding the future market conditions: the dynamics of production and consumption, the world economic and political situation, the intentions of other market players. Any current events and information signals are instantly reflected in the change in oil prices, which causes high volatility in the futures market. The globalization of the world oil market and

the functioning of the exchange in real time are due to the powerful development of computerization and information technologies that form a single information space.

The largest oil exchanges are ICE and NYMEX, which trade standardized marker oil grades - produced in the US by Light Sweet, or West Texas Intermediate (WTI), and produced on the North Sea shelf of Brent. These types of oil have similar characteristics and are considered reference (Table 1)

Table 1. Marker grades of oil and Russian Urals

	Density	Sulfur content
Light Sweet	40 API	0,4-0,5%
Brent	38,6-39 API	0,37%
Urals	31-32 API	1,2%

Source: Expert Portal "Eastern Oil Pipeline"
http://www.vstoneft.ru/analit.php?number=197

Historically, the price spread between the reference grades of WTI and Brent was 1-2% in favor of the former. After 2010 there was a striking, contrasting change in price dynamics - the difference in prices is more than 15-20 $ and higher (Figure 4).

Graph 4. Price dynamics of WTI and Brent, 1990-2016
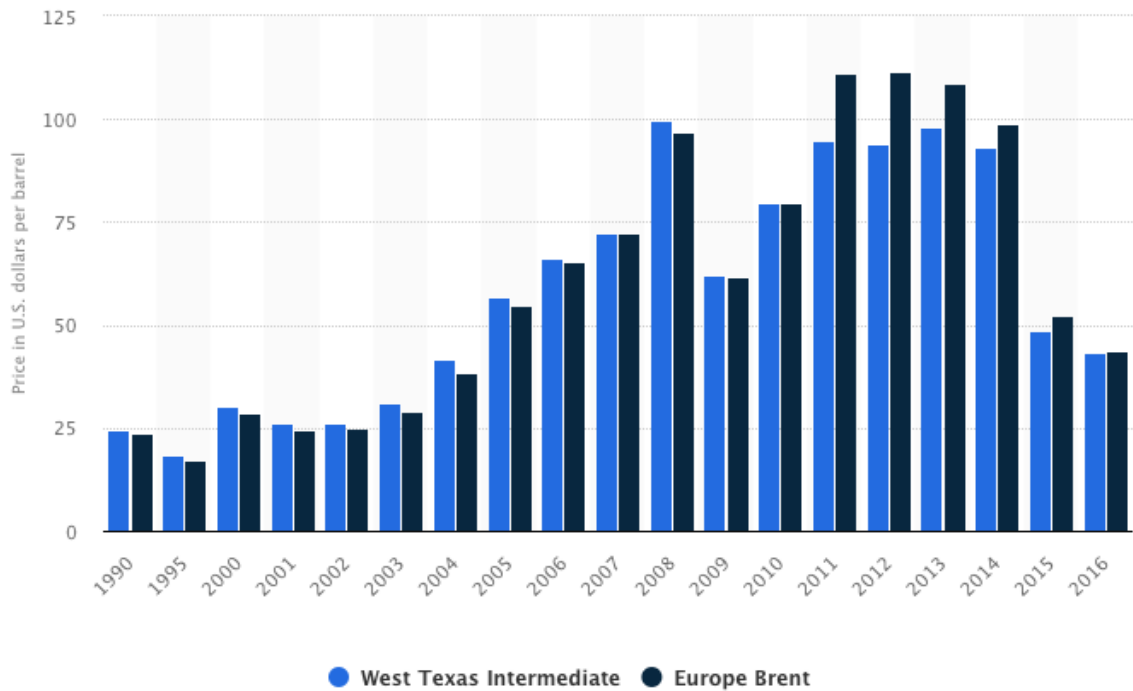
Source: electronic portal of statistical data "Statista.com"

http://www.statista.com/statistics/209641/average-annual-spot-price-of-wti-and-brent-crude-oil/

One of the reasons for this situation was the rapid growth in oil production in the states of Texas and North Dakota, which caused a glut of the market in the central part of the US and had a negative impact on the price of WTI. The increase in the price spread is due to other reasons: the legislative restriction[7] of US stock market speculation in the oil market, adopted by the administration of US President Barack Obama in 2010 in response to the global financial crisis of 2008-2009; as well as the position of the US Federal Reserve System in the field of monetary policy.

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[7] The Wall Street Reform and Consumer Protection Act, Pub. L

4.2. Over-the-counter oil market

At the largest exchanges of oil contracts in London and New York, only two types of oil are traded - WTI and Brent, and the produced varieties are several dozen. All differences in the characteristics of a variety (density, paraffin additives, etc.) are taken into account in the cost of this variety. Orientation for the determination of prices is marketed branded varieties. On the European over-the-counter market, the main reference point is Brent crude oil, in the American market - Light Sweet, in Asia - oil from Dubai (Dubai). A standard for OPEC member countries is the so-called OPEC Reference Basket of Crudes, which includes the main grades of oil produced by members of the cartel in proportion to the production volumes. After the entry into force of the last changes (January 2009), the composition of the "basket" is represented by the following grades[8]:

- Saharan Blend (Algeria);
- Girassol (Angola);
- Oriente (Ecuador);
- Zafiro (Equatorial Guinea);
- Iran Heavy (Iran);
- Basra Light (Iraq);
- Kuwait Export (Kuwait);
- Es Sider (Libya);
- Bonny Light (Nigeria);
- Qatar Marine (Qatar);
- Arab Light (Saudi Arabia);
- Murban (United Arab Emirates);
- Merey (Venezuela).

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[8] http://www.opec.org/opec_web/en/data_graphs/40.htm

The cost of the "basket" OPEC is determined by the situation in the oil market. The historical maximum for the "basket" of OPEC is the price tag
US $ 140.73 per barrel, recorded on July 3, 2008. Sharp falls of the "basket" were observed after the events of September 11, 2001 and during the protracted recession of the world economy in 2008-2009. (Graph 5)

Graph 5. The cost of the oil "basket" OPEC, 2004-2017
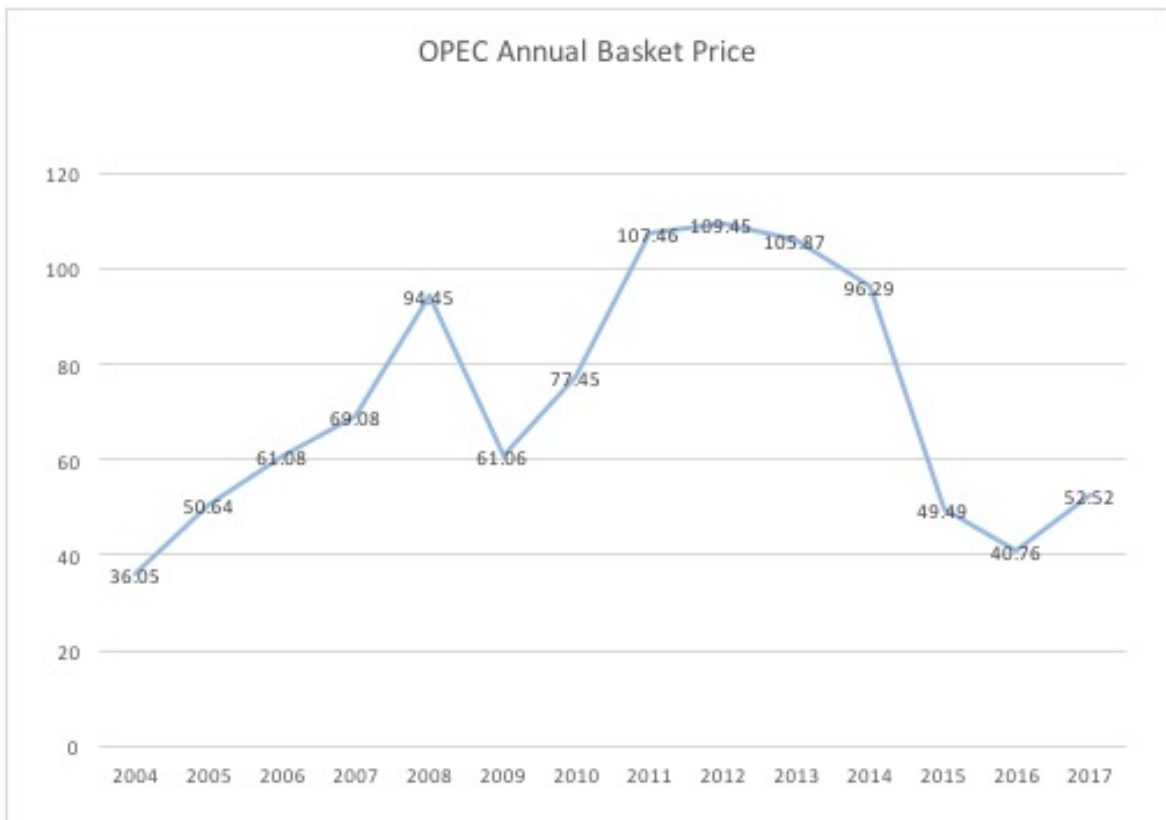
Source: https://data.world/finance/opec-basket-price

When pricing for other varieties is used, differentials - discounts or premiums - to the price of marker oil grades. The value of differentials depends both on the differences in characteristics, and on the current balance of supply and demand for a given grade of oil.

5. Factors of pricing in the world oil market

In a market economy, the pricing model in both foreign trade and the domestic market is multifactorial, i.e. the formation of prices occurs under the influence of a whole set of various factors. By the nature and scope of these factors can be divided into 5 groups:

- general economic - acting regardless of the type of product and the specific conditions for its production and / or implementation (the cycle of economic activity, the level of inflation, the state of aggregate supply and demand in the economy)
- economic - determined by the features, conditions of production and sale of this product (costs, tax and other charges, availability of substitute goods, quality and consumer properties of products);
- specific - affecting only certain goods and services (seasonality, completeness, warranty terms of service, operating costs);
- special - related to the operation of special economic instruments (state regulation of the economy, exchange rate);
- noneconomic - political, military.

When analyzing specific goods, pricing factors are ranked according to the degree of their influence. At the same time, fundamental factors directly shaping the price of the goods are singled out, and random factors, the presence of which can substantially adjust the price both to increase and decrease (for example, natural disasters, military actions and other force majeure circumstances). The most important pricing factors in the oil market are shown in Graph. 6

Graph 6. Factors of pricing in the world oil market

Factors affecting oil prices

Fundamental

Conjunctive and speculative

Demand level

Level of supply

Demand level	Level of supply	Conjunctive and speculative
1.The growth rates of the world economy 2.Energy and oil intensity of the economy 3.Efficiency of energy-consuming technologies 4.Relative competitiveness of alternative energy sources 5. Climatic conditions 6. Formation of commercial and strategic oil reserves	1. The sizes of the explored oil reserves 2. Production and export volumes 3. Level of oil production costs 4.Politics of oil-producing states 5. Level and prospects for changing global demand.	1.Special exchange operations on oil contracts. 2. Military operations in mining regions 3. Political sanctions 4. Force majeure circumstances

Source: compiled by author

The fundamental underlying factors determining prices in the world oil market are the factors that form the demand and supply for this product. According to the classical theory of pricing, the balance of demand and supply, in which their equilibrium is observed, is of decisive importance. Prices rise if demand grows faster than supply, and vice versa. At the same time, in the oil industry, the demand and supply have different effects on the price dynamics. In the short term, prices are more dependent on changes in demand, and in the long run, on changes in supply. This is due to the fact that the oil markets are characterized by a more inertial proposal: in the absence or exhaustion of commercial or strategic oil reserves, a rapid increase in production volumes (involvement in the development of new deposits, intensification of production) is difficult both technically and economically. Therefore, in the short term, the growth of unsatisfied demand, which is determined primarily by the growth rates of the world economy, the energy and oil intensity of the economy and the efficiency of energy-consuming technologies, leads to higher prices. In a longer time period, on the contrary, price dynamics is determined by such factors as growth / decline of explored and involved deposits, the emergence of new technologies and changes in the cost of oil production.
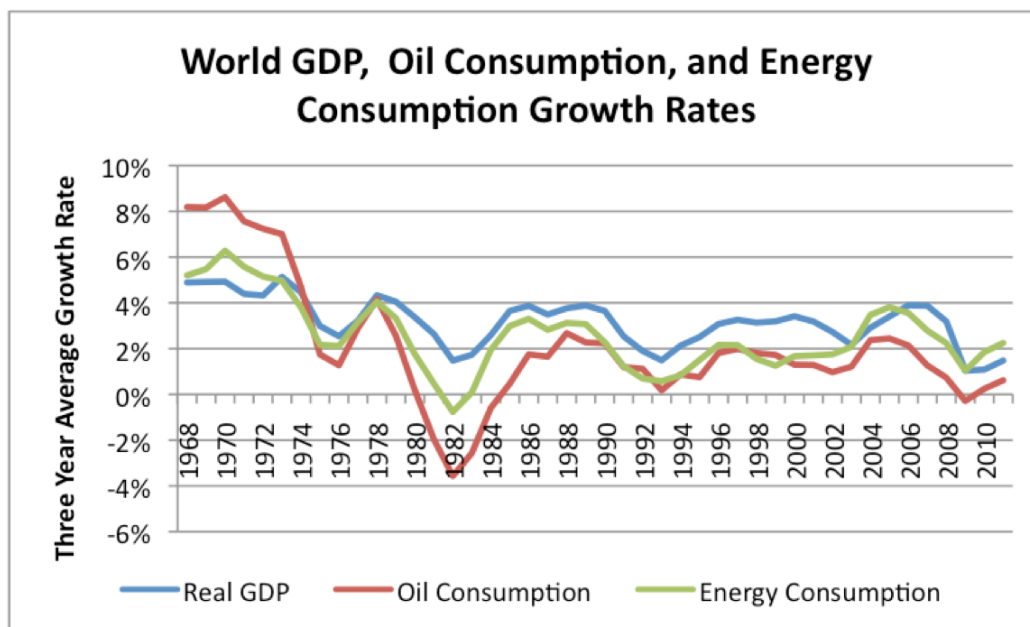
The factors of opportunistic and speculative nature, which also affect the levels and the ratio of demand and determine the price dynamics, include speculative exchange operations on oil contracts, military operations in the extraction regions, political sanctions and other force majeure circumstances.

Assessing the impact of all the above factors on the formation of oil prices, it must be borne in mind that often this impact is interdependent. For example, an increase in the supply of inexpensive oil leads to an increase in its use (a phenomenon typical of the first half of the 20th century), and the growing demand leads to the involvement of new deposits in the circulation. Forming under the influence of supply and demand, world oil prices have the opposite effect on this supply and demand. High oil prices, on the one hand, restrain demand and are an incentive for substitution of oil with alternative fuels, and, on the other hand, lead to an increase in oil production in regions with relatively low production costs. Such a restriction of demand and an increase in supply creates the prerequisite for lower prices in the oil market. With low oil prices, on the contrary, there is an increase in demand and a decrease in supply (due to a reduction in production and investment in regions with higher production costs), resulting in a subsequent increase in oil prices.

5.1. Factors of world oil demand

The most important factor shaping the demand for oil is the growth of the world economy. Since the 1990s. up to the global financial crisis of 2008-2009. the steady growth of the world economy was observed, although the rates ranged from 1.59% in 1991 to 4.19% in 2000 (Graph 7). In the same period, the annual increase in daily oil consumption averaged 1.68%. Peak demand growth (more than 3 million Bbl / d or 3.84% over the previous year fell in 2004, when the annual growth rate of the world economy was 3.99%.

Graph 7. Growth rates of world GDP and oil consumption, 1990-2010

Source:

https://ourfiniteworld.com/2012/10/25/an-economic-theory-of-limited-oil-supply/comment-page-2/

 http://data.worldbank.org/

A significant reduction in the growth rates of the world economy - this situation was observed in 1991 -1993, 1998, 2001 and 2008-2009. - has always slowed the growth of consumption and led to a drop in world oil prices (Table 2)

Table 2. The growth rate of the world economy, world consumption and the cost of oil, 1990-2011.

	World economic growth rates in %	Crude oil price in $	Oil consumption, thous. bbl/day
1990	3,03	40,83	66653
1991	**1,59**	**33,04**	66799
1992	**2,12**	**30,98**	67811
1993	**1,79**	**26,42**	67438
1994	3,29	**24,01**	68957
1995	2,89	**25,12**	70040
1996	3,37	29,63	71442
1997	3,7	26,76	73566
1998	**2,32**	**17,55**	74108
1999	3,29	24,26	75737
2000	4,19	37,22	76597
2001	**1,67**	**31,05**	77245
2002	**1,97**	**31,29**	78187
2003	2,74	35,25	79686
2004	3,99	45,47	82746
2005	3,5	62,80	83925
2006	3,99	72,69	84873
2007	3,95	78,53	86321
2008	**1,33**	101,61	85768
2009	**-2,22**	**64,66**	84631
2010	4,34	82,00	87439
2011	2,73	111,26	88034

Source: author's sample from statistics Statistical Review of World Energy 2012, BP

https://www.bp.com/content/dam/bp/en/corporate/pdf/energy-economics/statistical-review-2017/bp-statistical-review-of-world-energy-2012-full-report.pdf

and World Bank data

http://data.worldbank.org/

The largest consumers, forming a significant part of the demand for oil, are the industrialized countries. In period from 2000 to 2011 OECD countries accounted for 58% of world oil consumption[9]. At the same time, in recent years, Asian countries, primarily China and India, provided an essential part of the increase in world oil consumption, where the average annual growth rates for the same period were, respectively, 10.2% and 7.2%[10]. The top three in terms of oil consumption are the United States, China and Japan (Graph 8).

Graph 8. The largest consumers of oil and oil products 2017

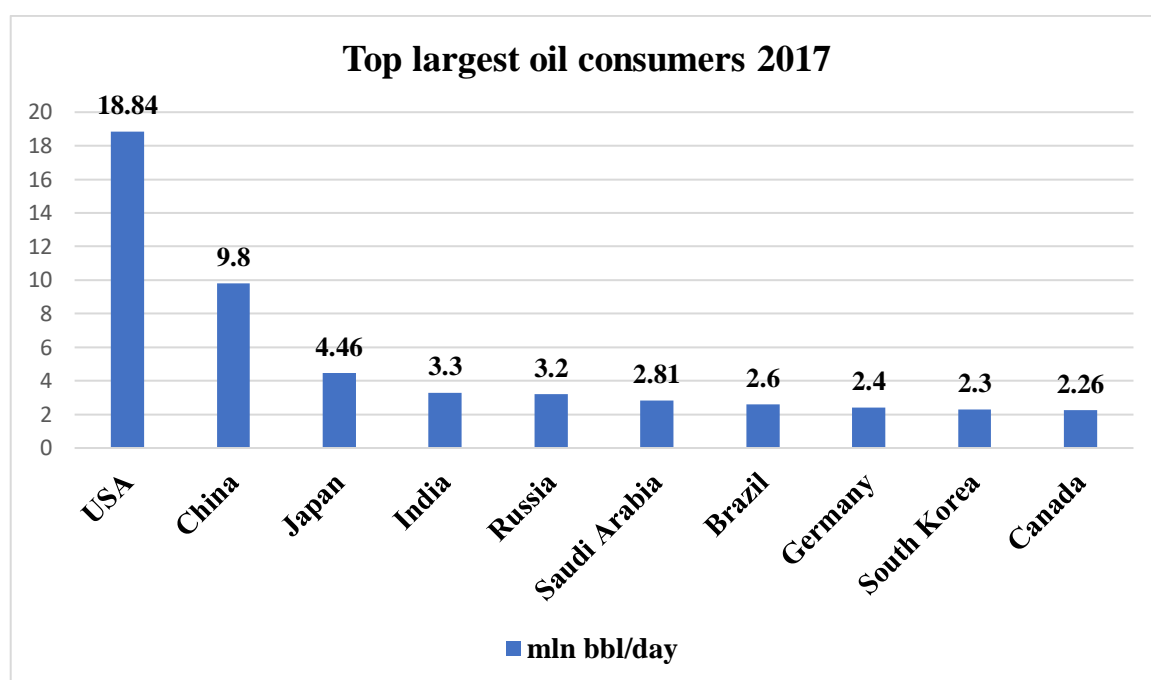Source: author's sample from statistics Statistical Review of World Energy 2017 BP
https://www.bp.com/content/dam/bp/en/corporate/pdf/energy-economics/statistical-review-2017/bp-statistical-review-of-world-energy-2017-full-report.pdf
https://decem.info/10-stran-osnovnyh-potrebitelej-nefti-v-mire.html

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[9] Statistical Review of World Energy 2017, BP

[10] World dataBank http://www.worldbank.org/

The main importers of oil are the US and Europe, in 2011 they accounted for 40% of the world's imports of crude oil and petroleum products. In recent years, there has been a rapid increase in China's oil imports, where it currently covers about 70% of the oil demand (Table 3)

Table 3. The largest importers of oil and petroleum products, 2015

Country	Mln bbl/day
USA	6,47
China	5,68
Japan	4,37
India	2,47
South Korea	2,26

Source: statistical data from Energy Information Management United States

https://www.eia.gov/

The formation of world demand for oil depends not only on the growth rate of the world economy, but also on its energy intensity, i.e. energy consumption per unit of GDP. An increase in the share of non-power-intensive industries in the economy and the development of energy-saving technologies lead to a decrease in the energy intensity of the economy. After a sharp jump in prices in the early 70's. in developed countries, a course was taken for energy conservation, which led to a significant reduction in the energy intensity of the world economy (Table 4)

Table 4. Energy intensity of GDP, BTU / year by 1 $ of GDP

	1980-1990	1991-2000	2007	2010
North America	11259,53	9652,33	7738,12	7514,08
Central and South America	5805,74	6266,86	6011,21	5895,57
Europe	6929,48	6738,87	5593,46	5485,99
Eurasia	No info	24293,92	15268,93	14592,10
Middle East	7586,95	10034,37	9936,01	10945,19
Africa	6425,33	6501,81	5522,91	5279,06
Asia and Oceania	9147,24	8392,85	8016,62	7974,81
World		10268,72	8298,18	8240,97

Source: author's selection from the statistics of the U.S. Energy Information Administration http://www.eia.gov/cfapps/ipdbproject/iedindex3.cfm?tid=92&pid=47&aid=2&cid=regions&syid=1980&eyid=2011&unit=BTUPUSDP

As energy resources, oil and oil products can be replaced by other energy carriers. The rise in oil prices increases the competitiveness of other fuels, as a result of which there is a relative decrease in demand for oil.

Climate and weather conditions also have an impact on the oil market. Low temperatures lead to an increase in global demand for petroleum products used for heating purposes. In a warm period of time, on the contrary, the demand for oil is relatively lower. This dependence on the climatic factor explains the seasonal fluctuations in the demand for oil.

In order to ensure the stability of supplies and maintain the level of oil prices in cases of sharp reduction or restriction of oil supply from the oil-producing countries for political or

other reasons, part of the oil produced is concentrated in special reserves. The decisions of the oil importing countries to replenish these reserves increase the world demand for oil and have a positive impact on the dynamics of world oil prices, and the implementation of a portion of strategic reserves in crisis periods increases supply and can help reduce oil prices.

5.2. Factors of the world oil supply

The supply of oil in the world market is determined by the demand for oil products, geological and technological factors, the state policy of the oil-producing countries in the oil sector, as well as a number of random factors: military actions in the regions of oil production, natural disasters, international sanctions, strikes,

Geological and technological factors reflect the state, qualitative and quantitative characteristics of the available geological reserves of oil and the existing technological possibilities for their extraction. At present, there are several classifications of oil reserves assessment, the most common of which is the SPE-PRMS (Petroleum Resources Management System), developed in 1997 by the Society of Petroleum Engineers (SPE) in conjunction with the World Petroleum Congress (WPC) and the American Association of Petroleum Geologists (English AAPG) and supplemented in 2007 with new clarifying and supporting documents. SPE-PRMS standards not only assess the likelihood of the presence of oil in the field, but also the economic efficiency of extraction, taking into account factors such as exploration and drilling, transportation, taxes, existing oil prices, etc.

The US standards developed by the US Securities and Exchange Commission (SEC) for a number of parameters are different from the classification of SPE-PRMS. In particular, the SEC classification does not consider categories of probable and possible reserves; The main criteria for assessing deposits are the reliability of the existence of reserves and the validity of the license for the development of the field. If the validity of a development license ends earlier than the planned recovery period, the oil reserves are not classified as reserves.

Currently, Russia has classifications established by Order No. 126 of the Ministry of Natural Resources of the Russian Federation of February 7, 2001, which differs significantly from SPE-PRMS and SEC standards and is based solely on the analysis of geological features without taking into account economic factors.

Technical progress leads to the expansion of technological opportunities for the extraction of reserves, contributing to the growth of available reserves and oil production. In general,

the world's proven oil reserves have grown and as of 01.01.2013 amounted to 1637 billion barrels (Table 6), which allows to ensure both current and long-term demand for oil.

Table 5. Proved oil reserves, bln barrels in period 2011 - 2015

Rank	Country	1.1.15	1.1.14	1.1.13	1.1.12	1.1.11	1.1.15
1.	Venezuela	298.4	297.7	297.6	211.2	211.2	18.0%
2.	Saudi Arabia	265.8	265.9	265.4	264.5	260.1	16.1%
3.	Canada	172.5	173.2	173.1	173.6	175.2	10.4%
4.	Iran	157.8	157.3	154.6	151.2	137.0	9.5%
5.	Iraq	144.2	140.3	141.4	143.1	115.0	8.7%
6.	Kuwait	101.5	101.5	101.5	101.5	101.5	6.1%
7.	UAE	97.8	97.8	97.8	97.8	97.8	5.9%
8.	Russia	80.0	80.0	80.0	60.0	60.0	4.8%
9.	Libya	48.4	48.5	48.0	47.1	46.4	2.9%
10.	USA	37.9	33.4	28.95	20.7	19.1	2.3%
11.	Nigeria	37.1	37.1	37.2	37.2	37.2	2.2%
12.	Kazakhstan	30.0	30.0	30.0	30.0	30.0	1.8%
13.	Qatar	25.2	25.2	25.4	25.4	25.4	1.5%
14.	China	24.6	24.4	23.7	20.4	20.4	1.5%
15.	Brazil	15.3	15.0	13.15	14.0	12.9	0.9%
16.	Algeria	12.2	12.2	12.2	12.2	12.2	0.7%
17.	Mexico	9.8	10.1	10.3	10.4	10.4	0.6%
18.	Angola	9.0	9.1	10.5	9.5	9.5	0.5%
19.	Ecuador	8.8	8.2	8.2		7.2	0.5%
20.	Azerbaijan	7.0	7.0	7.0	7.0	7.0	0.4%
21.	India	5.7	5.64	5.48	5.6	5.7	0.3%
22.	Norway	5.5	5.8	5.37	5.32	5.7	0.3%
23.	Oman	5.2	5.0	5.5	5.5	5.5	0.3%
World total		**1,655.9**	**1,647.4**	**1,639.4**	**1,520.1**	**1,469.6**	**100.0**
Total OPEC		**1,206.2**	**1,200.8**	**1,199.7**	**1,112.9**	**1,064.8**	**72.8%**

Source: statistical data of the electronic resource Petroleum Insights

http://petroleuminsights.blogspot.cz/2015/01/worlds-top-23-proven-oil-reserves_12.html

The geographic distribution of oil reserves is extremely uneven: 72.8% of all reserves are concentrated in OPEC member countries. The largest reserves are Venezuela, Saudi Arabia and Canada, accounting for 18.0%, 16.1% and 10.4% of world reserves, respectively.

From the point of view of the possibility of producing oil, the qualitative heterogeneity of the world's oil reserves is of great importance. At the same time, the characteristics of oil produced and the parameters of its occurrence, which cause significant differences in the level of unit costs for oil production, also have significance. For example, in most OPEC member countries, primarily in the Persian Gulf region, the production costs are rather low, while at the North Sea fields in the United States and Western Europe they increase significantly. Hence the differences in the possibility of expanding the supply of oil in various regions. Thus, with the reduction in world oil prices, the economic feasibility of increasing oil production in regions with high production costs is significantly reduced. In addition, as old deposits are depleted, new deposits are often involved in development, often with more complex geological conditions of production, for example, in great depths or in the Arctic shelf, where oil production is much more expensive.

World oil production follows the growing demand and in the pre- and post-crisis years has steadily grown. The decline in world oil production took place only in 1999 as a result of OPEC's actions to reduce oil production and reduce investment in the industry in other regions in the face of falling world prices in 1998, and also in 2009 amid the global financial crisis that broke out in 2008.

Currently, about 43% of the world's oil production falls on the OPEC countries. The largest oil producers are Saudi Arabia, Russia and the United States.

In (graph 9) we can see that oil production in the Middle East increased by 1.7 million Barrels per day, These figures were increased due to Iran (+700000 bbl/d) to Iraq (+400,000 bbl/d) and Saudi Arabia (+400,000 bbl/d, but simultaneously with this largely offset by a decline in production in the North America, South and Central America, Africa and the Asia-Pacific region .The production of oil outside the Middle East declined by 1.3 million bbl/d, with the largest decline in the US (-400,000 bbl/d), China (-310,000 bbl/d) and Nigeria (-280,000 bbl/d).

Graph 9. Oil production by region mln/bbl daily

Oil production by region mln/bbl daily
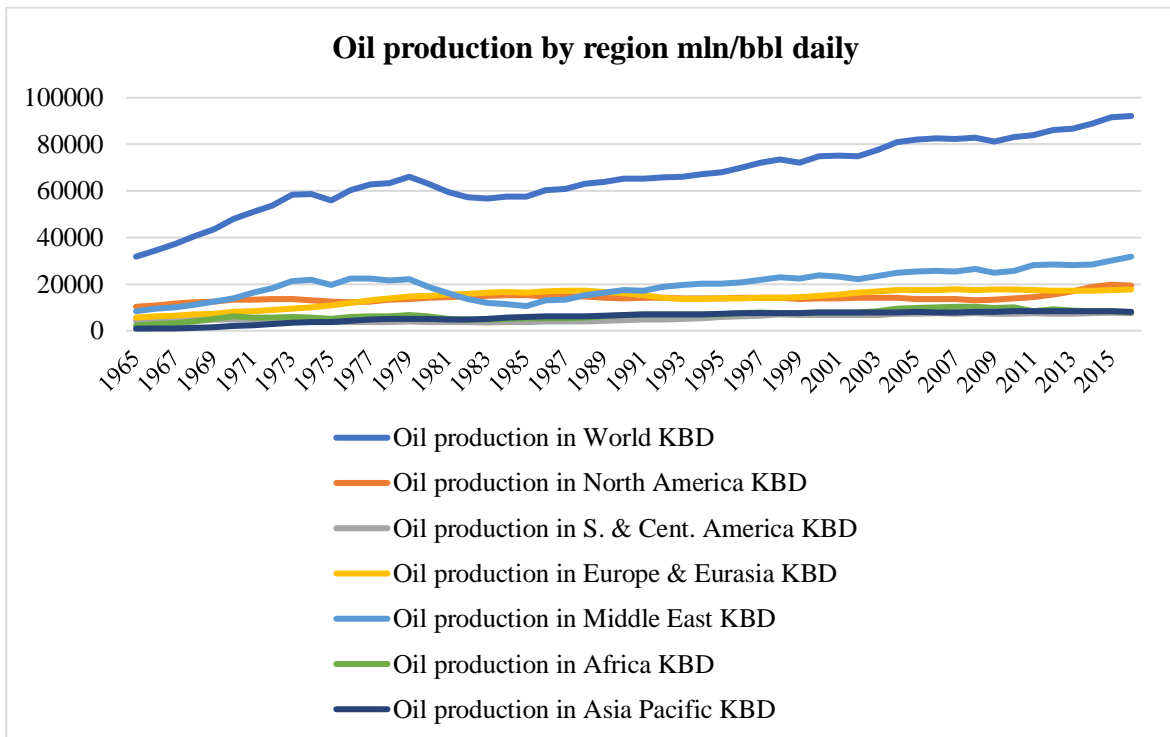
Source: statistical data Statistical Review of http://tools.bp.com/energy-charting-tool.aspx?_ga=2.251773513.1341384896.1520980620-73154110.1520591360   -/st/oil/dt/production/unit/KBD/region/NOA/SCA/EU/MIE/AFR/AP/view/area/

The oil produced goes both to domestic national consumption and to the world market. In different countries, the ratio of exports and domestic consumption is different: Saudi Arabia, for example, exports more than 60% of the oil produced; while in a number of other countries, one example of which is the United States, the oil produced is mainly supplied to the domestic market. Therefore, the share of OPEC countries on the world oil market, which is about 60% is much higher than their share in world production.

**Table 6.Top 10 largest oil exporters 2015**

Country Rank	Export in million bbl/d
1. Saudovskaya Arabia	8.5
2.Russia about	8
3.OAE	2.5
4. Kuwait	2.4
5. Iraq	2.3
6.Nigeria	2.2
7.Katar	1.9
8.Iran	1.8
9. Venezuela	1.8
10.Norvegia	1.7.

Source: https://utmagazine.ru/posts/8813-eksportery-nefti

The volume of oil production is also determined by the state policy of the oil-producing countries with respect to the oil sector. OPEC countries, where oil production is carried out by state-owned companies, current oil production volumes are formed in accordance with production quotas agreed at the interstate level. Thus, state policy is one of the main factors determining the level of production and export of oil to the world market. In countries where oil production is carried out by private oil companies, the state policy on the oil sector includes tax policy, licensing policy, access policy to prospective oil areas, etc., pursuing not only economic but also noneconomic objectives such as securing reliability of supply, achievement of national security, minimization of negative environmental consequences, etc.

In general, over the 40 year period from 1970 to 2011, the symmetric-ascending dynamics of the volumes of world consumption and oil production testifies to the close correlation of these indicators (Figure 1).

Figure 1. World production and consumption of oil, 1965-2011.

Source: https://www.economist.com/blogs/dailychart/2011/06/oil-production-and-consumption
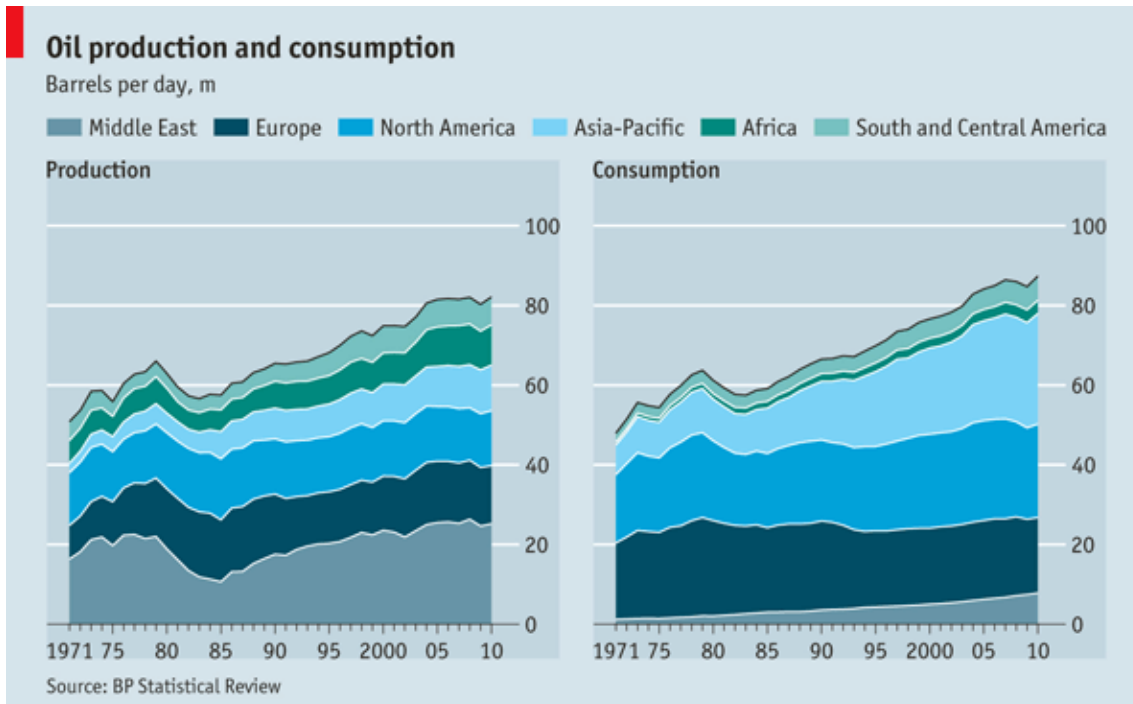
5.3. Speculative components of the price of oil.

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

In recent years, the trajectory of international commodity flows of energy carriers has shifted due to geopolitical factors. Political unrest in a number of Arab countries in 2011-2012. led to a threefold drop in national oil production in Libya and significant problems in the oil industries of Syria and Egypt. The situation in the region was also aggravated by the threat of closure of the Strait of Hormuz, through which 35-40% of international oil flows of goods are carried out. On the Western side, energy geopolitics was implemented in rather severe forms: for example, the US, in an effort to make Iran, one of the main producers of oil, abandon nuclear power development programs, imposed an embargo on imports of Iranian oil at the end of 2011. Also joined the European Union and a number of companies from South Korea, Japan and India. Under pressure from the United States, the leading insurance company Lloyds Register also stopped issuing opinions on compliance with safety standards and environmental standards for tankers and container ships of Iran. The ban on purchases of Iranian oil favored other countries, primarily Saudi Arabia, Kuwait, the UAE and Iraq, quickly mastered the suddenly opened market niches.

With the development of the paper market of oil, the actions of the participants of the exchange market, which are often speculative, have a certain influence on the formation of the price of oil. Until the mid-2000's. the main participants in this market were hedgers - players of the physical oil market, minimizing the risks of their physical operations through financial instruments. Players who follow such strategies are not only oil companies, but also many other organizations whose activities depend on fuel prices. Since the second half of last decade, the palm tree has passed to players who are not directly involved in the oil business - banks, pension and insurance funds - investors who view oil as an object of investment, capable of generating high profits. This lack of oil as an asset for long-term investments, as a strong price exposure to the impact of seasonal factors, natural and political cataclysms, turns into a positive characteristic for speculators playing on the fears and

expectations of the market. The growing number of speculators is evidenced by the fact that, despite the increase in open positions, the execution of contracts for the supply of oil is at an extremely low level: the participants in the oil futures market close positions before the execution of contracts, which allows them to avoid complicated procedures accompanying physical supply. Thus, the execution of contracts in the oil futures market takes place through financial mutual settlements.

As a result of the development of trading in derivative oil contracts, large amounts of capital were infused into the oil market, which turned from the classical into a futures version of the financial market and acquired high volatility characteristic of the currency and financial markets. The exchange method of oil pricing has led to the fact that the price of oil began to be determined by its value as a financial asset and became closely correlated with such factors as stock indices, in particular, the S & P 500, Dow Jones Index, the dollar rate and its inflationary expectations.

For a graphic example of correlation we choose Weighted average dollar rate and AMEX Price Index. As the price of oil is expressed in US dollars, the correlation between oil quotations and the dollar exchange rate is obvious (Graph 10).

Graph 10. Weighted average dollar rate (Trade Weighted US Dollar Index: Broad[11]) and AMEX Price Index (AMEX Oil Index Price[12])

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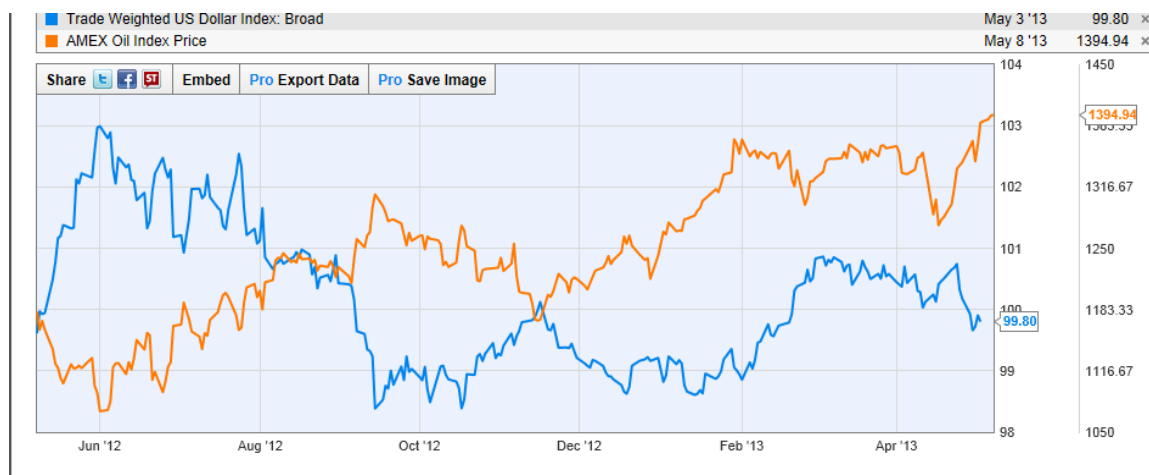
[11] Weighted average US dollar exchange rate against major trading partners in period May 2013
[12] The American stock index, which includes the price of oil for the top 13 US oil companies

Based on the above graph, the following calculations can be made. The relationship between the Amex Oil Index Price and the Trade weighted US Dollar is also proved using a correlation statistical check. So, from the two-dimensional general population (Trade weighted US Dollar, Amex Oil Index Price) we extract a sample of volume 241 (Appendix 1) and from it we find the Pearson correlation coefficient

$$r = \frac{\sum(x_i - x_{cp}) * (y_i - y_{cp})}{\sqrt{\sum(x_i - x_{cp})^2 * \sum(y_i - y_{cp})^2}}$$

using the Excel data analysis package:

r = -0.5399, which proves the inverse linear dependence of the investigated indicators.

The regression equation has the form:

Amex Oil Index Price = -36, 312 * Trade weighted US Dollar + 4891

However, the sample is randomly selected, so we can not conclude that the population coefficient is also nonzero.

Let's hypothesize H_0: there is no linear relationship between Amex Oil Index Price and Trade weighted US Dollar

As a criterion for testing the null hypothesis, we apply a random variable

T c n-2 degrees of freedom.

T obs = r | √ (n-2 /) √ (1-r ^ 2) = | 0,5399 | √ (241-2 /) √ (1- ⟦0.5399⟧ ^ 2) = 9,916

T table. (n-2; 0.05) = 3.33

T obs.> T table. - therefore, the hypothesis H_0 at the significance level of 0.05 is rejected. Communication can be considered significant.

The growth of the US currency rate leads to an increase in its purchasing power, and, consequently, to a decrease in the price expressed in dollars, and the rise in oil prices leads to dollar inflation and a decrease in its rate. Oil futures are tools to protect against dollar inflation. With a real and expected high level of dollar inflation, the demand for oil futures is growing, leading to a rise in crude oil prices

Thus, the dynamics of world oil prices is largely determined by the balance-flow of free capital of the world financial system to the futures oil market, which has become part of the

financial market. These processes are not spontaneous, but are coordinated by financial corporations and state structures of the United States and the EU that conduct an active monetary incentive policy in order to overcome the debt crisis and support the world economy.

A significant outflow of speculative capital could be possible as a result of tightening regulation of financial markets in order to overcome the crisis phenomena of the world economy. In particular, one of the measures is the establishment of speculative restrictions for commodity futures contracts and for swaps of similar derivative financial instruments. However, in September 2012, after negotiations with OPEC, the International Energy Agency (IEA) and a number of corporations, the International Organization of Securities Commissions (IOSCO) refused to reform the price regulation of swap deals. Its representatives noted that strengthening regulation could be counterproductive and would affect the representativeness of quotations

6. Econometric models of pricing in the oil market

Economic and mathematical modeling is widely used for empirical studies of the dynamics of oil prices. The main forms of modeling the oil market are:

1) Hybrid models - investigate financial, physical, regulatory and other components;

2) Model of exhaustible resource - the commodity is considered as a non-renewable asset that does not have substitutes;

3) Structural models - reveal the causal dependence of the investigated variables

One of the first most important work on modeling oil pricing is A.AL Faris (1991)[13], in which the price of oil is made dependent on economic activity in consuming countries, the exchange rate of the currencies of oil-producing countries and importing countries, the US dollar rate and the inflation index.

R.K. Kaufmann (1995)[14], using the real import price of oil as a dependent variable, compiled a structural model that includes the level of world oil demand, oil storage in oil storages and production capacities of the OECD countries, as well as the utilization of production capacities of the US and OPEC member countries.

The econometric model developed by S.Dees, P.Caradeloglou, R.K. Kaufmann, M.Sanchez (2007)[15], shows the effect of OPEC on oil prices, using the OPEC quota as dependent variables; production OPEC, exceeding the quota; the utilization factor of production capacities and the difference between the oil demand and oil stocks of OECD countries.

M. Ye, J. Zyren, J.Shore (2005)[16], examine the role of the relative level of oil reserves in order to predict the price of the WTI brand. The model also uses variables that characterize the changing policy of OPEC in the oil market and the terrorist attack of September 11, 2001.

[13] A. Al Faris. The Determinants of Crude Oil Price Adjustmanet in the World Petroleum Market. *OPEC Review*, 15, 1991.

[14] R.K.Kaufmann. A Model of the World Oil Market for Project LINK Integrating Economics, Geology and Politics. *Economic Modelling*, 12 (2) : 165-178. 1995

[15] S.Dees, P.Caradeloglou, R.K.Kaufmann, M.Sanchez . Modelling the World Oil Market: Assessment of a Quaterly Econometric Model. *Energy Policy,* 35:178-191, 2007

[16] M. Ye, J. Zyren, and J.Shore. A Monthly Crude Oil Spot Price Forecasting Model Using Relative Inventories. Interational Journal of Forecasting, 21: 491-501, 2005

Fundamental changes in the oil market over the past decades reveal the need to identify two aggregate economic models that reflect the conditions on the oil market and the economy in the periods from the 1980s to the late 1990s and the late 1990s to 2008.

6.1. Modeling the dynamics of the cost of oil in the markets of oil derivatives.

Analysis and modeling of the oil market indicators under the conditions of development and the speculative boom in the futures oil markets necessitate the consideration of the speculative factor and the uncertainty of the future price level reflected in the model of C.Dicembrio and P.L.Scandizzo (2011)

While both the main and the hypothetical component in the model have a probabilistic nature, they correspond to two different models of market conditions: (a) the need to balance long-term supply and demand for the main component and (b) the balance between requirements and circumstances for possible supplies for a hypothetical component.

The price of oil P follows the probabilistic process of the geometric diversity of the Brownian motion:

$dP = \alpha Pdt + \sigma PdZ$ (1)

where α and σ are slow and non-constant parameters

dZ is a random variable such that $EdZ = 0$ and $EdZ2 = dt$.

The optimal value of the country's activity from the oil producer will be obtained by maximizing the present net expected value of its cash flow:

$$V\left(K,P\right) = \max_{dk} E_t\left\{\int_t^\infty \exp\left(-\int_t^s p\left(u\right)du\right)\left[PQ\left(K\right)-I\right]d\tau\right\}$$ (2)

where Et is the wait due to the set of information available at time t.

According to Bellman, the optimality condition for a firm can be indicated as follows:

$\rho V\,dt = \max\,\{[PQ\,(K)\,\text{-}I)]\,dt + E\,[dV\,(K,\,P)]\,dt\}$ (3)

Using the Ito lemma,

$$E_t dV\left(K, P\right) = \left(V_k I + V_v \alpha P + Vpp\sigma^2 P^2\right) dt \qquad (4)$$

where the small subscripts denote partial derivatives.

The substitution in formula (3) and division by dt:

$$pV = \max_{dk}\left\{\left[PQ\left(K\right) - I\right]\right\} + \left[V_k I + Vp\alpha P + Vpp\sigma^2 P^2\right] \qquad (5)$$

Provided that the marginal cost of investment is equal to one, the authors obtain the following differential-difference equation:

$$pV = PQ + Vp\alpha P + \frac{1}{2}Vpp\sigma^2 P^2 \qquad (6)$$

In order to solve this equation, the authors calculate first a homogeneous component, suggesting that the solution function has a form:

$$V = AP^{\beta i} \qquad (7)$$

where A is a constant (constant) to be determined.

Replacing the cost of the function in formula (7) and its derivatives in the homogeneous component of equation (6), we obtain a characteristic equation whose two roots are given by the expression:

$$\beta_i = \frac{1}{2} - \frac{\left(p - \delta\right)}{\sigma^2} \pm \sqrt{\left[\left(\frac{p - \delta}{\sigma^2}\right) - \frac{1}{2}\right]^2 + \frac{2p}{\sigma^2}} \qquad (8)$$

In order to obtain the general solution of equation (6), a particular solution is added to the solution of the homogeneous component. A unique solution can be determined by paying attention to the fact that the basic size of a firm is equal to the current value of its cash flow: where σ = ρ-α. Adding this value to the proportional part in formula (7):

$$V = P\frac{Q}{\delta} + AP^{\beta i} \qquad (9)$$

Equation (9) implies that, given the optimal investment rule, the value created by oil production is equal to the expected current value of the optimal profit plus the possible value. This possible cost reflects hypothetical possibilities, including $P \to \infty$.

This model was tested on the basis of a sample of 192 monthly price levels from January 1994 to December 2009. On average, according to the authors' calculations, the speculative component is responsible for 12% of the oil price level, and at the highest oil prices, the share of the speculative factor exceeded 20%. Thus, price jumps in world oil markets are largely due to the actions of speculators in the financial oil.

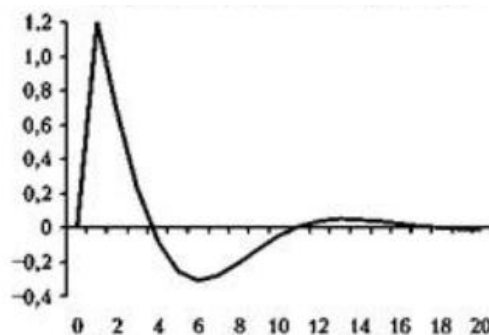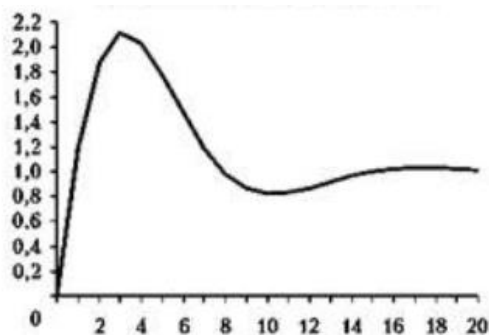## 6.2. Influence of oil prices on the Russian economy

A high level of oil prices positively influences output in the long run, but the impact on growth rates is positive in the short term and negative in the medium term.
The slowdown in the growth rate of the economy from the rise in the price of oil

As a historical example, we can distinguish the period from the second quarter. 2011 to III quarter. 2014, when oil prices stabilized above $ 100 per barrel, and the growth rate of the Russian economy was extremely low. Many explain this empirical fact by structural problems and a slowdown in the growth of domestic factors of economic development.

An example of a dome-shaped output response schedule for a permanent increase in oil prices

The impact of prices on the level of GDP / and the impact of prices on the growth rates of GDP

An illustration of this kind of dynamics is presented in Figure 1. Here it is assumed that oil prices once and permanently increased, say, from $ 100 / bbl. up to 110 dollars per barrel, and shows the dynamic response of the GDP level (Figure 1a) and GDP growth rates (Figure 1b) in response to this change. The figure shows that a higher level of oil prices positively affects output in the long term, but the impact on growth rates is positive in the short term and negative in the medium-term

However, an additional factor of the observed slowdown in economic growth in 2011-2014. there could be a transition to a phase of recession after overheating of the economy due to an increase in oil prices.

Such dynamics, in the first place, could be facilitated by the monetary policy pursued. Until the end of 2014, the Bank of Russia adhered to the policy of a managed nominal ruble rate. In particular, during the period of increasing world oil prices, the Central Bank of Russia prevented the strengthening of the real exchange rate, restraining the strengthening of the nominal rate. Thus, the increase in aggregate demand due to improved terms of trade led to an increase in demand for both imported and domestic goods. As the real exchange rate strengthened due to inflation, the competitiveness of domestic production worsened, the aggregate demand was more redistributed in favor of consumption of imported goods, thereby reducing the growth rate of the economy as compared with the long-term in the transition from a state of overheating to stationary equilibrium.

Secondly, the processes of capital accumulation can also generate some cyclical fluctuations. When there are significant changes in the economy (technological progress, increase in oil prices), which lead to a higher demand for capital in the long run, investments are growing at an accelerated pace to ensure the entry of new production capacities. But then, when the necessary capital capacities are put into operation, the need for such a large amount of investment is eliminated, and the level of investment activity is significantly reduced, which can have a negative impact on GDP, as investments are a component of aggregate demand.

Thirdly, a certain role could be played by fiscal policy and elements of political cycles. Here the following chain of events is possible. With positive oil price shocks, in the first instance, the popularity of the authorities provides for an increased rate of economic growth, and the

government largely saves additional revenues from taxation of hydrocarbons. With the decline in the positive contribution of the oil shock to the growth rate, the government, in order to support popularity, increases transfers to the population and salaries of state employees, which can trigger real private wages, higher costs and lower competitiveness of domestic production.

7. Conclusion

The importance of oil for energy, transport, national defense, for a variety of industries and for satisfying the everyday needs of the population in our age is extremely high. The oil industry is the engine of the world economy and constitutes a gigantic industry that brings huge money to the budgets of countries and goods to the homes of every person.

There is nothing surprising in the fact that oil prices are the cornerstone of the world economy. The price of oil can cause a strong movement in the stock markets. Especially strongly, oil prices affect emerging markets oriented to oil exports. Not paying attention to quotes of oil, it is impossible to successfully trade on the Russian stock market.

The study carried out within the framework of this study showed that the oil and gas sector remain not only the basic for the Russian economy, but also largely determines its further development.

This study revealed that the globalization of the world economy has led to the transformation of the mechanism of the functioning of the oil market. In the last century, the oil market was characterized by the dictates of international oil companies, until the mid-1980s the decisive role belonged to the member countries of OPEC, after which competitive pricing came to replace it. Oil begins to trade on the exchange, where prices are formed when the balance of supply and demand. The further development of exchange trade, in particular, the trading in futures contracts, increases the volume of speculative transactions leading to increased volatility of oil quotations.

For this moment, real oil prices are influenced by five main factors:

1. The level of demand, which is constantly rising in the context of global economic growth

2. The level of supply, which constantly causes problems in connection with the crisis situations in the exporting countries (military conflicts, strikes, etc.)

3. Stagnation of the economy of developed countries and slowing down the growth rate of China, leading to a decrease in the rate of demand for energy.

4. The exchange rate of the US currency, which is calculated on oil contracts, and if the dollar rate falls, the price of oil increases and vice versa.

5. Speculative trading in markets

The high dependence of the Russian economy on the export of raw materials carries serious risks that arise not only in the fall, but also in the growth of world oil prices. Lowering oil prices is accompanied by imbalances in the state budget and trade balance of the country,

and the result of higher prices may be the development of "Dutch disease" and the spiraling of inflation. The presence of such risks requires the development of adequate measures to overcome them. At the same time, in periods of favorable economic conditions, budget revenues from oil and gas exports help to generate additional resources that can be used to finance innovative activities and strengthen other sectors of the Russian economy.

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