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Crude oil price analysis in Azerbaijan

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Thesis title

Crude oil price analysis in Azerbaijan

Objectives of thesis

The main aim of the thesis is to investigate the recent dynamics of oil prices and the impact of such dynamics on Azerbaijan's economic development. The goals of the thesis are to investigate the key theoretical aspects related to energy and energy security, to analyze the recent global trends and tendencies in the oil market, to investigate the specificities of Azerbaijan's economic development and the role of oil in the country's economy.

Methodology

Theoretical overview was used for investigating the key theoretical aspects related to energy and energy security. Retrospective analysis and statistical analysis was used for investigating the recent dynamics of Azerbaijan's economic development and the dynamics of oil prices; deductive thinking was used with the aim of deriving conclusions in line with the goals and aims of the research. Also, regression analysis was used as a specific tool allowing investigating the correlation between changing oil prices and exchange rate AZN/USD, and Azerbaijan's level of GDP on the other hand. For this purpose, the secondary data was used from database called World Bank. As well was used software MS Excel for testing and to achieve set objectives

The proposed extent of the thesis

40 – 60 pages

Keywords

oil market, economic development, energy security, gdp, regression analysis, economy of Azerbaijan

Recommended information sources

Ebel, R. and Menon, R. (2000). Energy and conflict in Central Asia and the Caucasus. Lanham, MD: Rowman & Littlefield Publishers. ISBN 9780742500631. 267 p.

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Declaration

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

In Prague on   _____

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I would like to thank supervisor doc. Ing. Mansoor Maitah, Ph.D. et Ph.D. of the faculty of Economics and Management at Czech University of Life Sciences. The door to Prof. Maitah office was always office was always open whenever I ran into a trouble spot or had a question about my research or writing. He consistently allowed this paper to be my own work but steered me in the right the direction whenever he thought I needed it. I must express my very profound gratitude to my parents for providing me with unfailing support and continuous encouragement throughout my years of study and through the process of researching and writing this thesis. This accomplishment would not have been possible without them. Thank you.

Crude oil price analysis in Azerbaijan

Abstract

Oil is one of the most important energy resources and the leader in global consumption of energy. Therefore, investigating how the trends and tendencies in the oil sector affect the activities run by states is important and relevant. Azerbaijanis national economy is largely dependent on oil resources, and therefore this thesis aimed to investigate to which extent the changing dynamics of international oil prices affect Azerbaijan's economic development. Two hypotheses tested. Hypotheses were follows:

H1: Dropping oil prices have direct interconnection with Azerbaijan's dropping GDP, and vice versa. H2: The current dynamics of oil prices represent negative tendencies for Azerbaijan's subsequent economic growth.

For this purpose theoretical overview, retrospective analysis, deductive thinking and regression analysis were used as a specific tools allowing investigating.

Results of research have identified that there is indeed an interconnection between the international oil market conjuncture and the current economic situation in Azerbaijan.

Based on these results, we conclude that Azerbaijan is dependent on the overall oil market conjuncture. Azerbaijan's total oil exports have significantly dropped recently, which is due to the significantly lower oil prices. As a result, the Azerbaijani national economy is currently in a condition of recession.

Keywords: oil market, regression analysis, economy of Azerbaijan, energy resources, economic growth, export, gross domestic product

Analýza cen ropy v Azerbajdžánu

Abstrakt

Ropa je jedním z nejdůležitějších energetických zdrojů a lídrem v globální spotřebě energie. Zkoumání toho, jak trendy a tendence v ropném sektoru ovlivňují aktivity států je proto důležité a relevantní. Národní hospodářství Azerbajdžánu je značně závislé na zdrojích ropy, a tedy i tato práce se zaměřuje na prozkoumání toho, v jakém rozsahu ovlivňuje měnící se dynamika mezinárodních ceny ropy ekonomický rozvoj Azerbajdžánu.. V práci jsou testovány dvě hypotézy. Jedná se o následující hypotézy:

H1: Klesající ceny ropy mají přímou spojitost s Azerbajdžánským klesajícím HDP a vice versa. H2: Současná dynamika cen ropy představuje negativní tendence pro další ekonomický růst Azerbajdžánu.

Za uvedeným účelem jsme využili teoretický přehled, retrospektivní analýzu, dedukci a regresní analýzu jako specifické nástroje umožňující zkoumání.

Výsledky výzkumu identifikovali vzájemnou propojenost mezi situací mezinárodního trhu s ropou a současnou ekonomickou situací v Azerbajdžánu.

Na základě uvedených výsledků, docházíme k závěru, že Azerbajdžán je závislý na celkové situaci trhu s ropou. Azerbajdžánský export ropy v poslední době významně poklesl, z důvodu podstatně nižších nižších cen ropy. Důsledkem uvedeného je skutečnost, že národní hospodářství Azerbajdžánu se v současné době nachází v recesi.

Klíčová slova: trh s ropou, regresní analýza, ekonomika Azerbajdžánu, energetické zdroje, ekonomický růst, export, hrubý domácí produkt

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1 Introduction

In the current conditions of global development, the field of international geopolitics is characterized by intensified struggle between individual states fighting for their domination in their respective regions or on the international scale. Such geopolitical struggle exists in different context, including in the economic, political, military, and other plains. For the purpose of preserve their high level of national security and succeed in their geopolitical development, states need to be able to compete effectively by using the available strategic advantages, but also need to use their limited resources available in the most effective way with the aim of ensuring the best opportunities of long-term stable development.

The level of national security is preconditioned by a wide range of factors, including the level of economic independence, development of the defense sector, availability of partnership ties with other states, and so on. A unique role in the context of national security is played by energy resources. Namely, it should be understood that energy resources are indispensable for any state in the world, as virtually each economic sector consumes energy for the purpose of running its activities effectively, and furthermore, energy is indispensable for satisfying the basic needs of the social sector, i.e. the population of the respective country.

States which do not have substantial energy resource are required to seek the most effective ways to import them from abroad, which makes them dependent on external conditions, and thus more vulnerable in their geopolitical activities.

Among such energy resources, the most important role is played by oil, the leader in global consumption of energy. Therefore, investigating how the trends and tendencies in the oil sector affect the activities run by states is important and relevant. Particularly, this is important and relevant for Azerbaijan, the country chosen as the object of this research. Azerbaijan is located in the Caspian Basin region, and is one of the states considered as top oil import partners by the European Union.

The country's national economy is largely dependent on oil resources, and therefore this thesis will aim to investigate to which extent the changing dynamics of international oil prices affect Azerbaijan's economic development.

2 Objectives and Methodology

2.1 Objectives

The main aim of the thesis is to investigate the recent dynamics of oil prices and the impact of such dynamics on Azerbaijan's economic development.

The goals of the thesis are to investigate the key theoretical aspects related to energy and energy security, to analyze the recent global trends and tendencies in the oil market, to investigate the specificities of Azerbaijan's economic development and the role of oil in the country's economy, to evaluate the recent dynamics of oil prices in the international market, and to reveal the impact of such oil price dynamics on Azerbaijan's economic development.

In the research paper, two hypotheses will be tested. They are the following:

H1: Dropping oil prices have direct interconnection with Azerbaijan's dropping GDP, and vice versa.

H2: The current dynamics of oil prices represent negative tendencies for Azerbaijan's subsequent economic growth.

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2.2 Methodology

A number of methodological approaches will be used for running this research. Namely, theoretical overview will be applied with the aim of investigating the key theoretical aspects related to energy and energy security; retrospective analysis and statistical analysis will be used for investigating the recent dynamics of Azerbaijan's economic development and the dynamics of oil prices; deductive thinking will be used with the aim of deriving conclusions in line with the goals and aims of the research; and synthesis of data will be applied for summarizing the findings revealed.

Also, regression analysis will be used as a specific tool allowing investigating the correlation between changing oil prices and the Azerbaijani manat's exchange rate against the US dollar on the one hand, and Azerbaijan's level of GDP on the other hand; and

forecasting will be used for modeling the potential subsequent development of Azerbaijan taking into consideration the current trends in international oil prices.

3 Literature Review

3.1 Energy sector: key specificities

When investigating the energy sector and its particularities, it is first of all worth clearly defining and understanding the key theoretical aspects related to the energy sector, and explaining the main terms to be subsequently used and more deeply investigated in the thesis.

Energy is a very broad term derived from physics, and it may have a great number of interpretations depending on the particular approach chosen by the researcher, and on the particular aspect of energy investigated or classified. In the broadest terms, energy can be defined as any system's capacity to perform its functions or work of any kind. Thus, it can be stated that any living body or organism inherently has its energy which is subsequently transformed into work outputs (Steger 2005). Energy has its own inputs. For instance, living organisms take their energy from food and water, while machines, robots and other anthropogenic mechanisms take their energy from fuel, electricity, etc. (Brown 2002).

From the point of view of physics, energy can take two different forms: potential or kinetic energy. Potential energy is the one which an organism or machine stores, and can subsequently use for ensuring its activities. At the same time, kinetic energy is the one which exists during the process of movement. According to the laws of physics, potential energy can transform into kinetic energy, and vice versa. This law also applies to the transformation of different types of energy into its other types (for instance, heat into power energy or kinetic water energy into hydropower) (Steger 2005).

The types of energy are much variegated as well. Namely, they include, but are not limited to thermal, chemical, nuclear, electrical, solar energy, and so on. This categorization of energy is based on the source which ensures the generation of energy (Wiser 2000).

Energy has been playing an essential role in the organization of human activities since the ancient times, as the conservation and effective use of energy precondition not only the functioning of complex mechanical and engineering systems, but also the very basics of human life, namely the maintenance of body heat, prevention of freezing,

consumption of food for effective work, and so on (Bigerna et al. 2015). With the course of time, humanity progressed, and the use of energy became even more important with the aforesaid technological progress, particularly when complex processes were put into effect. The energy resources now were used more actively by humanity, and their development intensified with the growing industrial production (Agt 2011).

Energy resources can be defined as materials, substances or natural phenomena which can be used by people for generating energy for any purposes. All energy sources can be divided into the main types: fossil fuels, nuclear fuel, and renewable sources of energy. Each of those sources plays a unique role for the effective functioning of the global economy and the economies of individual states all over the globe, and therefore their rational use is a key task for the long-term global prosperity (Dupont 2015). The three types of energy resources will be investigated more in detail in the next chapter of the thesis.

The energy sector, also commonly referred to as the energy industry, is the complex including all industries dealing with the development of energy resource deposits, their operation, production of energy resources, generation of power, and the sales of any kind of energy resources or their derivatives. Thus, the energy sector comprises the entirety of various activities involved in the provision of humanity with energy resources and power (Junginger et al. 2012).

As the energy sector is a complex of different industries, it includes different elements which are interconnected, and ensure the effective functioning of the economy and social sphere. The most prominent components constituting the energy sector are as follows:

1. Oil-and-gas industry. This sector includes companies and processes associated with the development of oil and gas deposits, extraction of oil and natural gas, their refinement and enrichment, transportation, distribution and sales. Also, this industry comprises a number of associated processes such as the production of coal gas, which is a byproduct of the main processes;

2. Coal industry. Similarly to the oil-and-gas industry, the coal industry includes the same processes, although associated with coal. Historically, the development of the coal industry gained the most rapid boost, and ensured the effective industrial progress of

humanity, which was due to the specificities of coal production, namely its easiness as compared with the production of oil or natural gas (Steger 2005);

3. Traditional energy industry. This branch consists in the use of firewood as the source of energy. It used to play an important role on the earliest stage of humanity's development, but as of today, it rather remains as a rudiment in less developed and poorer countries;

4. Nuclear power industry. This industry of the energy sector ensures the generation of power through complex technological processes associated with the processes of nuclear reactions;

5. Renewable energy industry. The use of alternative sources of energy for manufacturing power plays an important role in the preservation of the environment and the prevention of global crises associated with the lack of sufficient traditional energy resources;

6. Electrical power industry. All resources produced within other branches of the energy sector or obtained from nature are processed using the technologies available to humanity in order to derive electrical power which is subsequently used in the widest variety of different spheres of the global economy and human life. The electrical power industry includes three main components, namely electricity generation, its distribution through power supply lines, and the sales of energy (Twidell and Weir 2006).

Taking into account the specific features of the energy sector, it becomes clear that this complex of industries plays an essential role for any country's effective development, and even for their national security, as the provision with energy resources largely predefines any such country's ability to withstand all possible challenges and negative shocks. Therefore, the energy sector is commonly believed to play a strategically important role in raising national and global welfare, and therefore energy resources are considered to be strategic resources (Aalto 2008).

However, the extensive use of energy resources required for ensuring the industrial progress of humanity assumes a great number of issues inherent of such processes. Namely, on the one hand, this is preconditioned by the fact that energy resources are most often non-renewable, and therefore their global reserves are quite limited. On the other hand, the extensive use of energy resources is often associated with negative effects for the

environment, and therefore the continuation of the aforementioned processes may in the long run lead to irreversible natural cataclysms (Bjørnebye 2010).

The energy sector is paid particular attention as of today, in the conditions of globalization, by all of the world's countries. This is due to the fact that energy has long become a strategic resource of the greatest importance. Thus, it ensures the functioning of all economic branches, and the existence of the population, and therefore is indispensable for any state. Countries with the lack of energy resources are forced to import it from energy-abundant exporters, which is the case of developed Western European states which have much developed economies, but very scarce and limited energy resources, which makes them enter the international market in search for energy imports (Checchi et al. 2009).

Taking into account the great dependence of countries with scarce energy resources on energy imports, it may become clear that energy is not only a powerful economic resource, but also a lever of geopolitical impact and tensions, as energy-abundant countries have a lever to affect the states with energy deficit in both economic and political terms (Twidell and Weir 2006).

As a result, a key task of energy importers, i.e., the vast majority of countries around the globe, is to develop their own independent energy policies, diversify the sources of energy supplies for minimizing the inherent risks, and increasing the share of alternative energy sources in order to reduce their dependence on the traditional energy resources imported from foreign countries (McGowan 2013).

In the next chapter of the thesis, different energy resources and their specific characteristics will be investigated more in detail.

3.2 Energy resources and their types

3.2.1 Fossil fuels

Fossil fuels are energy resources formed through natural processes, and are organic in their nature. Such processes might vary, but most often, they are associated with the decomposition of dead organisms of plants or animals under the effects of oxygenation. Such energy resources are believed to be non-renewable, as the average time required for a

fossil fuel deposit to be renewed amounts to hundreds of millions of years. Due to this, it can be stated that the estimated global reserves of fossil fuels would be used off much earlier than the time required for the nature to renew at least part of them (Checchi et al. 2009).

The most important fossil fuels include oil, natural gas, and coal, while other types of those resources also include turfs, kerosene shale, and so on. All such fuels contain hydrocarbon which is the main component ensuring the generation of electrical power from the respective raw materials (McGowan 2013).

Fossil fuels are also commonly referred to as traditional energy resources due to the fact that their production and use for electricity generation is the most widely spread around the globe, namely due to the fact that the extraction and processing of such resources is rather cheap on the one hand, and the global logistics allow effectively transporting them on the other hand (Twidell and Weir 2006).

As of today, the global use of non-renewable energy resources, i.e. fossil fuels, accounts for over 85% over the world's energy consumption. This figure proves the importance of fossil fuels for the functioning of the global economy (Wiser 2000).

However, despite the economic advantages of fossil fuels, there are constantly growing concerns over their industrial use, which is due to several main reasons. First of all, it should be understood that the permanently growing industrial needs within the global economy lead to the gradual exhaustion of fossil fuels, and as of today, the alternative energy sources cannot effectively replace the traditional power resources for feeding the entire world with power. On the other hand, an important aspect is the negative environmental effects inherent of thermal power plants working on fossil fuels (Agt 2011). Therefore, as of today, an important task of any developed state as of today is the diversification of energy resources for the purpose of minimizing the possible threats to energy security, and thus to national security in general (Junginger et al. 2012).

A trend in the international market is the growing consumption of fossil fuels in absolute terms, which is preconditioned by the growth of the global economy, particularly after its restoration from the recession caused by the 2008 global financial and economic crisis. However, in developed states, the share of alternative energy sources is constantly increased due to the drawbacks of fossil fuels described above (Checchi et al. 2009).

3.2.2 Nuclear fuel

Nuclear fuel is a type of energy resources containing materials capable of nuclear fission through which nuclear energy is obtained. The extraction and the subsequent procession of nuclear fuels are much expensive, and involve up-to-date technologies, due to which their use is largely limited, and is most intensive in developed countries (Junginger et al. 2012).

The most widely used nuclear fuels include uranium and plutonium, which have the best parameters in terms of the resulting energy generation. The energy density of nuclear fuels is much higher as compared with the traditional energy resources, and therefore nuclear power plants can effectively cover greater needs in energy of both industrial facilities and the population (Brown 2002).

The typical process associated with the use of nuclear fuels includes the following key stages: production of nuclear fuel, refinement, purification, use at nuclear power plants, and the subsequent disposal of the remains of such fuels. The entirety of those processes is commonly referred to as the nuclear fuel cycle (Fräss-Ehrfeld 2009).

Within nuclear reactors, nuclear fuels are hit by neutrons, which causes their disruption, and thus the emission of new neutrons. As a result, a chain reaction occurs, and through the process of such neutron emission, energy is generated (Brown 2002).

Despite the advantages of nuclear energy production, there are some obstacles to the development of this field of energy production and the use of nuclear fuels as sources of energy. Namely, the main issue associated with nuclear power production is the associated risks of nuclear pollution due to the possible uncontrolled processes in nuclear reactors or due to natural impacts. Another important issue is the use of nuclear fuels for the production of nuclear weapons. As countries around the globe struggle for the non-proliferation of nuclear weapons, this limits the technological capacities of nuclear fuel processing permitted by the international agreements (Junginger et al. 2012).

3.2.3 Renewable resources

Renewable energy sources are those energy resources which can be renewed or replenished within quite short deadlines, i.e. during human life, and therefore their use is not threatened by any physical limits. Thus, renewable energy sources differ from

traditional ones. Another key specific feature of renewable energy resources is the fact that they are not extracted, but are rather used in technological processes from transforming their energy directly into electrical power (Haghighi 2007).

Different renewable energy sources are located all over the globe, and the abundance of particular geographic regions in such resources is largely predefined by the specificities of their proximity to the Equator, and the particular climatic conditions or specificities of landscapes. However, the effective use of renewable energy resources requires the use of up-to-date technologies, and therefore alternative power production is mostly developed in the world's countries with the highest economic development. However, prospects exist for the development of alternative energy production in less developed states as well taking into account the great availability of such energy sources in those states, and taking into account the overall global trends for the diversification of energy sources used for power production (Brown 2002).

The world's most prominent renewable energy sources include, but are not limited to the following:

- Solar power. This resource is obtained through the rays of the sun which are collected onto special voltaic elements on sun batteries. Solar energy capture technologies can be divided into active or passive, depending on the particular processes applied for storing and subsequently using the energy received on the solar batteries;

- Wind power. The energy of wind is transformed into electrical power through the use of electrical windmills;

- Hydropower. The kinetic energy of rivers is capture by hydropower plants, and this renewable energy resource accounts for the greatest amount of energy production among alternative power sources;

- Biological materials. This energy resource is constituted by living organisms, namely plants or biomass, which are used as a source of power;

- Geothermal energy. This type of energy resource exists in the heat contained in hot streams in the surface of the Earth, and is used in geothermal power plant for generating electrical power (Fräss-Ehrfeld 2009).

The use of renewable energy sources is promoted in developed states both on the public level and on the level of enterprises and households. Thus, countries seek reducing their dependence on the imports of fossil fuels on the one hand and minimizing the negative impact of energy production on the environment on the other hand (Marín Quemada et al. 2012).

Having investigated the key aspects related to energy and different energy resources, in the next chapter of the thesis, the focus will be put on oil as an energy source and its particular role.

3.3 Oil as an energy resource

When investigating energy sources, it is worth paying particular attention to oil, as the role of oil in the global energy market is crucial. This is due to the fact that for the last 40 years, oil has steadily remained the main source of energy in terms of global consumption. As of today, the share of oil still remains at a level of over 30% in terms of global energy consumption, even despite the constantly popularized trend of the use of alternative energy sources. This means that oil prevails over other energy resources in terms of its use in the corporate sector and the provision of the population with basic commodities through power production (International Energy Agency 2018).

Therefore, understanding the major share of oil in global energy consumption, it becomes clear that oil plays an utterly important role in the provision of the energy sector's normal and uninterrupted operation not only on the level of individual states, but also on the level of the entire international economy. Without the sufficient provision with oil, most countries become unable to ensure the most effective operation of their national economy.

Oil as an energy resource has an important specificity and particularity: crude oil as such can rarely be consumed in production by companies or by households. In order to consume oil for producing energy, its refinement is required. As a result, countries without the availability of oil refinement facilities are forced to import part of energy resources from aboard, even if they have oil deposits. Also, it should be understood that the multiple stages of oil production raise the cost of use of this energy resource, due to which it becomes more expensive. With the development of new technologies and the growing

importance of biofuels and various alternative energy resources, the use of oil may become less effective, and this may lead to its replacement by other energy resources in major part (The Emirates Center for Strategic Studies and Research 2012).

Also, in the light of the recent negative dynamics of oil prices, the effectiveness of oil production has sharply fallen together with the financial benefits which oil producers may draw from their trade activities. This poses under doubt the subsequent prospects of oil as an energy resource on the one hand, but on the other hand, this may also generate higher demand on the part of net energy importers, as purchasing oil has already become cheaper (Investing 2019).
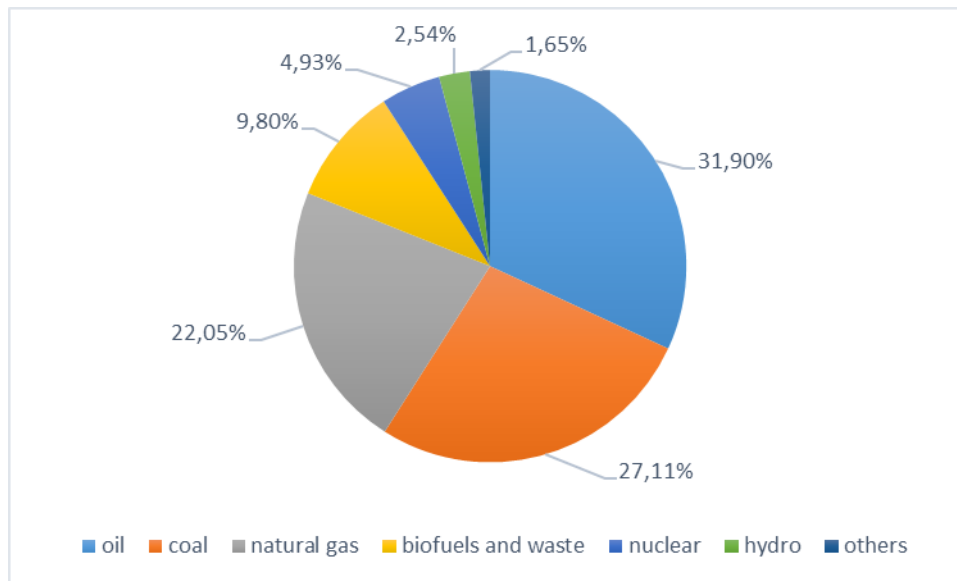
The current situation in the global oil market will be investigated later in this thesis. However, at this point, it is worth noting in particular that as of today, oil plays an important role not only as an energy resource. It is also a major factor affecting the structure, directions and scope of international relations. Due to the strategic importance of oil as an energy resource, it largely affects how the net importers and exporters cooperate, which efforts they undertake in order to preserve their high level of energy security and independence, how they try to diversify the structure of their oil imports, and how they achieve balance in terms of their energy consumption. This emphasizes the importance of oil and further highlights the importance of the investigation of oil within the framework of this paper (Looney 2012).

Taking into consideration the facts described above, in the next chapter of the thesis, the most prominent trends and tendencies in the global oil market will be investigated and analyzed.

3.4 Global oil market: key trends and tendencies

Understanding the current trends and tendencies in the global oil market and its overall structure is an important task within the framework of this paper, as it should allow understand the practical situation in the oil market in which Azerbaijan operates, including the most recent tendencies in this market in terms of oil price dynamics.

First of all, let's investigate the current global structure of energy consumption by source.

Pie chart showing global energy consumption by source:
- oil: 31,90%
- coal: 27,11%
- natural gas: 22,05%
- biofuels and waste: 9,80%
- nuclear: 4,93%
- hydro: 2,54%
- others: 1,65%

Legend: ■ oil ■ coal ■ natural gas ■ biofuels and waste ■ nuclear ■ hydro ■ others

Source: International Energy Agency 2018

Figure 3 1 Global structure of energy consumption by source, as of 2016

As Figure 1 above illustrates, oil is the most important source of energy consumption on the global scale as of today. Thus, the aggregate share of oil in global energy consumption amounts to as much as 31.9%, i.e. almost 1/3 of aggregate global consumption. Other most important resources in terms of global consumption include coal (27.11%), and natural gas (22.05%). The shares of other energy sources such as nuclear energy, hydropower, biofuels and alternative energy sources such as solar, wind energy, etc. are significantly smaller.

Overall, it can be stated that this structure emphasizes explicitly the importance of oil as an energy resource which has already been stated earlier in the course of this research. Global production is to the largest extent dependent on oil, and thus the effectiveness of the oil market's operation preconditions greatly the overall development of the global economy, and of individual countries.
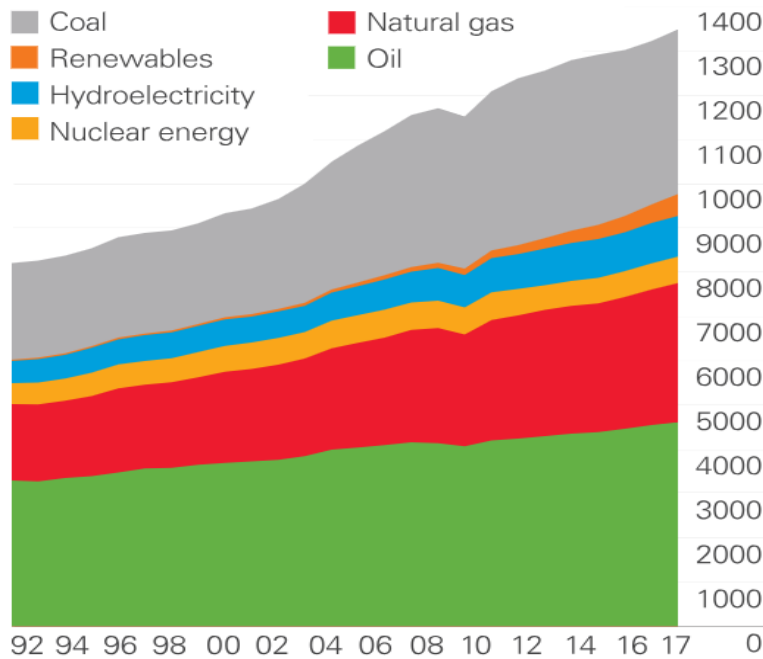
Source: BP statistical Review of World Energy 2018

Figure 3 2 Global dynamics of energy consumption by source in 1992-2017

Figure 2 above illustrates the dynamics of energy consumption by different types of energy sources. As can be seen from the chart, global energy consumption tends to keep steadily growing. This might illustrate the fact that the global economy is steadily developing, and thus requires greater and greater energy consumption volumes with the aim of ensuring the opportunities for its subsequent growth and development. However, in the context of oil as an energy resource, we can see from the chart that its aggregate share in global energy consumption has been shrinking lately, even despite the fact that it still maintains the leading positions on the global scale in those terms. At the same time, it is also worth noting the growing importance of alternative energy sources, which become particularly important and powerful in developed states (BP statistical Review of World Energy 2018).
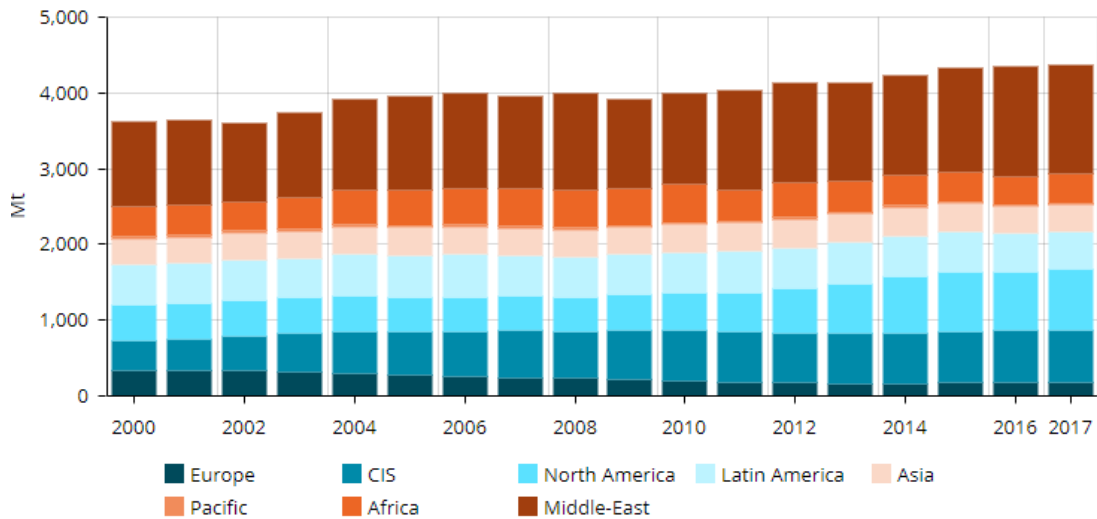
Source: Enerdata 2018

Figure 3 3 Statistics of global crude oil production in 2000-2017, in Mt

Figure 3 above illustrates more specifically the recent dynamics of global oil production. As can be seen from the chart, this figure has been steadily growing since the year 2010, i.e. after the recovery from the global financial and economic crisis. Moreover, since 2011, global yearly oil production has always remained at a level of over 4,000 Mt, and exceeded 4,200 Mt in 2015. Overall, those trends emphasize that even despite oil's shrinking share in global energy consumption, the absolute volumes of the resource's consumption have been steadily growing recently, which means that the absolute demand for oil around the globe tends to keep growing.

At the same time, it is also worth noting from the chart that the world's leading region in terms of oil production is undoubtedly the Middle East followed by North America and the CIS countries.
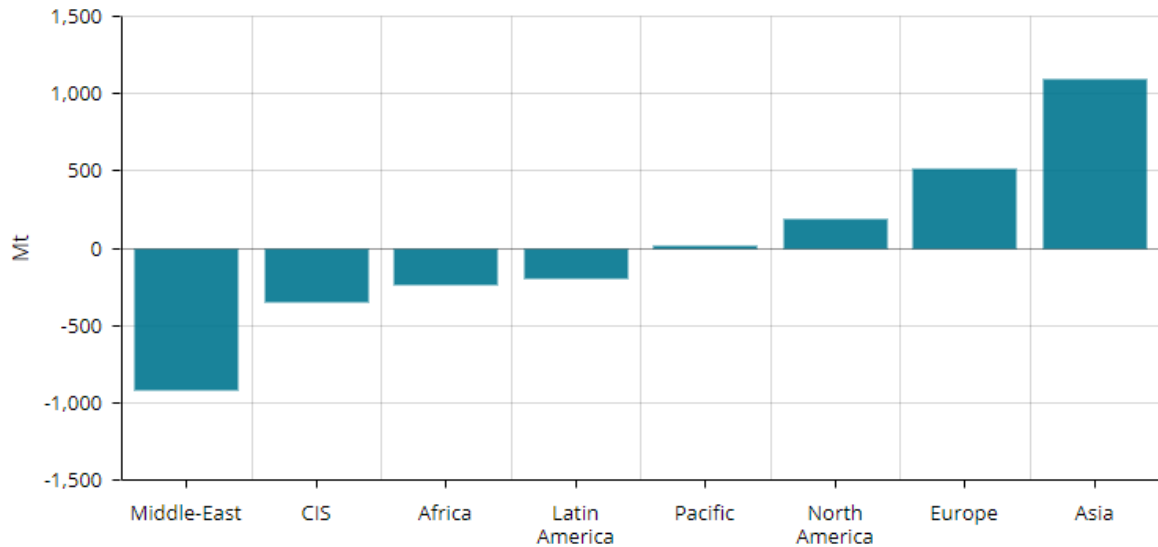
Source: Enerdata 2018

Figure 3 4 Statistics of global crude oil trade, as of 2017 (top importers), in Mt

Figure 4 shows the balance of the world's different region trade in oil as an energy resource. As can be seen from the chart, the main top net exporter of crude oil as of 2017 is the Middle East followed by the CIS countries. At the same time, Asia, Europe and North America are net oil importers, even despite the fact that countries such as the US or Canada are among the world's leaders in terms of oil production. This is due to the fact that those developed states consume great amounts of energy resources for ensuring the most effective functioning of their national economy, and as a result do not satisfy their national demand fro oil using only domestic oil sources. Also, this depends upon the national policies in the oil sector and the direction of the market's development identified by the public authorities of the respective state (Blas and Hurst 2016).
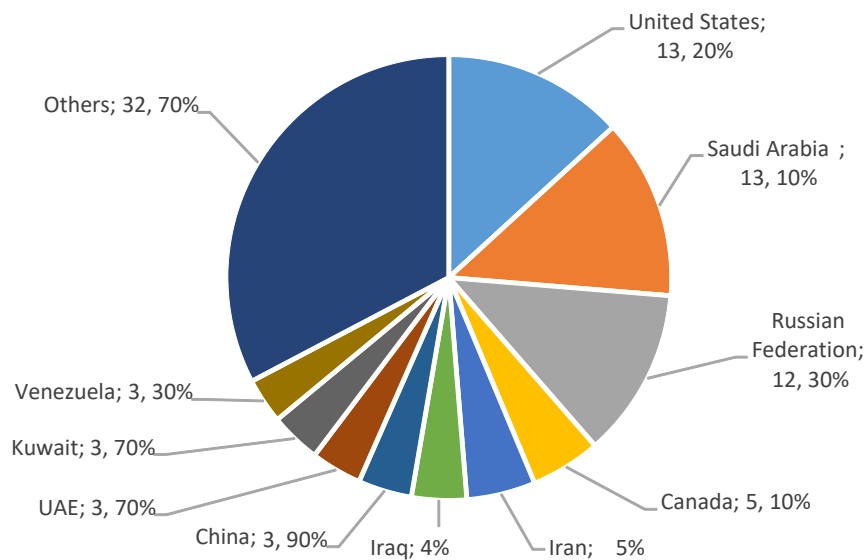
Source: Enerdata 2018

Figure 3 5 World's top oil producers, as of 2017

Figure 5 above illustrates the current structure of global oil production in terms of its absolute volume in the breakdown by states. As can be seen from the chart, the world's major oil producer as of today is United States, which alone accounts for 13.2% of global oil production. Other important states in this context include the Saudi Arabia (13.1%), and the Russian Federation (12.3%). Thus, as can be seen from this information, both global superpowers are among the global leaders in terms of oil production. This is one of the factors which contributes to the particular role of energy in global geopolitics, and further emphasizes the particular role played by this strategic resources. Other major global oil producers include Canada (5.1%), Iran (5%), Iraq (4%), China (3.9%), UAE (3.7%), Kuwait (3.7%), and Venezuela (3.3%). The 10 abovementioned states in aggregate account for 67.3% of global oil production, while the aggregate share of all other states is significantly smaller, and makes up only less that 1/3 of global oil production.
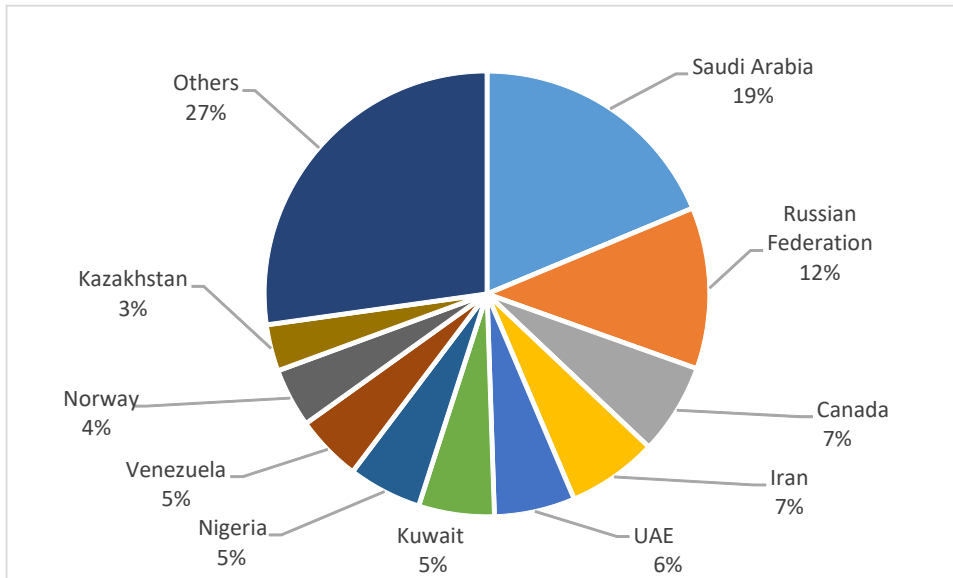
Source: Enerdata 2018

Figure 3 6 World's top net oil exporters, as of 2017

Figure 6 above illustrates the world's current major net exporters of oil. As can be seen from the chart, those countries include Saudi Arabia (19%), the Russian Federation (12%), Canada (7%), Iran (7%), UAE (6%), Kuwait (5%), etc. The top 10 global net exporters of oil account for 73% of global net oil exports in aggregate. At the same time, it worth noting the absence of the US on the chart. This is due to the fact that, despite being a major global oil producer, the US had been having a ban of all oil exports until 2016, when it was finally lifted, which already boosted the development of the American oil sector, and more generally, gave a major impetus to the US national economy for its subsequent growth (Blas and Hurst 2016).

Now, it is worth focusing our attention on another main aspect of the global oil market, and namely the current trends in the market in terms of the prices for oil and their potential further movements which definitely affect the opportunities for major oil exporters to ensure their economic development and growth.

In order to provide forecasts regarding the dynamics of oil prices in 2019, it is worth first noting that there are three main benchmark crude oil grade used in the international oil pricing regime: Brent, WTI, and Dubai/Oman. However, the most widely accepted benchmark oil grade for tracking any oil price dynamics in the international

market is Brent (Mabro 2006, p. 60). Therefore, our investigation will be based on the analysis of price movements of Brent.

Source: Investing 2019

Figure 3 7 Brent oil price dynamics per barrel in 2014-2019

The chart above illustrates the dynamics of Brent oil prices in 2014-2019. During this period, the highest price for a barrel of Brent was observed in June 2014, and amounted to USD 112.36 per barrel. However, as the figure illustrates, since the second half of 2014, oil prices had started dropping sharply, and only a slight improvement (however still far lower as compared to the previous years) was observed in 2016.

Source: Investing 2019

Figure 3 8 Brent oil price dynamics per barrel in December 2018 -March 2019

However, closer to the year-end of 2018, Brent oil prices began to rise again. Thus, while the price for Brent had amounted to USD 61.55 per barrel on December 14, 2018, it already raised to USD 67.66 by March 14, 2019 (the last trading day as of the date this paper is written), only slightly dropped to USD 50.47 by December 26, 2018.

So, overall, we can see that the dynamics of the price for Brent crude oil fluctuate much and are not stable. This emphasizes the need to forecast the prices for oil in the next year, as oil is a strategic resource for all countries affecting the effective activities of the authorities, corporate and private sector, and also largely preconditioning the level of states' national security in general.

First of all, it should be noted here that from the years 2017 and 2018, the Organization of the Petroleum Exporting Countries (OPEC) featuring member states which are among the global leaders in oil production agreed upon the establishment of a cap for oil production in 2017 (the first such step within the last 8 years). The cap value is set to be 44.3 million barrels a day. According to experts, this step may predefined the movement of oil prices in 2018-2019 (Bloomberg 2019).

The **World Bank**'s initial forecast for Brent oil prices in 2019-2020 had stated an average price of USD 67 per barrel. The world Bank expects oil prices to average USD 67 per barrel this year that is $ 2 less next year than forecast last June, the Bank said in its Global economic Outlook report, in which it also revised its growth forecasts against the background of the "darkening of the sky" for the world economy. (Source for Oil & Energy News 2019).

The **US Energy Information Administration**'s (independent body within the structure of the Federal Statistical System) forecast published on March 12, 2019, states that the price for Brent in 2019 will amount to USD 63 per barrel on the average. I.e. slight dropped is expected as compared to 2018. In 2020, their forecast again drop to USD 62 per barrel on the average. When comparing this forecast with the one provided by the World Bank, it can be stated that it is 5.97% lower (US Energy Information Administration 2019).

According to **Goldman Sachs** (one of the world's major investment companies), the prices for Brent oil are expected to amount to approximately USD 62.5 per barrel in 2019. That is 10% lower that their previous forecast of USD 70 per barrel. The oil market will be balanced with lower marginal costs in 2019, given higher levels of reserves at the

beginning of the year, a steady blow in shale production growth in 2018 amid minor cost inflation, weaker than previously expected, and expectations of demand growth and an increase in low-cost production capacity. This forecast is 0.8 % lower as compared to the USEIA or 6.7% lower as compared to the World Bank (Consumer News and Business Channel 2019).

Deloitte's (one of the world's major audit companies and providers of professional services) forecast the highest price for Brent oil in 2019: Brent oil price is expected to remain on the level of USD 68 per barrel in 2019. (Deloitte 2018).
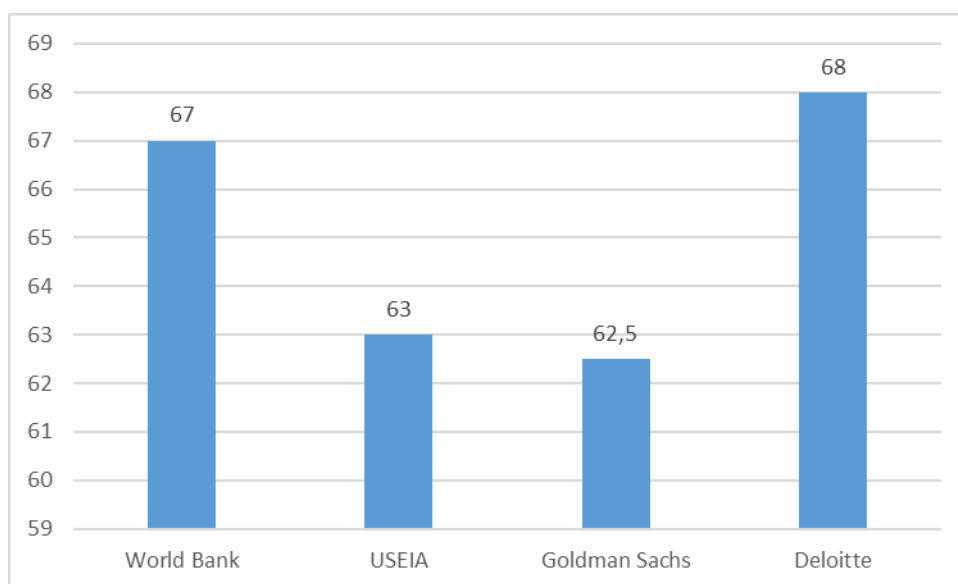
Source: Source for Oil & Energy News 2019, US Energy Information Administration 201, Consumer News and Business Channel 2019, Deloitte 2019

Figure 3 9 Brent oil price in USD per barrel forecasts for 2019: summary

Figure 9 above shows the summary of major Brent oil price forecasts for 2019. As can be seen from the chart, the forecasts provided by the US Energy Information Administration, Goldman Sachs, are rather comparable, while Deloitte's forecast oversees a higher price for Brent crude oil grade per barrel in 2019.

In aggregate, based on the above forecasts and the information described in this paper, it can be stated, that Brent oil prices in avarage are expected to remaining lower in 2019, with maybe only the slightest upward movement possible, which is rather negligible.

No recovery in oil price should be expected for 2019, and the situation with oil prices should be expected to remain relatively the same as in 2018.

Now, having investigated the most prominent trends and dynamics in the global oil market, we may emphasize again the strategic importance of oil as an energy resource. Taking into account that fact, in the next chapter of the thesis, energy security will be paid particular attention.

3.5 Energy security

In order to understand energy security and its importance in the international geopolitical arena, it is worth first providing the definition of energy security. According to Pradhan (2008), "*energy security can be defined as the capabilities to mitigate the vicissitudes of uncertainties in the event of a crisis in terms of energy supply as well as demand disruptions during a period of time*." Therefore, based on this definition, it can be stated that energy security stands for an energy consumer's ability to ensure the stable supplies of energy and its sufficiency for covering the required needs in energy, even in case of any negative events or developments.

Leal Filho and Voudouris (2013) claim that the concept of energy security is mainly investigated in terms of two key concepts: from the economic perspective on the one hand, and as a component of national security on the other hand. In the economic context, energy security means that a country, region or company requires minimizing the inherent risks in terms of energy sufficiency and ensuring the uninterrupted supplies of energy. As has been stated earlier in this thesis paper, in the current conditions, the global economy cannot function without energy, and moreover, is steadily raising the volumes of energy consumption. Therefore, in this context, energy security is a key precondition for ensuring the growing levels of economic production and the quality of economic development. At the same time, in the broader context, energy security should be seen as a factor which affects national security in general. Thus, in the current conditions of international geopolitics, oil is not only an important energy resource, but also a critical factor preconditioning the development of international relations. Therefore, a country's energy security also means its stable positions in international relations, ability to withstand effectively external threats, and so on.

Sovacool (2011) provides another definition of energy security considering this phenomenon from the perspective of households and the role of energy in their operation. In this context, the researcher defines energy security as the "*access to secure, stable, and reliable supplies of modern energy services in full so as to ensure human health and well-being.*"

Therefore, basically, proceeding from the above definitions, we can state that although slightly differing in their formulations, they still mean largely the same. Also, they stress the importance of energy security for any kind of economic actors.

In addition to energy security, it is also worth investigating the notion of energy insecurity. Sovacool (2011) defines energy insecurity as a lack of affordable and/or sufficient energy resources, which thereby affects the quality of individuals' life or the effectiveness of corporations and the public sector's operation.

Taking into account the above information, it is worth highlighting the fact that energy security is a multi-sided phenomenon which embraces a large number of different fields, including the economy, social sector, public authorities, international relations, etc. Therefore, in order to ensure their energy security, states are required to undertake the most effective steps and actions not only in terms of their domestic policies, but also in terms of their relations with any foreign countries.

Also, it should be noted that there are numerous threats affecting a country's energy security. For instance, as stated by Vivoda (2014), the main threats to energy security can be classified in the following way:

1. Political factors. These factors are the most important ones in terms of international energy security. Namely, here, the author emphasizes the role of the policies implemented by major energy resources suppliers such as Russia and the Middle Eastern countries, and also the overall geopolitical situation in those states and in their relations with other foreign counterparties. Any military conflicts in the Middle East or political disagreements with the Russian Federation on the part of the Western states pose under doubt their energy security, but also the energy security of all other states in the world, as the aforesaid countries are the largest energy suppliers which affect the quantity and prices of energy supplies, which in their turn affect the national security of states around the globe.

2. Economic factors. Economic factors affecting energy security may include the lack of the required technologies for processing raw energy materials and generating power from them. The lack of piping and transport infrastructure may be another important factor affecting a country or region's energy security. Also, it is worth noting a country's overall financial condition and the availability of funds for covering significant imports of energy resources as another critical factor affecting the level of energy security. Except for those states which fully ensure their provision with energy resources, other countries are forced to import energy from abroad in large quantities. Therefore, the availability of financial resources is a key precondition to ensuring their high level of energy security.

3. Environmental factors. Any acts of God or other negative natural conditions may affect a country's energy security. Also, in this context, it is worth remembering that fossil fuels are not renewable, and therefore the subsequent exhaustion of fossil energy deposits would definitely affect the overall quantities of energy supplies, and thus the overall sufficiency of oil for the current global demand. As a result, this affects greatly energy security on the global scale.

4. Psychological factors. Even if there are no other obstacles to energy security, psychological factors may play an important role still. Those factors include any psychological aspects which affect an individual or group of individuals' perception of their energy security and their expectations regarding the future of their energy security and its overall implications for such individuals' life.

Thus, based on the information provided above, it can be stated definitely that energy security plays an essential role in the effective existence of states, and therefore it should be paid particular attention on the part of the public authorities.

Now, it is worth proceeding to the practical part of the thesis where Azerbaijan's economic development and the role of oil prices in it will be investigated in detail.

4 Practical Part

4.1 Overview of Azerbaijan's economic development

Prior to line a regression analysis in order to evaluate the role of oil prices in Azerbaijan's national economy and its growth, it is first worth investigating the overall parameters of Azerbaijan's economic development, and identifying the particular role which energy resources play in the Azerbaijani national economy. This is required in order to justify and validate the importance of the subsequent findings and practical recommendations within the framework of this research to be developed based on the results of the practical part of this analysis.
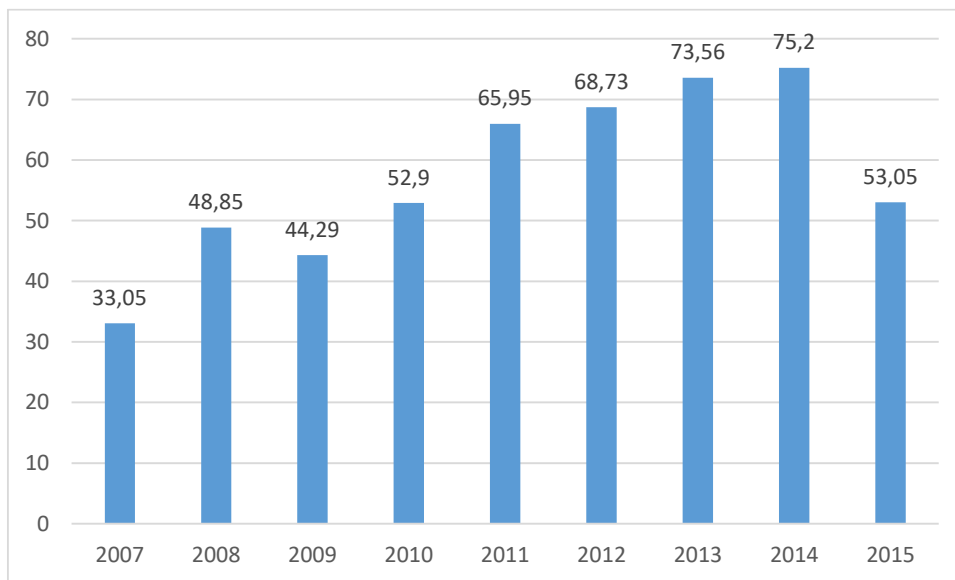
Source: World Bank 2016

Figure 4 1 Dynamics of Azerbaijan's GDP (Nominal) in 2007-2015, in current USD billion.

As can be seen from Figure 1 above, Azerbaijan's gross domestic product has demonstrated negative dynamics lately. Thus, as the chart illustrates, the country's GDP had been growing from the year 2009 until 2014, but thereafter sharply dropped in 2015. The total decrease in the level of Azerbaijan's GDP in 2015 made up 29.5% compared to the previous year. Even in 2009, after the start of the global financial and economic crisis, the country's GDP had not been subject to such a drastic shrinking. This tendency is definitely negative for the country, as it means the lesser effectiveness of Azerbaijan's

national economy, and thus the country's overall limited opportunities to succeed in international relations in both economic and geopolitical terms. Taking into account the fact that oil accounts for almost one half of Azerbaijan's GDP, it can be stated that those recent negative dynamics were caused by the country's dropping oil prices to a large extent (World Bank 2016b). However, we will focus on that assumption more in detail in the next chapters of this thesis.
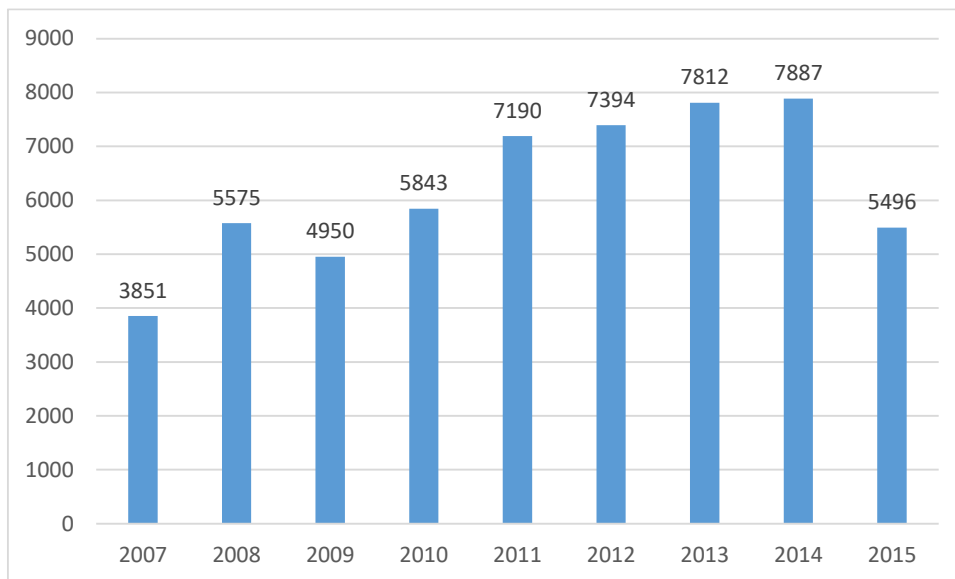
Source: World Bank 2016

Figure 4 2 Dynamics of Azerbaijan's GDP (Nominal) per capita in 2007-2015, in current USD

Figure 2 above reveals the dynamics of Azerbaijan's GDP per capita. As the chart illustrates, the trends and dynamics in those terms are largely similar to the trends and dynamics in terms of the absolute GDP figures. In 2015, Azerbaijan's GDP per capita amounted to USD 5,496, and thus was 30.4% lower compared to the previous year. This trend is negative for the country, as it means that the Azerbaijani population earns less, and its purchasing power tends to keep falling, which is a major negative for both the Azerbaijani national economy and the population's overall living standards.
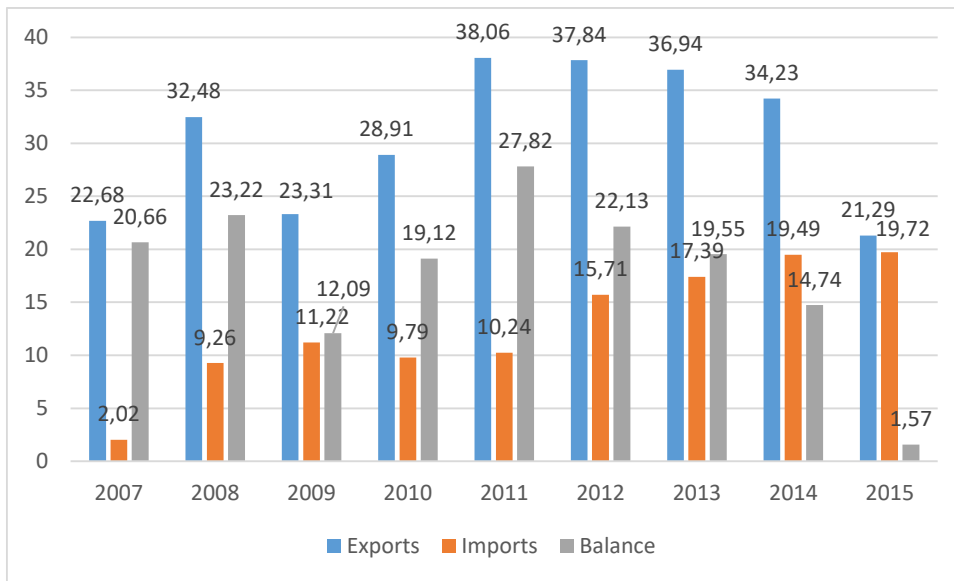
Source: World Bank 2016

Figure 4 3 Dynamics of Azerbaijan's foreign trade in 2007-2015, in current USD billion

Figure 3 above depicts the most recent dynamics of Azerbaijan's key foreign trade indicators. As can be seen from the chart, the country's exports have been dropping recently, while its imports have been rising, to the contrary. Thus, in 2015 Azerbaijan's total exports amounted to USD 21.29 billion, which was almost 38% lower compared to the previous year. Also, this figure is the lowest throughout the entire period investigated. This tendency per se is very negative for the states, as it means Azerbaijan's lower proceeds from foreign trade. At the same time, Azerbaijan's imports amounted to USD 19.72 billion in 2015, and thus were 1.2% higher compared to 2014, and 25.5% higher compared to 2012. In the long run, those two groups of tendencies led to a major shrinkage of Azerbaijan's balance of foreign trade, which reached its record low value for the recent years, and amounted to only USD 1.57 billion. This situation means that Azerbaijan's net proceeds from foreign trade keep shrinking, and if the trend persists, they might even become negative already in the near future, which would mean an additional burden for the Azerbaijani national economy.
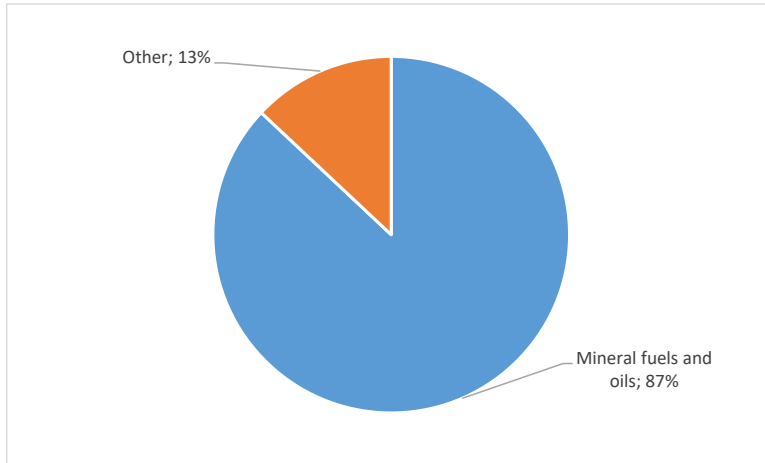
Source: International Trade Center 2016

Figure 4 4 Structure of Azerbaijan's exports by product groups, as of 2015

Figure 4 above reveals the structure of Azerbaijan's exports in the breakdown by products. As can be seen from the chart, mineral fuels and oils totally prevail in the country's exports, as their total share makes up 87%. This means that Azerbaijan is utterly dependent on its energy sector, and namely on oil, as it plays an essential role in Azerbaijan's economic development through foreign trade. Also, this finding further highlights the importance of this research paper, and the actual need to find the correlation between international oil prices and Azerbaijan's gross domestic product.
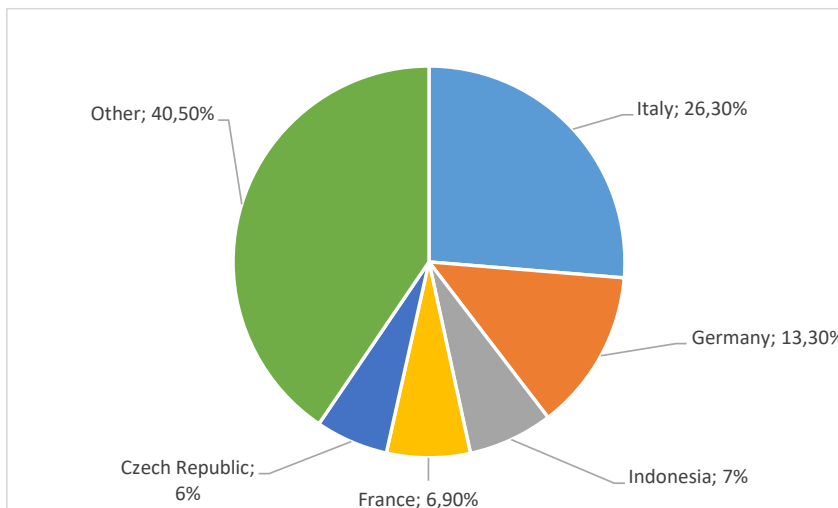
Source: International Trade Center 2016

Figure 4 5 Structure of Azerbaijan's exports by partner countries, as of 2015

As Figure 5 above illustrates, Azerbaijan's top export destinations are Italy (26.3% in the country's aggregate exports as of 2015), Germany (13.3%), Indonesia, France, and the Czech Republic. This structure of Azerbaijan' exports together with the product structure of the country's exports allows stating that Azerbaijan exports oil mostly to developed European Union member states, and thus is utterly dependent on the demand for oil resources on the part of those states.
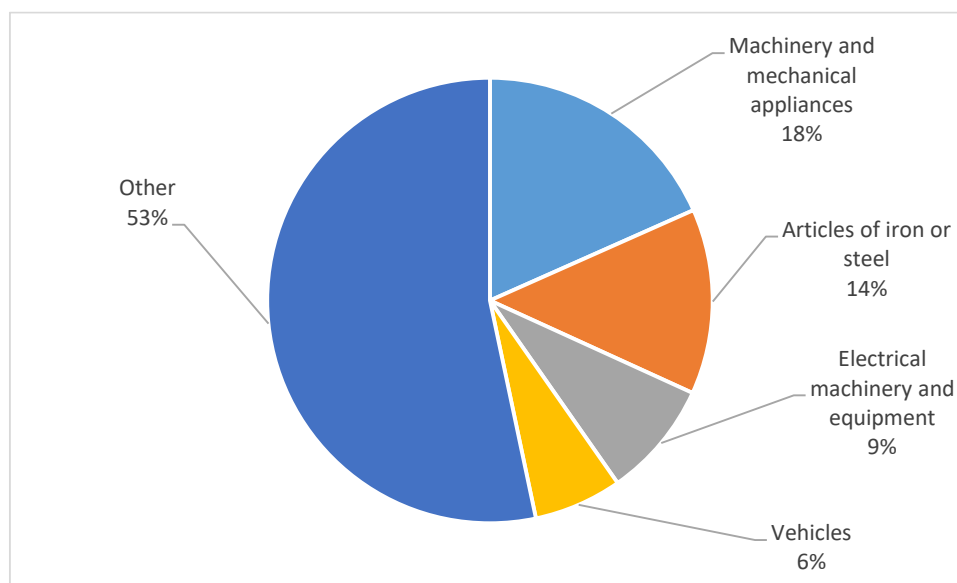
Source: International Trade Center 2016

Figure 4 6 Structure of Azerbaijan's imports by product groups, as of 2015

While Azerbaijan mostly exports raw materials, and namely oil, the country's imports are mainly constituted by equipment and machinery, as is proven by Figure 15 above. This means that Azerbaijan tends to import technological goods, as its economy is not able to satisfy in full the domestic demand. Against the country's dependence on the exports of raw materials, this tendency represents a major threat to the Azerbaijani national economy, as it demonstrates the lack of its structural balance, and thus the lack of opportunities to effectively address whatever external or internal effects which might occur.
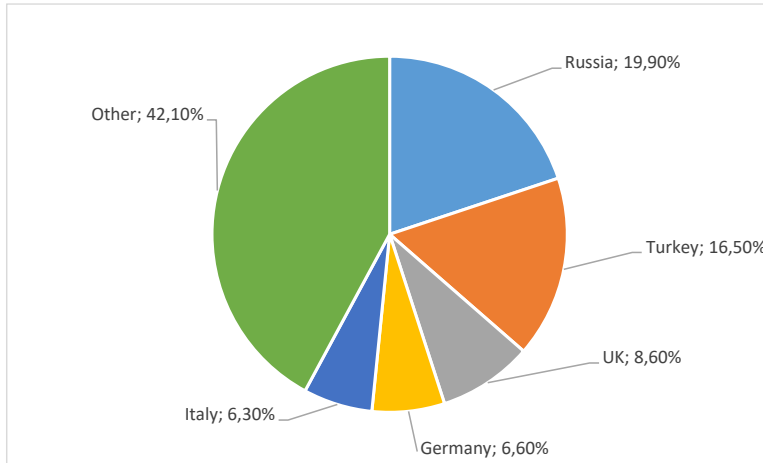
Figure 4 7 Structure of Azerbaijan's imports by partner countries, as of 2015

Figure 7 above illustrates the structure of Azerbaijan's imports by the main partner countries. As can be seen from the chart, those states include the Russian Federation (19.9% in Azerbaijan's aggregate imports), Turkey (16.5%), the United Kingdom, Germany, and Italy. In this context, it is worth noting in particular Azerbaijan's great dependence on the Russian Federation. This dependence is important not only in economic terms, but also in the context of Russia's geopolitical impact and Russia's foreign policies aimed to remain the main supplier of oil to the European Union, and thus to limit Azerbaijan's role as a competitor in this target market (Jafalian 2011).
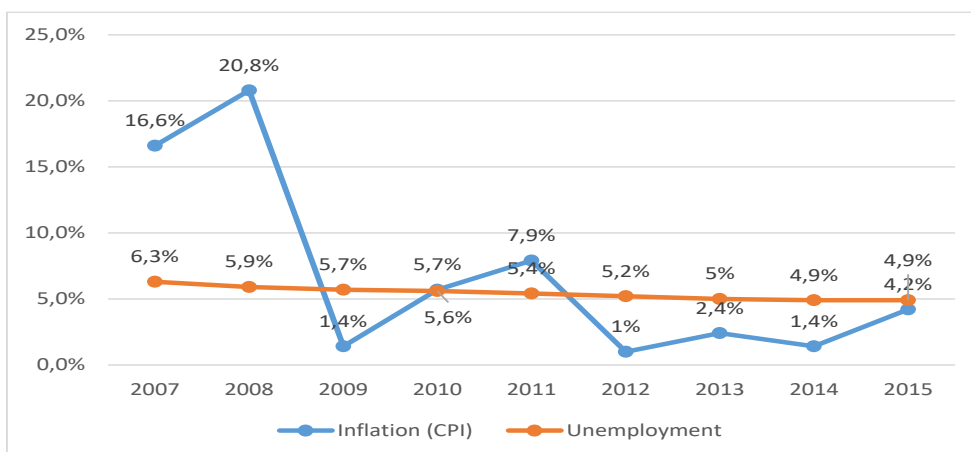
Figure 4 8 Dynamics of Azerbaijan's annual inflation (CPI) and total unemployment in 2007-2015

Figure 8 above depicts dynamics of Azerbaijan's at the period between 2007 and 2015 in terms of the country's inflation rate (CPI), and the total rate of unemployment among the aggregate labor force. As can be seen from the chart, Azerbaijan's total unemployment has been steadily decreasing in recent years. Thus, it made up 6.3% in 2007, but amounts to only 4.9% as of today. The shrinking rate of unemployment in Azerbaijan is positive for the country, as it means the availability of jobs for the local population, and thus their greater purchasing power and overall higher living standards. As for the inflation rate, it has remained unsteady in recent years. Thus, in 2015, inflation rose by 2.8 percentage points compared to the previous year, and made up 4.2%. Overall, the figures of inflation varied from 1% to 20.8% in 2007-2015. Such a high volatility may prove the lack of economic stability in Azerbaijan, and the overall vulnerability of the country's national economy.

So, based on the findings presented above, we can definitely states that there have been some negative tendencies in Azerbaijan's national economy lately, and moreover, that there are significant structural drawbacks which should be addressed for minimizing potential issues and ensuring Azerbaijan's subsequent economic growth. Also, the particular role of oil in Azerbaijan development should be noted.

Taking into account the aforesaid importance of oil as a resource for Azerbaijan's economy, in the next chapter of the thesis, the energy sector and oil in Azerbaijan will be investigated more in detail.

4.2 Energy sector and oil in Azerbaijan

Azerbaijan's economic development has been always tightly linked with the energy sector in the newer era. After the collapse of the Soviet Union, Azerbaijan's energy sector was not only left in a weak condition with obsolete equipment and technologies, but also lost its previous ties with other Soviet republics. This situation touched upon the entire national economy of Azerbaijan, and caused its recession. In those conditions, the public authorities of Azerbaijan were forced to seek new ways of raising Azerbaijan's attractiveness as a foreign economic partner, and to build up new high-quality economic and political ties with other states on the international scale.

The focus was put on the restoration and modernization of the energy sector, as the Azerbaijani authorities understood the trends consisting in the growing demand for energy, and Azerbaijan's prospects to become one of the most important suppliers of hydrocarbons to Europe. In 1994, the Azerbaijani authorities liberalized the energy sector in the country, and entered into an international agreement for the exploration of the Azeri-Chiraq-Guneshli oil field in the Azerbaijani part of the Caspian Sea with major multination oil-and-gas corporations such as British Petroleum, Exxon, Penzoil, Statoil, Amoco, and others. This was the first production sharing agreement which allowed subsequently raising the investors' interest in Azerbaijan and promoting the inflow of foreign investment in the country. Due to the importance of the contract and the amounts of investment which it allowed attracting to Azerbaijan, it is commonly referred to as the "Contract of the Century" (Ismailzade 2006).

As stated earlier in this research, oil exports account for 87% of Azerbaijan's total exports, and oil ensures almost one half of Azerbaijan's aggregate GDP, which emphasizes the important of the oil sector for Azerbaijan's economic growth. However, on the other hand, it is worth noting that the Azerbaijani oil is much important to importers who purchase it from Azerbaijan, and namely to the European Union in the first turn.
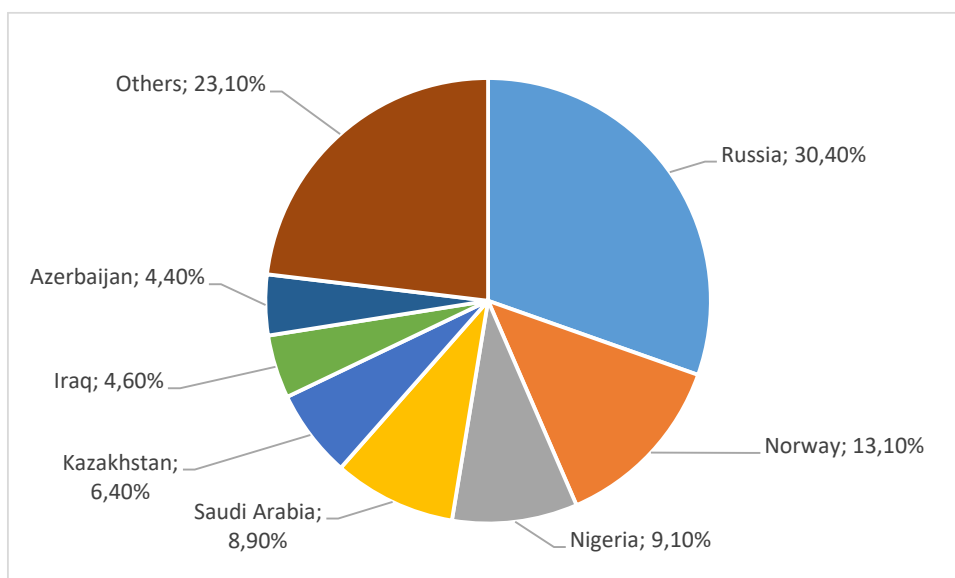
Source: European Commission 2016

Figure 4 9 Structure of the European Union's oil imports by supplier, as of 2014

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As can be seen from Figure 9 above, Azerbaijan is among the top exporters of oil to the European Union, and its aggregate share in the EU's oil imports amounted to 4.4% as of 2014. In the light of the EU's diversification policies for its energy imports, the cooperation with Azerbaijan plays a particularly important role, as it allows reducing the EU's dependence on oil imports from the Russian Federation, thus raising the overall level of the Union's energy security. At the same time, for Azerbaijan, this represents great opportunities both in economic and in geopolitical terms, as Azerbaijan's role becomes greater not only in the local South Caucasian arena, but also on the entire Eurasian scale (Aydin-Düzgit 2015).

When investigating the energy sector of Azerbaijan, it is also worth noting the particular importance of the oil and gas pipelines which pass through the territory of Azerbaijan and link the country with European states which are the main buyers of its oil. Namely, in this context it is worth noting the Baku-Tbilisi-Ceyhan oil pipeline, which is the second longest network of oil pipelines in the territory of post-Soviet states behind Druzhba. This pipeline was constructed during the era of Azerbaijan's independence, and was the Azerbaijani authorities attempt at freeing itself from the need to transit energy to the European Union through Russia. The Baku-Tbilisi-Ceyhan oil pipeline joins Azerbaijan's Caspian see oilfields with the European Union via Georgia, and Turkey. Another important oil pipeline is the Baku-Supsa pipeline which links Azerbaijan with Georgia. This pipeline route is important due to the fact that it allows storing the oil being exported at Black Sea port terminals in Georgia from where it can be thereafter transported to Romania or Bulgaria by sea (Marriott and Minio-Paluello 2012).

In addition to the above pipelines, it is also worth noting the major gas pipelines in Azerbaijan such as TAP and TANAP, and also the Nabucco project which has been frozen. Despite the fact that those pipelines are not aimed to transport oil, they are still developed and maintained by the same actors, and namely by Azerbaijan's energy market monopolist SOCAR together with major multinational corporations such as British Petroleum, and so are closely interlinked with the oil sector as well. The involvement of major foreign corporations allows Azerbaijan not only getting significant investment in its energy sector, but also obtaining up-to-date technologies which allow for the most effective functioning

of all equipment and staff used in the respective projects (Marriott and Minio-Paluello 2012).

However, despite the abovementioned advantages which provide Azerbaijan with great prospects in the context of its energy sector's development, it is also worth noting that there are major threats which affect the effectiveness of the Azerbaijan's oil sector, and also raise uncertainties regarding its subsequent development. Thus, first of all, it should be noted that the conflict with Armenia over Nagorno-Karabakh is still ongoing, and it should not be neglected. Military clashes which occur between the two states significantly raise the inherent risks threatening the oil sector, and overall make the extraction and transit of oil less effective due to higher costs. On the other hand, it should be noted that the Russian Federation is not interested in seeing Azerbaijan become a major regional player and a major supplier of oil to the European Union. The projects implemented by the Russian Federation for the construction of pipelines to join it directly with the European Union raise significant threats for Azerbaijan as an oil supplier, even despite the EU's policies aimed to achieve greater independence from Russia in terms of energy resources supplies (Donaldson et al. 2014).

Thus, based on the abovementioned facts, it can be stated explicitly that Azerbaijan's oil sector is not only a major source of the country's own economic development, but also a crucially important sector for the entire Eurasian geopolitics.

Taking into account the information outlined above, in the next chapter of the thesis, we will proceed to the creation of the linear regression analysis model with the aim of evaluating the impact of oil prices on the Azerbaijani economy.

4.3 Development of the Linear Regression Analysis Model

The main aim of this research paper is to investigate whether there is any important correlation between international oil prices and the gross domestic product of Azerbaijan. For this purpose, linear regression analysis will be used, and namely multiple linear regression. The equation of multiple linear regression is as follows:

$$Y = b0 + b1X1 + b2X2$$

We will have two sets of variables with the framework of the aforesaid multiple regression:

1. Independent variables:

- International oil prices (X1 variable). Within this context, we will investigate the Brent grade of oil. As stated earlier in this thesis, this oil grade is the most widely traded oil grade in the international arena, and it is also the most widely used indicator of the oil market volatility or stability in terms of oil prices.

- Azerbaijani manat to United States dollar exchange rate (X2 variable). This is the second independent variable which will be taken into account within our multiple regression analysis. As Azerbaijan is much dependent on exports, any exchange rate fluctuations may be important for shaping the actual figures of Azerbaijan's GDP. Therefore, the correlation between this factor and GDP will be investigated, and also the impact of the two independent variables on Azerbaijan's economic results will be compared.

2. Dependent variable (Y variable): Azerbaijan's GDP. For the purpose of this research, we will take the data pertaining to Azerbaijan's GDP (nominal) in current United States dollars. This indicator has been chosen as the dependent variable as it describes well Azerbaijan's actual economic achievements. Furthermore, as shown earlier in the course of this thesis, Azerbaijan's GDP has dropped recently together with the dropping prices for oil. Therefore, selecting both variables for our multiple regression analysis should allow revealing the correlation between them, if any.

The period to be analyzed within the framework of this linear regression analysis is the years 2007-2015 for which explicit data are available on all the three variables outlined above.

Table 4 1 Dynamics of the chose multiple regression variables in 2007-2015

	2007	2008	2009	2010	2011	2012	2013	2014	2015
GDP, in USD billion	33.05	48.85	44.29	52.9	65.95	68.73	73.56	75.2	53.05
Oil prices, in USD per bl	92.21	45.88	71.46	101.01	110.98	115.55	106.4	52.99	34.74
AZN to USD	1.148	1.248	1.245	1.253	1.272	1.274	1.275	1.276	0.64

Source: World Bank 2016, Investing.com 2016, XE.com 2016

We have already investigated Azerbaijan's recent dynamics in terms of GDP. now let's focus more in detail on the two independent variables. As Table 1 above illustrates,

oil prices have been demonstrating negative growth dynamics in recent years. This has already been emphasized in this thesis as well. However, at this point, it is worth additionally noting that similar negative dynamics in terms of international oil prices had been observed in the years 2008-2009, when the global economic and financial crisis occurred. Those fluctuations should help us identify the correlation between Azerbaijan's GDP and oil prices more easily, if it exists at all.

At the same time, as regards the market exchange rate between the Azerbaijani manat and the US dollar, the Table illustrates clearly that the manat had remained more expensive compared to the US dollar up until 2015. Prior to this time, it had even been growing stronger to the US dollar. However, in 2015, the AZN to USD exchange rate dropped to 0.64.

Now, taking into account the abovementioned data, we shall run a regression analysis using the Microsoft Excel software built-in regression tool. The summary output of the regression analysis is presented below:

Table 4 2 Summary output for multiple regression using the developed model

Regression Statistics								
Multiple R	0.288							
R Square	0.083							
Adjusted R Square	-0.223							
Standard Error	15.911							
Observations	9							
ANOVA								
	df	SS	MS	F	Significance F			
Regression	2	137.395	68.697	0.271	0.771			
Residual	6	1519.016	253.169					
Total	8	1656.411						
	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	35.983	32.808	1.097	0.315	-44.296	116.261	-44.296	116.261
X Variable 1	0.055	0.223	0.246	0.814	-0.491	0.601	-0.491	0.601
X Variable 2	14.255	33.041	0.431	0.681	-66.593	95.103	-66.593	95.103

Source: Own calculations

What does the information above mean for us? First of all, it should be noted that the R-squared value is negative. This means that the developed model's predictive capacity is close to 0. Therefore, we cannot understand the changes in Azerbaijan's gross domestic product using the two sets of independent variable outlined above. Therefore, there is no sense in interpreting the numerical information above, as the practical value of those results is zero. The chosen model is statistically incorrect, and its predictability is not valuable at all.

Probably, the problem is that we united two sets of independent variables, one of which may explain well the variations in the dependent variable, while the other may not. Therefore, let's now investigate separate multiple regressions for X1 variable and Y, and for X2 variable and Y and consider simple linear regression models. Here is the equations of simple linear regressions:

$$Y = a + bX1$$
$$Y = a + bX2$$

Table 4 3 Summary output for regression using only X1 variable (oil prices)

Regression Statistics								
Multiple R	0.233							
R Square	0.054							
Adjusted R Square	-0.081							
Standard Error	14.958							
Observations	9							
ANOVA								
	df	SS	MS	F	Significance F			
Regression	1	90.271	90.271	0.403	0.545			
Residual	7	1,566.14	223.734					
Total	8	1,656.411						
	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	48.38	14.881	3.251	0.014	13.191	83.569	13.191	83.569
X Variable 1	0.11	0.173	0.635	0.545	-0.298	0.518	-0.298	0.518

Source: Own calculations

Table 3 above illustrates the results of regression analysis calculated with only one independent variable, and namely oil prices. As can be seen from the table, in this case, the

adjusted R-squared value is negative as well. Therefore, the model has no predictive capability, and overall, it can be stated that the changes in international oil prices in the period from 2007 to 2015 cannot serve well for describing Azerbaijan's economic results in terms of the country's GDP. Therefore, this independent variable is not suitable for our research. However, let's try to run our regression analysis using only the second independent variable (AZN to USD exchange rate).

Table 4 4 Summary output for regression using only X2 variable (AZN to USD exchange rate)

Regression Statistics								
Multiple R	0.271							
R Square	0.074							
Adjusted R Square	-0.059							
Standard Error	14.805							
Observations	9							
ANOVA								
	df	SS	MS	F	Significance F			
Regression	1	122.019	122.019	0.557	0.480			
Residual	7	1534.392	219.199					
Total	8	1656.411						
	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	34.986	30.295	1.155	0.286	-36.650	106.622	-36.650	106.622
X Variable 1	18.880	25.304	0.746	0.480	-40.956	78.715	-40.956	78.715

Source: Own calculations

As can be seen from Table 4 above, the independent variable describing the changes in the AZN to USD exchange rate cannot be used for interpreting the changes in Azerbaijan's GDP as well, as the adjusted R-squared value for the analysis with this single independent variable is negative as well.

Therefore, overall, it can be stated that we cannot explain any changes in Azerbaijan's GDP in 2007-2015 using the framework of the model we have developed within the framework of this research paper. Neither the two sets of independent variables,

nor any one of them taken independently might be used for describing the shifts in Azerbaijan's GDP value at any degree of statistical justification.

Taking into account the above results, in the next chapter of the thesis, we are going to interpret them more in detail, and also to find other ways in which shifts in the oil market can affect Azerbaijan's GDP.

4.4 Impact of oil prices on the Azerbaijani economy

The findings obtained and described in the previous chapter allow us stating that there is no direct correlation between international oil prices and the GDP figure achieved by Azerbaijan. Moreover, we have proven that the entire model which was developed as a basis for this research is not viable or correct, as it does not provide any statistically significant opportunity to describe changes in Azerbaijan's gross domestic product through changes in either international oil prices or the Azerbaijani manat to United States dollar exchange rate.

This allows us drawing a conclusion that there is indeed no direct correlation between oil prices and Azerbaijan's economic growth. Moreover, if we come back to Table 1 in the previous chapter outlining the dynamics of the two independent variables and the one dependent variable chosen as the basis for our multiple regression model, we can see that even visually, there has not been any direct correlation in recent years. Thus, during the years 2008-2009 (global financial and economic crisis), Azerbaijan's total GDP figures continued growing, while the prices for oil on the international scale dropped significantly. Moreover, the fluctuations which occurred with Azerbaijan's GDP were obviously contrary to the direction of international oil prices' movement. Similarly, the Azerbaijani manat's continued growing despite any changes in both the country's GDP and international prices.

What do the above findings allow us stating in the context of this research. Well, first of all, the model is indeed statistically unviable: we can see from the statistical data that there were asynchronous movements of oil prices and Azerbaijan's GDP in the analyzed period. However, this means that there is no direct correlation. But what about any indirect correlation? As has been stated earlier in this research, Azerbaijan's national economy is largely dependent on the oil sector due to its large share in the country's

exports. Moreover, according to expert estimates, the recent negative developments in terms of Azerbaijan's GDP may be well linked with oil prices.

Based on the above information, a question arises on how oil prices and Azerbaijan's economic growth, i.e. GDP, can be linked indirectly. The previous findings of this thesis allow stating that the linking factor may be Azerbaijan's exports, where oil stands for 87% of the total exported value. Therefore, let's investigate the viability of this assumption by running a regression analysis with one independent variable, and namely Azerbaijan's total exports.

$$Y = a + bX3$$

Where:

Y- dependent variable (Azerbaijan's GDP)

X3- independent variable (Azerbaijan's exports)

**Table 4 5 Dynamics of the chose multiple regression variables in 2007-2015**

	2007	2008	2009	2010	2011	2012	2013	2014	2015
GDP, in USD billion	33.05	48.85	44.29	52.9	65.95	68.73	73.56	75.2	53.05
Export, in USD billion	22,68	32,48	23,31	28,91	38,06	37,84	36,94	34,23	21,29

Source: World Bank 2016

Table 4 6 Summary output for regression using X3 variable (aggregate exports)

Regression Statistics								
Multiple R	0.809							
R Square	0.654							
Adjusted R Square	0.604							
Standard Error	9.050							
Observations	9							
ANOVA								
	df	*SS*	*MS*	*F*	*Significance F*			
Regression	1	1083.147	1083.147	13.226	0.008			
Residual	7	573.264	81.895					
Total	8	1656.411						
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	4.892	14.719	0.332	0.749	-29.913	39.698	-29.913	39.698
X Variable 1	1.710	0.470	3.637	0.008	0.598	2.822	0.598	2.822

Source: Own calculations

$y = 1{,}7101x + 4{,}8922$
$R^2 = 0{,}6539$
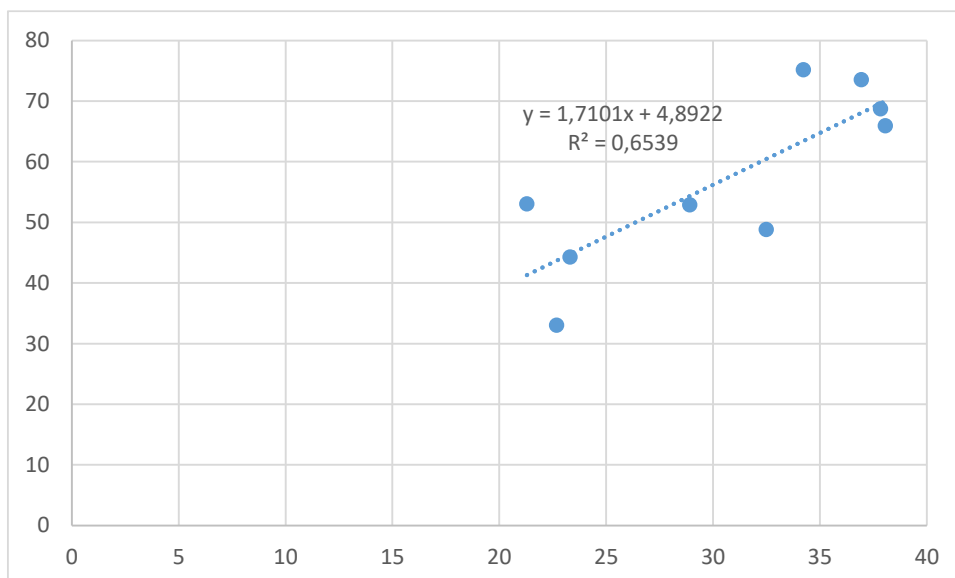
Figure 4 10 Summary output for regression using X3 variable (aggregate exports)

As can be seen from Table 6 and Figure 10 above, the R-squared value for the analysis with Azerbaijan's exports as the independent variable and Azerbaijan's GDP as the dependent variable amounts to 0.654, while the adjusted R-squared value makes up 0.604. This allows us stating that changes in the total value of X variable (Azerbaijan's total exports) describe effectively over 60% in the changes of Y variable (Azerbaijan's GDP by PPP). Therefore, there is indeed a correlation between the two variables, and it is worth investigating the results obtained through this regression analysis more in detail with the aim of understanding them better.

As can be seen from the table, the p-value for X variable is considerably lower than 0.05. This allows us stating that the null hypothesis can be rejected in this case. In other words, the low p-value means that the results of our regression analysis are indeed meaningful and statistically significant. This is further confirmed by the low value of the F-significance parameter, which illustrates that the regression model chosen is statistically significant.

The multiple R value exceeds 0.8 and is quite high as well. It means that there is a strong relationship between the two chosen variables (1.0 is the perfect relationship).

Therefore, overall, it can be stated that, in contrast to oil prices and the AZN to USD exchange rate, the values of Azerbaijan's exports can be indeed used effectively for the purpose of describing the changes in Azerbaijan's GDP. Thus, probably, it is worth investigating more in detail how Azerbaijan's exports are affected by international oil prices in order to understand whether the dropping oil prices can lead to the country's dropping exports.
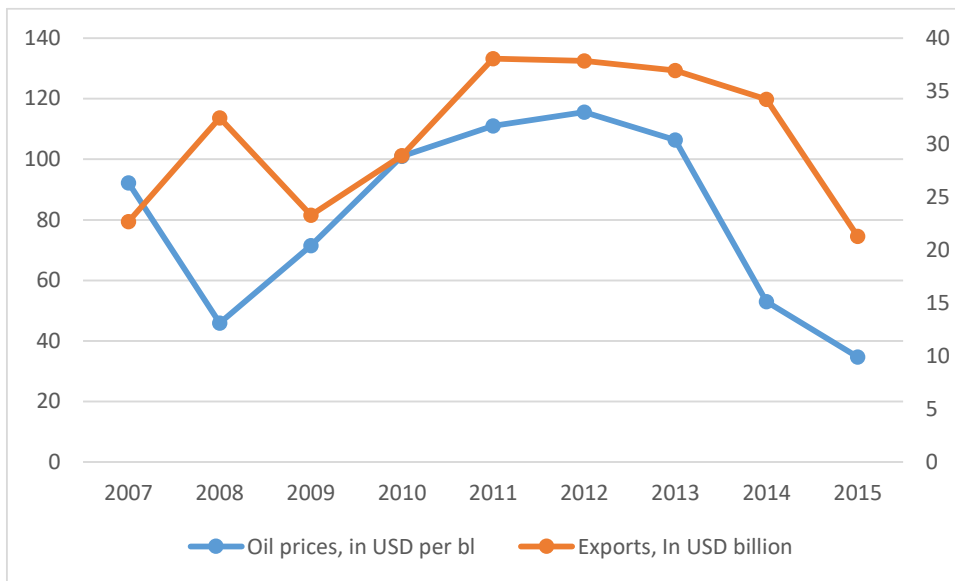
Source: Previous findings of the research

Figure 4 11 Illustration of the dynamics of Azerbaijan's exports and international oil prices

As can be seen from the chart above, the trends of international oil prices and Azerbaijan's exports have been very comparable in recent years. The only drastic difference that we can se on the chart is the year 2008, i.e. the year when the global financial and economic crisis occurred. Despite the dropping oil prices, this year's exports grew significantly in Azerbaijan. So, it is worth understanding while this occurred.

We can find the answer in the United Nations (2009) where it is stated that during the crisis year when the prices for oil dropped, major oil exporters were still able to gain significant profits thanks to the availability of large-scale future contracts for oil supplies entered into in previous years at higher prices. A great part of Azerbaijan's 2008 export deals were performed based on earlier futures contracts, i.e. the price for oil under those

contracts was fixed at higher, pre-crisis levels, which contributed to Azerbaijan's exceptional financial results in terms of exports. Despite the dropping effectiveness of oil sales, Azerbaijan was able to fulfill a great number of commercially effective deals, raising significantly the overall volume of oil exports, and also their financial value, despite the decreased prices of oil per barrel.

Thus, we can explain this discrepancy by the facts described above. Therefore, it can be stated that Azerbaijan's actual GDP values cannot be understood fully through the value of Azerbaijan's exports, just as the latter cannot be understood only through oil prices. Even in the conditions of dropping oil prices, Azerbaijan still has opportunities to ensure effective exports and even GDP growth, as shown on the example of the years 2008-2009. Therefore, the currently dropping oil prices do not mean Azerbaijan's ultimate lack of opportunities to improve the situation, if the prices for oil are not restored.

Taking into account the above facts, in the next chapter of the thesis, we will focus on forecasts for the future of the Azerbaijan's economy, namely in the context of the energy sector.

4.5 Forecasts for the future

The forecasts regarding the future international prices for oil have been given earlier in this research. No major restoration of the previous oil prices should be expected. Obviously, this imposes major threats on the Azerbaijani national economy. However, taking into account the findings of the regression analysis, it is worth investigating the general prospects of the Azerbaijani economy and of its energy sector, in order to understand whether Azerbaijan does have opportunities to overcome the current negative tendencies in the international oil market by means of internal resources and effective economic policies.

As of today, the forecasts for Azerbaijan's subsequent development are not very good. According to the World Bank, the sharp decline in oil exports in 2016 has already harmed substantially Azerbaijan's national economy. The country's government has yet been unable to adapt to the new conditions of the global oil market conjuncture. At the same time, it should be understood that Azerbaijan's economy is not developed, and is greatly dependent on the energy. It lacks diversification, and also lacks a high level of

development of own technologies. Due to those conditions, Azerbaijan's national economy remains much vulnerable to the impact of any external shocks associated with the global oil market and shifts in its conjuncture (Antidze 2016).

In addition to this, as has been stated earlier in this research, there are significant risks and threats to Azerbaijan's position as an exporter of oil to the European Union on the part of the Russian federation which seeks creating the most effective transport routes via Turkey to transport its oil to Europe.

Overall, taking into account the fact that as of today, the Azerbaijani authorities do not have any opportunity to complete a quick conversion from an oil-oriented economy to a developed and diversified economy, the problems associated with the country's decreased total oil exports will be likely to continue bringing major damage to Azerbaijan's gross domestic products.

As the forecasts for oil prices remain negative for the near future, it can be stated, that Azerbaijan's proceeds will be likely to remain at their current low levels as well. In its turn, this will definitely affect the country's gross domestic product through the relationship which has been proven in the course of the research analysis.

Taking into consideration all the previous findings of this research paper, in the next chapter of the thesis, we are going to discuss the results obtained, and their practical implications in terms of Azerbaijan's economic growth and the current situation in the global oil market.

5 Results and Discussion

The main finding that has been derived throughout the course of this research in line with the topic and aim of the thesis is the fact that we have not identified any direct correlation between the shifts in oil prices and shifts in Azerbaijan's gross domestic product for the years 2007-2015. It should be noted that this finding does not mean that there is no interconnection at all between the two variables. A major point which we have revealed is the fact that part of Azerbaijan's oil contracts are executed on futures terms. In the years 2008-2009, Azerbaijan had major futures contracts with foreign importers of oil, which it fulfilled at high oil prices, while the actual market conjuncture changed, and the prices for oil dropped. As a result, as we observed on the statistical data provided in this research, during the years of the global financial crisis, Azerbaijan's GDP was growing despite the negative tendencies in the international oil market and the dropping oil prices.

In my opinion, this fact hindered significantly the effectiveness of the model developed for the regression analysis investigating Azerbaijan's GDP in the interconnection with its oil prices and the AZN to USD exchange rate. As such futures contracts were already unavailable to Azerbaijan in 2015, the country's GDP dropped sharply together with a major recession in the global oil market. Moreover, according to expert estimates which we have provided in this thesis, the recent shrinkage of Azerbaijan's GDP is interconnected tightly with the dropping prices for oil in the international market.

Nevertheless, we have conducted another regression analysis, taking Azerbaijan's exports as the only independent variable and the country's GDP as the dependent variable. The results of regression analysis under the new model proved that it is statistically significant and has a high predictive value. Therefore, we drew a conclusion that there is direct interconnection between Azerbaijan's gross domestic product and the country's total exports. At the same time, we cannot neglect that the dropping prices for oil affect adversely the country's exports which consist of oil to 87%.

So, how can this situation exist when Azerbaijan's exports are interlinked directly with oil prices, but we have not found any correlation at all between international oil prices and Azerbaijan's GDP.

Based on the previous findings of this thesis, I believe that this is due to the aforesaid issues with futures contracts. Exports proceeds are calculated in accounting for the particular year, and do not include the state's possible future income from foreign trade. As a result, when comparing export proceeds and GDP within the same time span, we get justified results. To the contrary, futures contracts with oil prices in fact make a shift in the application of prices. While the actual prices for oil may be low, the previous ones which are stipulated in oil contracts may be high. This situation existed in 2008, but does not exist now. As a result, regression analysis shows that there is no direct correlation between international oil prices and Azerbaijan's GDP. Nevertheless, we have identified that there is indeed an interconnection between the international oil market conjuncture and the current economic situation in Azerbaijan – and this is the most valuable finding of this paper.

Based on this, I believe that the subsequent growth prospects of Azerbaijan are rather much limited. At least when speaking of the short-term perspective, we can be confident that no major surge in oil prices should occur. The plummeting prices in the oil market have been a predominant trend during 2 years, and therefore it can be stated definitely that Azerbaijan does not have futures contracts which could temporarily improve the situation. Therefore, at least when speaking of the next few years, we should not expect Azerbaijan's GDP returning to its previous figures.

As for the recommendations which might be provided to Azerbaijan in terms of its economy in the context of the international oil market conjuncture, in my opinion, the main advice which should be implemented by the Azerbaijani authorities is the need to diversify the local economy. The recent development of the situation proves that the excessive dependence on oil exports is very negative for Azerbaijan. Any major negative tendencies in the global oil market harm the country's economy greatly, and Azerbaijan cannot resolve those issues, as its economy does not have any opportunities to get boosted through other sectors.

For the best results in its economic achievements, Azerbaijan should focus on attracting foreign investors to provide financing to the country's national economy, namely, the focus could be put on other industrial sectors where Azerbaijan has preconditions for the subsequent growth, and on the tertiary sector, as services account for

the greatest share of GDP in developed states. If the country's authorities are able to diversify their economy and to decrease Azerbaijan's dependence on oil exports and the conjuncture of the international oil market, the country will be likely to achieve greater economic stability, and an overall higher level of its national security.

6 Conclusion

Oil is a strategic resource in the global geopolitical arena. Despite the recent tendencies for the growing share of alternative energy sources, oil still remains the world's major energy resource in terms of consumption. As a result, countries which are abundant in oil have an important economic and geopolitical value on the global scale. However, recently, the oil market has been in a major recession. Namely, international oil prices have been dropping recently, and this affected much the countries whose national economies are largely dependent upon oil.

In the practical part of this thesis, the interdependence between international oil prices and Azerbaijan's gross domestic product were evaluated. The results of the regression model developed for running the required computations proved that in 2007-2015, no correlation was observed between Azerbaijan's GDP and international oil prices. However, as we noted, this is largely due to the fact that previously, Azerbaijan had been able to benefit from futures contracts for sales of oil at higher prices, while as of today, such opportunities do not exist. Nevertheless, Azerbaijan's aggregate exports are largely dependent on the prices of oil in the international market, and we have revealed that they affect directly Azerbaijan's economic growth opportunities reflected in the country's GDP values. Therefore, we can be confident that oil prices still do affect Azerbaijan's gross domestic product, even though indirectly.

In the course of this research, several hypotheses have been tested, namely the following:

H1: Dropping oil prices have direct interconnection with Azerbaijan's dropping GDP, and vice versa.

H2: The current dynamics of oil prices represent negative tendencies for Azerbaijan's subsequent economic growth.

H1 can be disapproved, at least for the time span we investigated in this thesis (2007-2015). In fact, the regression analysis model that was used for computing the correlation between international oil prices and Azerbaijan's gross domestic product in the abovementioned period proved that there is no direct correlation at all, and therefore the model has an utterly low statistical predictability. Nor did we identify any correlation

between the Azerbaijani manat's exchange rate against the US dollar and Azerbaijan's GDP. Nevertheless, the findings of this research allow stating that an interconnection still exists between oil and Azerbaijan's GDP, namely in the context of Azerbaijan's oil exports. As stated earlier, the major problem for the computation of oil prices' effects is the fact that part of the deals for oil exports are performed under futures contracts. In 2008-2009, the share of such contracts was high in Azerbaijan's exports contracts, and as a result, the country was able to sell great amounts of oil at high prices despite the negative price tendencies. As of today, there are no such opportunities, and therefore the country's GDP is dropping together with the oil prices. Due to such great mutual fluctuations, the regression analysis model did not reveal any direct correlation, and therefore the hypothesis can be disapproved.

H2 can be confirmed. As of today, Azerbaijan does not have expensive futures contracts, and therefore oil prices have direct negative effects for the country's GDP. Azerbaijan's total oil exports have significantly dropped recently, which is due to the significantly lower oil prices. As a result, the Azerbaijani national economy is currently in a condition of recession, and the subsequent instability in the oil market will be likely to limit Azerbaijan's economic growth opportunities. Therefore, we can definitely state that Azerbaijan is much dependent on the overall oil market conjuncture, even though our regression analysis revealed such correlation only for oil exports.

In order to improve the current negative situation with Azerbaijan's dropping GDP in the light of the dropping oil exports, the country's authorities should focus on changing their economic policies in a way to reduce the economy's dependence of oil, and to diversify it for greater independence, stability, and security. This might require major investment on the part of foreign investors, and also significant time expenditures, but in the long run, this should provide Azerbaijan with much greater opportunities to easily withstand any subsequent shocks in the global oil market, thus raising the country's overall financial prospects.

However, it should also be stated that as of today, major international organizations and private companies provide forecasts for the international oil markets mainly only for a 1-year perspective, and therefore we cannot judge upon the subsequent tendencies in oil prices. If they return to their previous levels in the mid-term perspective, Azerbaijan will

be able to raise its proceeds from exports, and thus, in the long run, its gross domestic product.

The framework of this thesis can be used for any subsequent analysis of other states and their interconnection with oil prices or other economic variables.

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