EMPIRICAL ANALYSES OF THE DUTCH DISEASE IN AZERBAIJAN'S ECONOMY

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ABSTRACT

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Dutch Disease syndrome has been frequently investigated in the literature and observed as a threat to the resource-rich economies. Basically, it describes a phenomenon which increasing activity in a booming resource sector harms overall economy and decreases growth. This thesis analyzes effects of the petroleum sector employing various indicators (export of the petroleum sector, transfers from SOFAZ, and price shocks) on various units of the economy namely GDP growth, output in the non-oil tradable sector, REER, government expenditure, and investment expenditure for Azerbaijan's economy under the topic of "Dutch Disease". Employing VAR methodology this analysis covers 20 years between 2001 and 2020 using quarterly data. Granger Causality test, Impulse-Response analysis, and Variance Decomposition features of the VAR models are used in this paper. The main conclusion of this analysis is that Azerbaijan's economy is not suffering from the Dutch Disease. Although REER appreciates because of the increasing activity in the booming sector, it is not followed by the negative affection of the GDP growth and the non-oil tradable sector. The investigations revealed that the main reason behind that is the subsidization of the non-oil sector with the transfers directed from SOFAZ. Additionally, analysis of the possible asymmetric effects of the negative and positive price shocks revealed that although positive price shocks affect the economy positively, negative price

shocks fail to cause downturns in the economy. It is concluded that this is the result of policies aiming to prevent the consequences of the negative price shocks. Overall, it is hard to claim that the petroleum sector negatively affected the growth.

Keywords: Azerbaijan, Dutch Disease, natural resources, Vector Autoregression.

ÖZ

AZERBAYCAN EKONOMISINDE HOLLANDA HASTALIĞI ÜZERİNE EMPİRİK ANALİZ

Safarli, Uzeyir

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Hollanda hastalığı sendromu literatürde sıkça araştırılmış ve doğal kaynaklarla zengin olan ekonomiler için bir tehlike olarak gözlemlenmiştir. Genel olarak, Hollanda hastalığı sendromu gelişen bir doğal kaynak sektörünün genel ekenomiye zarar verdiği ve büyümeni azalttığı bir olguyu tanımlar. Bu tez çeşitli verilerin (petrol ihracatı, SOFAZ-dan transferler ve fiyat şokları) GSYİH büyümesi, petrol dışı ticari sektördeki hasıla, Reel Efektif Döviz Kuru, devlet harcamaları ve yatırım harcamaları üzerindeki etkisine bakarak petrol sektörünün Azerbaycan ekonomisi üzerindeki etkisini Hollanda hastalığı sendromu başlığı altında analiz etmekdedir. Bu analiz Vektör Otoregressif metodolojisini kullanarak 2001 ve 2020-ci yıl arasındaki 20 yılı kapsamaktadır. Vektör Otoregressif modellerin Granger nedensellik testi, Etki-tepki ve Varyans dekompozisyon analizi özellikleri bu araştırmada kullanılmaktadır. Bu analizin esas sonucu, Azerbaycan ekonomisinin Hollanda hastalığı sendromuna yakalanmamasıdır. Reel Effektif Döviz Kuru büyüyen kaynak sektöründeki artan

faaliyet nedeniyle değer kazansa da, bu petrol dışı ticari sektörün olumsuz etkilenmesi ile izlenmiyor. Araştırmalar, bunun temel nedeninin, SOFAZ'dan yapılan transferlerle petrol dışı sektörün sübvansiyonu olduğunu ortaya koydu. Ek olarak, negatif ve pozitif fiyat şoklarının olası asimetrik etkilerinin analizi, pozitif fiyat şoklarının ekonomiyi olumlu etkilemesine rağmen, negatif fiyat şoklarının ekonomide gerilemeye neden olmadığını ortaya koymuştur. Bunun olumsuz fiyat şoklarının sonuçlarını önlemeye yönelik politikaların sonucu olduğu fikrine varılmıştır. Genel olarak, petrol sektörünün ekonomik büyümeye üzerindeki etkisinin pozitif olduğu kanısına varılmıştır.

Anahtar Kelimeler: Azerbaycan, Hollanda hastalığı sendromu, doğal kaynaklar, Vektör Otoregressif.

To my family

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LIST OF ABBREVIATIONS

ADF	Augmented Dickey-Fuller
AIC	Akaike Information Criterion
BP	British Petroleum
CBAR	Central Bank of Azerbaijan Republic
CPI	Consumer Price Index
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GMM	Generalized Method of Moment
GPFG	Government Pension Fund Global
HQ	Hannan-Quinn Information Criterion
IRF	Impulse Response Function
MOPD	Mork's Oil Price Decreases
MOPI	Mork's Oil Price Increases
MVA	Manufacturing Value-Added
NOPD	Net Oil Price Increases
NOPI	Net Oil Price Decreases
PP	Phlipps Perron
REER	Real Effective Exchange Rate
SOFAZ	State Oil Fund of Azerbaijan
SSCRA	State Statistical Committee of Republic of Azerbaijan
SIC	Schwarz Information Criterion
US	United States

VAR	Vector Autoregression

CHAPTER 1

INTRODUCTION

Resources had been seen as a determiner of wealth in spite of rare negative thoughts since the Netherland economy got acquainted with petroleum reserves in the North Sea. Despite the huge importance of crude oil reserves for a country that possesses resources, its overall effect on growth has been under question from Dutch economy's experience nearly half a century ago. The Netherlands enjoyed oil revenues with the exploitation of oil reserves in Groningen in the 1960s. However, the economy experienced repercussions. The previously developed manufacturing sector was damaged and the economy got dependent on oil revenues significantly. After this case, literature gained a new term which is called the 'Dutch Disease'.

Dutch Disease is a common name for the case of growth being negatively affected by dependence on some resources, especially petroleum. One of the ways the Dutch Disease shows itself is by appreciating the Real Effective Exchange Rate (REER). It is called indirect de-industrialization. According to Bresser-Pereira (2013) exchange rate appreciation because of Dutch Disease is chronic as inflation (Niftiyev, 2020). Appreciation of REER leads to loss of competitiveness of the non-booming tradable sector and in turn, investments that could possibly be brought to the sector. Moreover, withdrawal of capital and labor from the non-booming sector to accommodate in the booming sector is direct de-industrialization.

With the above-mentioned event, there started a new flow in the literature about resource abundance. After building a theoretical base, cross-country investigations such as Sachs and Warner (1995, 1999), Gylfason et al., (1999), Gylfason (2001), and Stijns (2005) contributed to the literature. Collier and Goderis (2007) and some follow-up researchers investigated the effects of resource growth on other sectors of

concern for developing economies, such as Asia and Sub-Saharan Africa. Developed countries like USA, Norway, and Canada have been researched by Wright (2001) and Dissou (2010) respectively. The number of researches may be counted more and more. However, Azerbaijan has not been investigated deeply in the context of resource abundance in the means of empirical econometric analysis.

British Petroleum Company (2018) reports that Azerbaijan possesses respectively 0,4 % and 0,7 % of total oil and gas reserves in the world. Despite the insignificance of those numbers in the overall demand of the world, petroleum sector has played a vital role in Azerbaijan economy. In fact, according to the Central Bank of Azerbaijan Republic's (CBAR) (2021) reports GDP of Azerbaijan in the petroleum sector concludes 38% of total GDP in 2020. The petroleum sector plays a vital role also in attracting both local and foreign investments to the economy. State Statistical Committee of Republic of Azerbaijan (SSCRA) (2019) reports that 73,8 % of all investments in the economy had been attracted by mining industry between 2005-2016. While these numbers show the significance of the role the petroleum sector plays in the economy, our purpose is to investigate on whether possessing petroleum reserves has been revealed to be advantageous or disadvantageous for the economy.

After the fall of the Soviet Union, 15 new free countries emerged in its previous borders. However, the fall of the Soviet Union didn't happen as just in political borders as it was supposed to be, and those countries were separated also economically and socially. That means previously emerging common market, common industrial production, common agricultural production had been disappeared and a new system must be adapted. That means previously dependent and common production were not present anymore, previously united countries won't get wheat to produce flour for your grape production or they won't be able to be given oil industry machinery for free. Those hardships of being separated from previously common production system become less manageable when conflicts with neighbors are added. Azerbaijan was one of them to struggle to adapt to the new system. Inflation was in its peakiest as it saw 1600% in the first years of liberation (CBAR), production declined significantly as it was dependent on various countries' production mutually. The political environment

was turbulent, and most significantly it found itself directly into a war with Armenia which resulted with more than 700 thousand of refugee and lost 20% of the land. In this situation Azerbaijan got favored to have the petroleum sector.

During the first years of independence, Azerbaijan negotiated with foreign oil majors about the extraction and selling of oil and gas reserves in the Azerbaijani areas and especially in the Caspian Sea. Together with Kazakhstan, Hamilton (1998) describes the negotiations as "perhaps one of the world's largest energy games" (Mahmudov, 2002). As a result, Azerbaijan signed contracts in 1994. After the pass of 30 years from gaining freedom, naturally, it can be seen at the first superficial glance that Azerbaijan has been enjoying its oil and gas stocks throughout the last quarter of the century which started with the so-called "contract of the century" and used them to build a strong economic basement in the remnants of the socialist system, for the welfare of its current population, and future generation. Oil revenues showed effects on the economy especially after 2003 when the first transportation of oil to Europe through Georgia and Turkey started. For example, the GDP growth rate was 34,5% in 2006 which was the highest among all countries. The share of the manufacturing and agricultural sector in GDP proves that the most significant part of all these successes was because of petroleum reserves. For example, the share of agricultural production in GDP was 32,5% in the first year of a young country in 1992, while it was 5,6% after 26 years in 2017 according to the State Statistics Committee of Azerbaijan Republic reports(SSCRA 2019a). Moreover, manufacturing contributed just 5% of GDP in 2007. Another important point is that Azerbaijan's exports are essentially composed of crude oil and gas. According to Figure 1, 2003 was the year experiencing the least share of oil exports among the total export from 2001 till 2020 with 85.5% of exports being oil products which is quite impressive number. The stats are one of the most surprising in all Post-Soviet borders. These stats back up the idea that the Azerbaijan economy is significantly dependent on oil windfall revenues. All in all, thinking of high dependence on oil, there comes a strong question to our minds: is it really good to possess petroleum stock if an economy is strongly dependent on it? What happens

to an economy with that much dependence on oil if the stockes finish or the commodity prices decrease to zero levels?

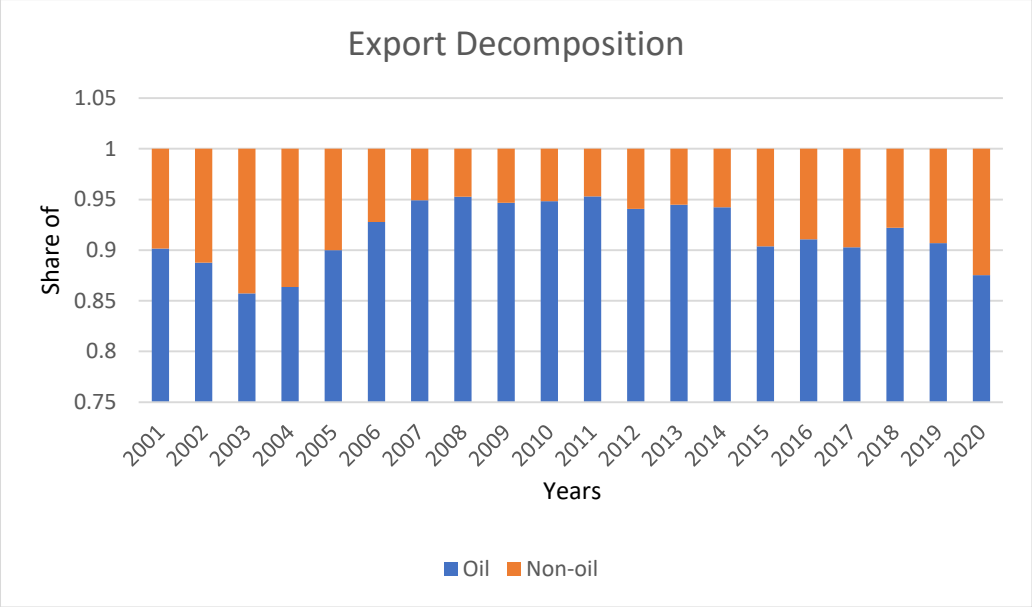

Figure 1. Export Decomposition

Source*:* Central Bank of Azerbaijan Republic

Despite of the fact that Dutch Disease is frequently approached topic in the literature, Azerbaijan's economy has not been investigated comprehensively. Following above-mentioned facts, the main aim of this paper is to investigate whether the economy has contracted Dutch Disease or despite of huge dependence on the petroleum reserves Dutch Disease is not present in the economy. To serve this purpose, Vector Autoregressive (VAR) model is employed in this paper to assess the level of-oil dependency in the economy by using a variety of variables. Firstly, revenue from oil exports is used to assess the effect of the petroleum sector on GDP, the non-oil tradable sector's output, and REER. Observing the results from the first model, another model to further assess the effect of the revenue in the economy, the impact of the transfers from the oil fund on government and investment expenditures, and the non-oil tradable sector's output is constructed. Moreover, a model is also constructed to observe

asymmetrical effects of negative and positive oil price shocks on the economy following Mork's (1989) and Hamilton's (1996) approaches.

The paper continues with the review of the literature about the Dutch Disease. Chapter 3 is established to present the nature of resource abundance and the Dutch Disease, besides policies to prevent an economy contracting them. After that, the Azerbaijan economy is presented by the means of the historical developments, and economic performance is investigated through comparisons employing a variety of historical data. In Chapter 5 review of the data and methodology is presented. Chapter 6 is consisted of results of empirical analysis through VAR methodology. It is followed by conclusions about presence of the Dutch Disease based on empirical analysis in this paper.

CHAPTER 2

LITERATURE REVIEW

2.1. Introduction

"... I call petroleum 'the devil's excrement'. It brings trouble. Look around you. Look at this locura-waste, corruption, consumption, our public services are falling apart... and debt, the debt we shall have for years. We are putting our grandchildren in debt." This is a quote from Juan Pablo Perez Alfonso – Energy Minister of Venezuela who is also one of the founders of the Organization of Petroleum Exporting Countries(OPEC). The time has made his words be proven to be right as Venezuela which happened to be 12 times richer than China, 4 times richer than Japan is now drowning among its debts and its valueless currency units which seems to be an inheritance to and a burden on upcoming generations.

Since the late middle ages economists, philosophers, sociologists had warned about the disadvantages of resources. A paper by Cairnes (1859) is known to be the first to investigate a type of resource abundance while studying Australian gold extraction (Tilaklal, 1992). The thoughts about resource abundance gained more attraction in the period after the 2nd World War. Beginning with the 1960s, East Asia's resource-poor countries' economically stronger performance than resource-abundant countries started to draw attention to this field. As a reasonable ending of the peak level of interactions with the field, in 1993 the term – "resource curse" was firstly used by Richard Auty to describe how resource-abundant countries perform lower in growth terms than countries with poor levels of non-renewable resources.

According to resource curse theory, the underperformance of resource-abundant countries than resource-poor countries can be explained in two different branches which are complementary to each other. Those are economic and socio-political sides resource curse theory indicates. If economical results of resource curse can be summoned under Dutch disease, there are various results of the resource being a curse on the socio-political side. For instance, natural resources have always been seen as sources of economic rent to generate easy revenue for dominant factions in the country. So, usually, there is a convenient environment for corruption, political instability, and conflicts. On the economical side of the resource curse, Dutch disease has been investigated to explain the underperformance of resource-rich countries.

Indeed, it was not the first time in the history that resource abundance was being seen as a curse. As it was mentioned before there had been significant numbers of people who approached resource abundance emphasizing their negative side. In the period after the Netherlands discovered huge gas sources, scientists felt the need for the field to be investigated more deeply to learn it, and policymakers in order to prevent economies from experiencing the same results and to cure them.

Although there had already been interests in this field, the 1970's oil boom pulled a lot more acceleration on this topic. After the case of the Netherlands the term – 'Dutch Disease' was brought in parallel which was firstly mentioned in a journal called 'The Economist' in 1977 to describe the situation of the Netherlands. In 1982, developed by Corden and Neary it took its place as Dutch Disease theory in the literature. Dutch Disease theory covers just one of complementing parts of the famous 'resource curse' theory as it coincides with the economic side.

In this chapter literature on the Dutch Disease will be reviewed in four sections. In the Section 2, theoretical studies on the Dutch Disease will be investigated. It will be proceeded with review of empirical studies. A separate section is dedicated to review the Dutch Disease studies in the literature on the Azerbaijan economy. At last, macroeconomic policies to prevent the Dutch Disease will be reviewed through the literature in a separate section.

2.2. Literature Review on Theoretical Dutch Disease Studies

According to Corden, Dutch Disease analysis involves a subject of growth and trade literature which is interested in general equilibrium effects of technological change or some other improvements in one sector drive the economy to resource allocation. In that context, the well-known Dutch Disease theory by Corden and Neary (1982) tries to describe those channels through which the sector experiences technological advances that lead resource-rich countries to perform lower in economic terms than resource-poor countries.

Corden and Neary (1982) divide economies into three sectors in the theory: 'booming' tradable sector, 'non-booming' tradable sector, and 'non-tradable' sector which is the service sector. The booming sector is usually mining natural resources like oil and gas, diamond, gold, etc. A price increase or discovery of new resource stocks may result in a boom in the economy. The non-booming tradable sector usually attributes manufacturing and agriculture in Dutch Disease theory. Both are traded internationally, and prices are formed in a market, not inside the country. However, the third sector – service sector is non-tradable since it is only supplied and demanded domestically, and its price is formed inside the country.

In the Dutch Disease framework, direct and indirect effects of booming in an economy are distinguished. According to the theory either increasing price, the discovery of new natural resource stocks, or the development of a cost-minimizing technology leads to a boom in the sector. With that development, the booming sector demands more labor, which increases wages under the assumption of full employment, which in turn means the labor demand will be met with a labor force accommodated in other sectors. As a result, because of decreasing labor accommodation in traditional sectors which is a production factor, potential and factual output levels will decrease significantly, and the overall sector will be hurt. In the Dutch Disease framework, this channel is the direct effect of booming in the oil sector on labor and called the "resource movement effect" and referred to as direct de-industrialization. Martin (1999), Rosenberg and Saavalainen (1998) claim that the resource movement effect will be insignificant for

Azerbaijan since the labor demand of the booming sector will be met by including employment surplus in the state-owned enterprises (Mahmudov, 2002).

Coming to the indirect effect of booming, it is also interesting in the timeline. As income increased, the demand for both non-tradable, which is the service sector and lagging tradable will increase also. That means extra labor will be demanded in the service sector at the expense of the lagging tradable sector. Increased demand for services will result in prices of the service sector going up since it is formed domestically. However, prices of manufactured goods will not change since it is formed in international markets. Since production factors are directed to the booming and mostly service sector, any excess demand for manufactured goods will be met by importing goods. This indirect effect of booming in an economy is called the "spending effect" and results in indirect de-industrialization.

One of those early Dutch Disease models was constructed by Van Wijnbergen (1984). He was looking for an explanation of the insufficiency of energy-rich countries to increase their well-being and economic performance despite increasing oil prices since it is for their advantage. Actually, increasing oil prices resulted in the deterioration of other tradable sectors and their turnover. He revealed that increasing commodity prices was not its direct cause since it was resulted because of the more valuable domestic currency. As the domestic currency is appreciated domestically produced goods are being less competitive. Sachs and Werner (1995) revealed that countries with a higher ratio of natural resource exports to GDP tended to grow slower than others. Ross (2001) concluded that countries rich with exhausting resources experience a lower rate of growth than those which do not own by mentioning that major oil producers as Saudi Arabia, Angola, Venezuela, Iran have recently experienced shrinking growth per capita.

Karl (1997) described the political environment as the main reason for the poor performance of countries with rich mineral resources. He uses the term "petrolization of the political environment" implying that extracting oil for the means of exporting brings a common set of problems as well as similar difficulties to get rid of them

(Mahmudov, 2002). There has been a generally accepted consensus that countries with democracy have a greater chance to predict and treat relative symptoms. However, most times, researchers have not found any relationship between the form of government and the ability to prevent the deterioration of economies as a result of resource dependence. That is an important factor if we are analyzing Azerbaijan since the remainders of the Soviet era have still been observed in the political environment of Azerbaijan. In other words, corruption, old-minded management, and low level of the education are some of the characteristics of the environment in Azerbaijan. However, different views have been seen in the literature. Amuzegar (2001) revealed that Ecuador and Venezuela which are countries with democracy revealed the close levels of growth rates with Saudia Arabia and Nigeria which are in the opposite end of the governance style. However, Papyrakis and Gerlagh (2004) found evidence of the resource curse hypothesis, mainly for developing economies and medium-high income countries. I agree with the claims that the effects of oil revenues can not be analyzed by ignoring the influence of institutional inefficiency and socio-historical factors (Karshenas, 1990). Specifically, when economies from the aforementioned groups are characterized by a weak quality of political institutions, then oil dependence is not growth-enhancing. However, mostly, the focus will be variables affecting functions of oil windfall revenues rather than socio-historical actors which formed those variables.

Also, some alternative views were developed for the poor performance of resource-rich countries. Rodriguez and Sachs (1999) claimed that the slow growth of resource-rich countries may be due to the fact that they are not at their natural level and they earn high levels of revenues which sustainablity is less probable. (Mahmudov, 2002).

To distinguish the effects of different exchange rate regimes on Dutch Disease results, there have been some investigations. For example, Ebrahim-zadeh (2003) in his respective paper concludes that the exchange rate regime that a country applies does not affect the condition of competitiveness of the traditional tradable sector in foreign markets. That is important to note since the exchange rate regime has changed in Azerbaijan over the period which is included in our research. That is till 2015

Azerbaijan operated in a fixed exchange rate system when CBAR decided to change the exchange rate system to a floating regime.

Additionally, Behzadan, Chisik, Onder, Battaile (2017) presented a theory to base Dutch Disease. They argued that income inequality in a state is a reason for the Dutch Disease. According to their theory, non-tradable service is a luxury good, wealthier individuals have a greater propensity to consume service. They revealed that states with higher inequality tend to be caught by Dutch Disease with higher probability.

2.3. Literature Review on Emprical Dutch Disease Studies

Empirically, Dutch Disease has been investigated deeply by focusing on a various social, political, and economical variables for a variety of countries.

After building a theoretical base, scholars began to contribute literature with empirical researches. One of the earliest was done by Fardmanesh (1991), employing 20 years' annual data for resource-rich countries, concluded that the traditional tradable sector's output is negatively affected by Dutch Disease. His main outcome was about commodity prices and he revealed that oil price is not a variable that causes Dutch Disease.

Like Azerbaijan, other resource-rich Post-Soviet countries have been targets of Dutch Disease researches. There have been a few investigations that confirm Russia has contracted Dutch Disease. Scholars Bogetic, Smits, Budina, and Van Wijnbergen (2010), assumed the validity of the claim that the Russian economy suffers from Dutch Disease. Researchers - Koomes and Kalcheva (2007), concluded that Russia has Dutch disease symptoms in their relative paper in which they investigate Russia's economy. They found that the Real Effective Exchange Rate is positively related to oil prices which is one of the very first symptoms of Dutch Disease. Secondly, they revealed that the service sector's growth rate in Russia is way higher than that of the manufacturing sector's growth rate, and real wage increases are a general trend throughout the economy. However, they could not confidently approve that these trends are results of Dutch Disease. So the above-mentioned symptoms may be the

results of other economic activities. Although Dobrynskaya and Turkisch (2010) approved REER appreciation, decreasing employment in the manufacturing sector, higher growth rates in the service sector, they do not approve of the existence of the Dutch Disease in the Russian economy. They insisted that industrial productivity is rising besides production in Russia (Niftiyev, 2020). However, Ito (2017) found a contradicting result to the widely believed claim in his empirical analysis of Russia's economy employing the Vector Autoregressive model (VAR). He found that manufacturing output increases are associated with oil price increases and slightly even with REER appreciation. The model revealed a possible crowding-out effect in which increasing government expenditures decrease manufacturing output. In order, the author links the positive relationship of commodity price and manufacturing output to subsidizations of energy prices for the manufacturing sector.

The negative effect of oil-exporting on the traditional sector is a serious concern mostly for the less developed countries. However, it has been also revealed that highly developed countries are not guaranteed from the negative sides of being resource-rich. It has been claimed by Dissou (2010) that Canada suffers from being an exporter. Aye et al.(2014) concluded that resources leading to Dutch Disease is not limited to oil and gas, and any exhausted resource that could lead to an increase in exchange rate with the capital inflow may be a reason for Dutch Disease.

Wright (2001) claimed that the problem with resource-based economies is not based easily on mining resources. He backed up his claim by giving resource-rich countries like USA and Norway as being developed. He suggested the failure of institutions and unstable political structures are the main reasons since they are being insufficient to back up sustainable economic development. He believed that nation's participation in the learning process which is structured to develop sustainably is key to avoiding the disadvantages of being dependent on resource-mining. Alternatively, to comparison of two developed countries Bjørnland (1998) did a study on the U.K and Norway analyzing the effect of the oil and gas sector on the manufacturing output, revealed that the UK showed signs of Dutch Disease in the long run in opposed to Norway. One

of the results may be subsidization of the manufacturing sector in Norway while in the UK a lot of factories closed which resulted in the increasing unemployment rate.

The variety of variables that could lead the economy of high oil prices to Dutch Disease is seen to be so much that any seminal works with a large variable set could still be inefficient in including all significant variables. As much as transition channels and variables, a variety of models in the literature on the topic of Dutch Disease is quite wide. However, Vector Autoregressive models are more frequent and widespread.

Bjørnland, Thorsrud, Torvik (2019) explain good performing countries by focusing on productivity dynamics of Dutch Disease. They argue that the difference in results of learning-by-doing models and Dutch Disease models is because of incorporating spending effect exclusively but not working on effects of resource movement on productivity dynamics. They tried to solve this problem in their models which estimated a time-varying VAR model by including activity in the petroleum sector which captures effects of resource movement and oil prices which captures windfall gains that is effective for spending effect. The model revealed that the oil boom that increases value-added per worker in the oil sector has its productivity spillovers to other industries. It is also revealed that there are no such productivity spillovers following an oil price shock in the industry the other models consider. So it is natural for models incorporating spending effect that is because of increasing oil price to find a negative effect of the oil industry on overall growth. Their analysis revealed an important point about the existence of petroleum funds. They thought of the petroleum fund of Norway as a reason for the less effective spending effect of windfall gains since it was built to limit current spending from oil income.

Another research that brought petroleum fund as the main reason to not contract Dutch Disease is that of Ostensen (2017). Employing the VAR model, he found that only net export responded to changes in oil prices while GDP, REER, and inflation do not. According to him, a flexible, productive, and competitive mainland economy in addition to a floating exchange rate is central to buffer external shocks that may

influence petroleum income. This is similar to the results obtained by Mehrara (2008), Iwayemi and Fowowe (2010). They implied that negative oil price shocks dominate positive oil price shocks. This is an indicator of Dutch Disease, where following a positive oil price shock output experiences little to no increase, however, following a negative oil price shock output declines significantly (Mehrara, 2008). It is not a concern in Norway, a negative oil shock does not make output decline significantly. Thereby it is confirming other studies which concluded that Norway does not suffer from Dutch Disease. This is attributed to the presence of the GPFG. Following this, Olu and Olagunju (2005) examined whether Dutch Disease was present in Nigeria. By using quarterly data from 1980 to 2003 and employing the Vector Autoregressive (VAR) model, they revealed that the economy suffered from Dutch Disease. In countries like Nigeria, which showed sign of Dutch Disease, policies like diversification of the economy, reduction of government debt, and handling oil revenues through an oil fund was suggested to combat this. In Norway, prudence in government expenditure has been a priority since the start of the 2000s. It is beneficial to note that State Oil Fund of Azerbaijan also actively operates.

Stijns (2003) on the other hand employed the gravity model of trade on the data from the World Trade Database. His conclusions are interesting and need to be further investigated. He revealed that manufacturing production output can increase as a result of the resource boom. However, that does not mean manufacturing export will increase. In other words, domestic demand for manufacturing goods will increase more than increasing manufacturing exports as a result of the commodity boom. For that to happen, the competitiveness of manufacturing goods has to be strongly negatively affected. Indeed, as mentioned before these conclusions need to be further investigated.

Moreover, Apergis et al. (2014) employing two-step System GMM by Blundell and Bond (1998) concluded after research on the relationship of Dutch Disease and the agricultural sectors came up with a finding of a negative relationship between oil rents and agriculture value-added in the long run, with a rather slow rate of short-run adjustment of agriculture value added back to equilibrium after a boom in oil rents. In

other words, the oil sector boom will shrink agricultural value added in the long run. This is probably attributable to a resource movement effect from other economic sectors to the booming oil sector in these countries. This serves as an evidence of a Dutch Disease effect of an oil sector boom on agriculture in the Middle East and North Africa countries in this study.

Koitsiwe and Adachi (2015) found that Australia's service sector had strongly been affected by the mining boom. Employing the VAR model, they used variance-decomposition analysis which revealed that while mining shock is quite effective in explaining variations on the exchange rate, the exchange rate is equally effective in explaining variations in manufacturing output.

Despite the above-mentioned examples' variety and abundance in the literature about the Dutch Disease and Resource Curse in general, there are some examples that argue that resource abundance is not damaging and question the classification of it as a disease. One of the popular ideas about the positive sides of resource abundance is the approach of learning by doing which indicates that there are spillover effects from the booming sector to the rest of the economy. Torvik (2001) argues the existence of spillover effects between tradable and non-tradable sectors. Bjørnland et al. (2019) revealed that the oil boom that increases the value-added per worker in the oil sector has its productivity spillovers to other industries. They also found that oil activity also increases productivity in the whole economy as time passes so innovation is the result of Norway's oil service industry. One of the interesting points is that although the share of employment in the traded sector decreased significantly faster in Norway in comparison to its alike neighbor Sweden, productivity per worker in Norway is significantly higher. Besides, they argued that productivity spillovers of activity in the petroleum industry are much higher for the traded sector than others. Alternatively, Magud and Sosa (2010) advise preventing undesired effects of resource-abundance employing advocating macroeconomic policy and benefitting windfalls of the booming sector while they accept Dutch Disease symptoms like appreciating REER, decreasing manufacturing productivity, and growth (Ramirez-Cendrero and Wirth, 2016).

2.4. Literature Review on Dutch Disease Studies about the Azerbaijan Economy

Dutch disease possibility in Azerbaijan economy has been drawing attention by both foreign researchers and locals. One of the early investigations was done by Rosenberg and Savalainen (1998). According to them, although resource exploitation had already created fluctuations in the economy through goods and assets prices it had not affected the competitiveness of domestic goods yet. However, they believe that there is a high possibility of Dutch Disease danger for Azerbaijan since huge capital inflows and foreign direct investments flowing into the booming sector resulted in an appreciating exchange rate. They also gave suggestions as founding an organization to manage resource income, investing in the traditional tradable sector, and keeping some part of money outside the country to prevent the economy from negative effects of Dutch Disease. Laura and Singh (1999) also indicated the possibility the of Azerbaijan economy catching Dutch Disease, so they warn policymakers on taking important steps. As both papers concluded, a fund to manage oil money both for efficiency and to save for future generations is established.

Clemens (2008) is just another author who gave his contributions to the literature. He argued that directing investments to the non-oil sectors may prevent the threat. Moreover, he said that previous years' level of FDI decreased which may be accepted as positive news. He then suggested fighting against corruption, making important reforms to increase democracy and human rights levels to fight against negative sides of resource abundance.

One of the interesting conclusions came from Arezki and Ismael (2013) with their research which they included Azerbaijan in a panel-data analysis. They revealed that government expenditures in Azerbaijan are positively related to increases in oil prices while they do not decrease with the fall in oil prices. Another interesting point they made is about the effects of two kinds of government expenditure on the real exchange rates. They concluded that government current expenditures positively impact real exchange rate while capital expenditures decrease the real exchange rate. They explain this asymmetry with the characteristics of capital spending being import-intensive.

Gojayev (2010) revealed that Azerbaijan suffers from Dutch Disease and suggested that economic reforms and fighting with monopolies would help to fight Dutch Disease. Contrary to him Hasanov (2010) did not confirm Dutch Disease contraction for Azerbaijan although he found a positive relationship between oil price and Real Effective Exchange Rate. He used the ARDL approach to constructing ECM.

Zulfugarov and Neuenkirch (2020) employed the Vector Autoregressive model and observed the impact of oil prices on various macroeconomic indicators. One of the attractive points in their study is that they also investigated asymmetric responses to negative and positive oil price shocks. They employed both Mork's (1989) and Hamilton's (1996) approach to distinguish effects of positive and negative oil price shocks. They found that Azerbaijan's non-oil economy is dependent on transfers from oil revenue which explains the downturn in the times of decreasing oil revenues. Contrarily, increasing oil revenues also slow the non-oil economy because of appreciating REER. Coming to non-linear extensions, they revealed that GDP responds only after positive price shocks. They believe that the Central Bank of Azerbaijan asymmetrically counteracts the negative oil price shocks.

2.5. Macroeconomic Policies against the Dutch Disease

There is no single framework to depict the way to prevent the economy to contract the Dutch Disease. As Sachs and Warner stated – "just as we lack a universally accepted theory of economic growth in general, we lack a universally accepted theory of the curse of natural resources". Its absence makes it difficult for policymakers to point out the procedure an economy should follow. Despite these difficulties of managing oil windfalls efficiently a variety of tools in the hands of policymakers makes it affordable to prevent the economy to contract the Dutch Disease, if we look at the various countries' practices possessing abundant resources. Some of them – Norway, Indonesia, and Malaysia, in the near past present good examples to latecomers. In this section, we aim to describe the straightforward management of revenues from the booming sector by employing efficient tools. While doing this, Norway's path will be a benchmark to explain optimal management tools.

2.5.1. Fiscal Policy

The government's position as a policymaker is a determining force in an economy's position to defend against the Dutch Disease. That shows its importance. One of the main transition channels of the Dutch Disease passes through the spending channel. One of the results of higher spending is REER appreciation which in turn, is thought of to be the most important stage of the transition. That is why it is always advised to keep away resource money to eventually flow to the economy which obligates the emergence of a government fund to collect all money collected from the resource sector. It is recommended to resource-rich countries by also IMF to put resource wealth in a sovereign wealth fund (Davis et al., 2002). The existence of the fund also ensures the deserved share of the future generations from the resource revenue. Norway government created Government Pension Fund Global and collected all income taxes, environmental taxes, royalties, dividends from national oil companies like Statoil in this fund. According to the rule, only 4% of net cash flows of the petroleum sector may be transferred to the state budget (Ramirez-Cendrero and Wirth, 2016). As it is seen from the name it is also a saving fund. According to the law, GPFG ensures that the money is kept outside of the country by investing in risk-free assets in other countries. This also ensures that no pressure will fall on Norwegian currency since all the money will be in foreign currencies.

Another effect of spending on the transition process of the Dutch Disease is due to the classification of the spending. The famous Dutch Disease theory indicates that as income increase, the demand for non-tradable and non-oil tradable goods will increase which put pressure at their prices. As a result, REER appreciation takes place. This means that if the government's expenditures are characterized as more of a consumption expenditure it is more probable to cause the economy to experience REER appreciation. However, if it was capital-intensive expenditures, there is less chance of it to cause. Fabrizio and German (2013) states that in the first case REER appreciation is at the high levels while it is less on impact in the second case. It is believed that it might cause by a new steady-state level of the economy with the high

public capital level which will also increase productivity in all sectors of the economy (Fabrizio and German, 2013). Expansionary fiscal policy is also recommended by Jean-Pierre, Mohamed, and Tovonony (2020) as they state that it increases productivity in the general economy.

Despite these steps, there were some other factors that were in favor of Norway that improved economic performance. First of all, Singh (2017) claims that Norway had already built a stable, wealthy, and equitable economy before finding oil reserves at the North Sea, and not exploring it before building an economy is its luck. Another reason is the deliberate policy for the participation of national factors of production in the exploration and exploitation of petroleum reserves. The traditional specialization of the Norwegians in engineering as they had used in shipbuilding helped them to succeed (Bjornland et al., 2019). As a result, the need for advanced technology was met by local shipbuilders, and the local cement industry was also employed. More deeply, it resulted in unlimited spillover effects for the rest of the economy (Ramirez - Cendrero and Wirth, 2016).

2.5.2. Monetary policy

In a classical economy of a resource-rich country, there is a fund to collect all the foreign reserves that flow from the resource sector. The next stage of the money is the Central Bank on the way to the economy. That is why central banks are crucial in managing the revenues from the booming sector.

From the exchange rate regime side, it has been claimed that exchange rate regimes have no effect on preventing the Dutch Disease by Ebrahim-zadeh (2003). He backs up his claim by stating that the competitiveness of the non-oil tradable sector's output is not affected by the exchange rate regime. However, Jean-Pierre et al. (2020) revealed that under the fixed exchange rate regime macroeconomic variables improve. However, Faltermeier et al. (2017) claim that decreasing interest rates to keep the exchange rate stable leads to increases in the non-tradable sector (Jean-Pierre A. et al,

2020). Expansionary monetary policy is the path to take by aiming non-oil tradable sector.

2.6. Conclusion

The literature review showed that analysis of the Dutch Disease presents too much flexibility: there is not a single instruction on choosing a methodology, as much as author has no limitation on choosing variables to investigate contraction of an economy to the Dutch Disease syndrome. Moreover, the variety of the results show that it is crucial to opt for the most purposeful set of variables to answer the well-determined research questions. In conclusion, review gave worthy recommendations on the proceeding analysis about choosing the efficient set of variable and methodology.

Before proceeding to present the data and methodology, Azerbaijan's economy will be described in a historical perspective in the next chapter.

CHAPTER 3

OVERVIEW OF THE AZEBAIJAN'S ECONOMY

3.1. Introduction

In the previous chapter, literature about the Dutch Disease syndrome was reviewed in a variety of aspects. Overall, the review insinuates the review of Azerbaijan's economy historically from different views in the means of observing the historical trend in the economy and comparing flow of the different key factors in the economy. That will enable us to choose the variables that fit in our aim to answer well-determined research questions and to give our insights about the economy based on the results from empirical analysis of the models.

For this purpose, this chapter review the economy historically in two sections. Firstly, a review of the history of the petroleum industry and the overall economy in Azerbaijan will enable us to see trends. After that, the general overview of the economy will be analyzed from the statistical analyze of the historical data which includes Balance of Payments (BOP) and more deeply import classification in the economy.

3.2. Historical Timeline of the Petroleum Industry in Azerbaijan

Historically, Azerbaijan is known to be a wealthy country being homeland to significant weights of oil and gas stocks. While some historians informed on Azerbaijani oil in the 11-12nd century, famous Italian traveler Marko Polo reported on the income of Azerbaijan oil. Even a manuscript from 1594 proved that oil was being extracted and sold by Allahyar Mamedhur. Additionally, Azerbaijan is known to be the 'Land of Fire'. While there are a lot of etymological conjectures for this

name, some of them sign Azerbaijan oil and gas resources on earning this name. To be more precise, there are some districts in the Absheron peninsula, which steadily burning flames can be seen. For example, Yanar Dagh which means 'burning mountain' in Azerbaijani, burns steadily, as it contains constant burning of gas stocks from the subsurface.

With the start of the industrial use of oil in the 18th century, the importance of oil reserves increased and became a more significant and determining factor in Azerbaijan history. National bourgeoise was established in Baku and the city became a reputational industrial center in the world. According to the Ministry of Energy of Azerbaijan, besides the Nobel brothers, the Rothschilds actively participated in the oil production of Azerbaijan with the means of their Caspian-Black Sea oil company. They controlled Baku oil export. Moreover, it is noted that Azerbaijan used to produce 11 million tons of oil back in 1901 which forms 50% of total oil production all over the world.

As it was previously mentioned increasing oil production created a national bourgeoise in Baku. Haji Zeynalabdin Taghiyev, Shamsi Asadullayev, Musa Naghiyev are some of the well-known members of oil magnates of time. They were investing a lot of resources in the oil industry in Azerbaijan. The first stock oil company was established by national millionaires which were called the Baku Oil Society. It is worth mentioning that not only the oil industry or oil millionaires were benefitting oil revenue. Oil magnates were investing in other regions and industries too. For example, Zeynalabdin Taghiyev invested in a textile fabric in Shaki. Industrial fisheries were invested also, while he owned Caspian Steamship Company. He financed a project which supplied people in the Absheron region with drinking water. At the same time, he was ahead of his time founding a school for girls which was not a trend in the East. Overall, it could be said that oil was the backbone of Azerbaijan's economy throughout the period till independence. The oil revenue was playing the role of subsidization for general economy in Azerbaijan from the first days of industry.

After being invaded by the Soviets oil industry came into a recession with state ownership. However, oil production in Azerbaijan lived one of its peaks in the 2nd World War. One of the winning factors of the war for the Soviets is Azerbaijan oil industry. According to a report submitted to the French Prime Minister in 1940, 75% of all oil necessities of the USSR were being supplied by Baku. The reporter believed the Soviets would fall into crisis if those sources were lost (Vagif et al., 1995).

Azerbaijan passed a hard period in the last years of the Soviets and in the first years of the independence. People's resistance against both central and domestic government take them through hard times and even the slaughter of people by their army happened in Baku. After independence Azerbaijan entered directly into a recession which there was not much to do in the situation as Azerbaijan was. It was easy for neither people nor the economy to quickly adapt to the new capitalist system after 70 years of socialism. Small and medium organizations were dependent on subsidies from the central government. All the production was used to be planned by the central government, which disappearance of the central planner made it hard to continue production. The interrelationships of all Soviets countries on almost all economic activities brought a recession to all economic facilities. Hyperinflation which was levels of two thousand made it even more difficult for the economy.

Additionally, directly after independence there started a war in which Azerbaijan had to face its devastating results not just in short term but also in the next 30 years. Besides all military losses and devastating results for people, Azerbaijan also lost economically. Lands known to have huge gold, coal, and other valuable substances were lost to the neighbor enemy – Armenia. Besides, those regions were useful for farming, tourism, agriculture, and other beneficiary activities. Nearly more than 700 thousand refugees were the responsibility of the Azerbaijan government.

In those times of a series of difficulties for the Azerbaijan economy, oil was thought of being a basis to solve all those difficulties and backbone for the independence of Azerbaijan. As a reasonable ending to the above-mentioned difficulties and timeline, in 1994 well-known "Product Sharing Agreement" which is also called the 'contract

of the century ‘was signed. It was aimed to cover 30 years since it was signed. 13 leading western multinational oil companies (AMOCO, BP, McDermott, UNOCAL, SOCAR, LUKOIL, Statoil, Exxon, Turkish Petrol, Pennzoil, Itochu, Remco, Delta) from 8 countries (Azerbaijan, the USA, the UK, Russia, Turkey, Norway, Japan, and Saudi Arabia) were included in the contract. The capacity of oil wells was firstly estimated to be 511 million tons, which was later estimated to be 750 million tons after reevaluations of wells. According to the Ministry of Energy of the Republic of Azerbaijan 80% of the net profit of the total project is accounted to be the profit of Azerbaijan, while investors gained 20% of total profit. However, oil was not intended to only reach economic growth and stabilization, but people’s welfare was dependent on it. As Heydar Aliyev stated: our objective is not only to produce oil but also to transport it and get paid for it. We must use the oil, political, economic, and other incomes to ensure the interests and welfare of the people. Moreover, his successor, Ilham Aliyev, indicated in one of his speeches that the main aim is to transfer oil capital into human capital.

In accordance with the contract, Baku-Tbilisi-Ceyhan (BTC) oil pipelines were constructed to transport oil to Europe while two other options were being Baku-Novorossiysk (BN) and Baku-Tbilisi-Supsa (BTS). It was mentioned by Aliyev, that it is critical to guarantee the independence of Azerbaijan. In 2006, BTC started to fully serve, and it was a significant breakpoint for Azerbaijan’s economy. With the revised agreement in 2017, the duration of the contract of the century was extended till 2050. The estimated capital to be invested, is 40 billion dollars after the revised agreement, while 36 billion had been invested since 2017.

In addition to oil exploitation, projects to extract gas stock have been held. In 2006, Shah Deniz reserves started to be extracted. It is one of the largest gas-condensate fields according to BP which was the one to discover it. In 12 years after starting to operate, Shah Deniz reserves were celebrating to finish extraction of 100 billion cubic meters of total gas production according to BP reports.

Overall, it can be surely stated that the oil and gas industry in Azerbaijan is determining factor for the economy. Taking all the historical situation, economic and social conditions into consideration, analyzing the current situation would give someone strong insights about economic growth and simultaneously increased welfare level in Azerbaijan which would be thought of as development. It can be said that oil is the reason for the above-mentioned improvement and economic independence in Azerbaijan.

3.3. General Overview of the Azerbaijan Economy

The main issue is not to reach growth with oil revenue, but rather reaching sustainable growth is the main aim. With that much of being impacted by oil, the main challenge in front of policymakers is to prevent the economy to be dependent on oil. The non-oil tradable sector, especially agriculture and manufacturing sector may play an important role to serve this goal. One of the positive, more advantageous sides of the manufacturing and agricultural industry is its capability of increasing productivity which is a learning-by-doing sector and having productivity spillovers to other sectors. In the case of Dutch Disease with increasing income as service is much more consumed, labor will flow to the service sector and goods of non-oil tradable sector will be imported. With the potential of manufacturing as being open to learning and productivity improvements and the labor force being in the service sector, a state loses its chance for productivity improvement.

Another advantageous side of the non-oil tradable sector is its potential for job creation. In contrast, the oil industry does not require a huge labor force since it has no employees more than 1% of the total labor force in Azerbaijan. Additionally, manufacturing presents a wider area for research and development. Indeed, statistics show that Azerbaijan is not successful at all to benefit from all these positive sides of the manufacturing industry. Yet, data from the United Nations Industrial Development Organization (UNIDO) shows that Azerbaijan is ranked 103rd out of 148 countries having 0,011 Competitive Industrial Performance index. It was also reported by UNIDO that manufacturing value-added (MVA) per capita is just $307,3 making it be

ranked 103rd in 2015. It is worth mentioning that in 2010 it was $280. And those numbers show their devastating reflection in the share of MVA in real GDP. The report states that in 2015, MVA concluded only 5,13% of real GDP.

Another incentive to develop the non-oil sector for Azerbaijan is the exhaustibility characteristics of resources. It was recently estimated by reputable reports that unless new reserves are discovered, Azerbaijan will not benefit anymore after a few more years. The need for a developed non-oil tradable sector becomes more desperate with the fact that oil revenue contributes to nearly half of the budget revenues for the last 4 years and takes a higher share previously. Figure 2 shows the budget revenues, transfers from the oil fund to the state budget, and the share of these transfers in the budget revenue of Azerbaijan for the last 17 years. Transfers from the State Oil Fund of Azerbaijan play an important role in the revenue side of the budget.

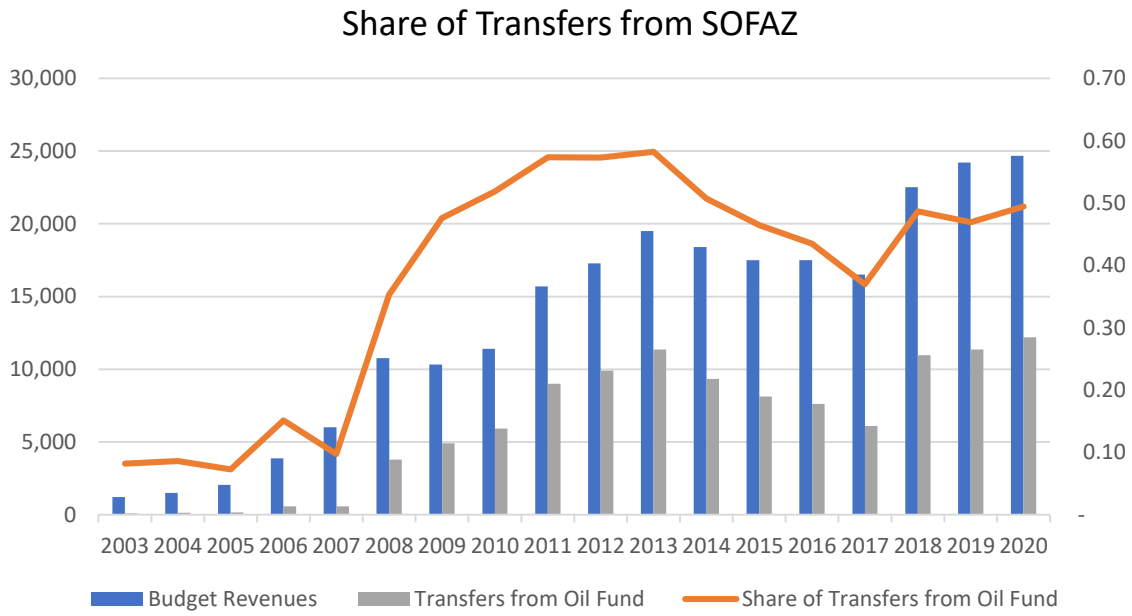

Figure 2. Levels of Transfers from Oil Fund and Budget Revenues in Millions of US Dollars, and Shares of Transfers from Oil Fund in the Government Budget Revenues in Azerbaijan

Source: Generated based on the Budget Revenue data from CBAR and Transfers data from State Oil Fund of Azerbaijan Republic

Especially, with the start of production of gas reserves from Shah Deniz field and transportation of Azerbaijani oil to Europe through BTC oil pipelines in 2006 the shares of transfers rose to 15% from 7% in 2005, and reached its peak 58% in 2013. And as of declining oil prices, its share in budget revenues shrank to 51% in 2014. Nevertheless, its role is still essential as being a provider of more than 45% of total budget revenue for the last three years.

To describe the situation in Azerbaijan's economy, the most straightforward step to take would be to mention the output level for the last 20 years. As it can be seen from the Figure 3, the agriculture and manufacturing sectors increased their levels of output 2 and 3 times respectively which seems quite impressive. However, the fact that the output level in the mining sector increased the gap with other sectors makes the situation a little disturbing.

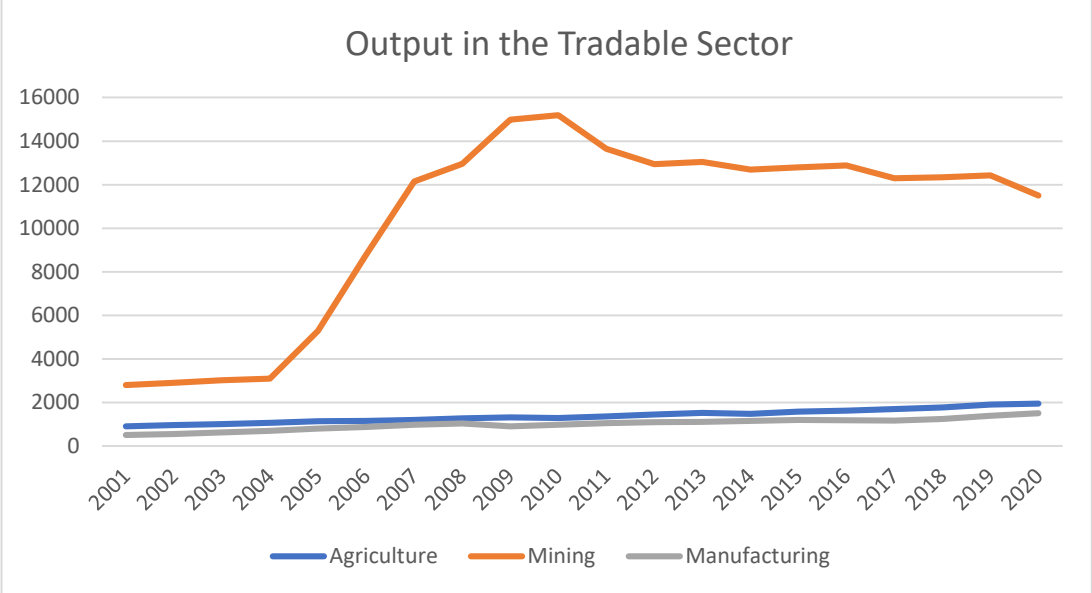

Figure 3. Levels of Outputs in the Tradable Sectors of Agriculture, Mining and Manufacturing in Millions of US Dollars

Source: State Statistics Committee of Azerbaijan

3.3.1. Analysis of Balance of Payments of Azerbaijan

Azerbaijan economy has benefitted from the petroleum sector significantly throughout the last 20 years in the means of foreign capital inflow. Before proceeding to check the influence of petroleum sector's revenue in the various variables by employing econometric methods it would be better to analyze other essential ways of capital inflow to the economy of Azerbaijan. One of them is Foreign Direct Investments (FDI) which is the most important factor in today's condition of petroleum sector in Azerbaijan. Figure 4 presented below indicates values of FDI values in the last 20 years. As it is seen easily FDI has been very volatile throughout the 20-years' period. Another crucial point in the graphs is about timing of the picks of FDI values. The highest FDI in Azerbaijan occurred 2003 while till 2006 FDI had been high. These years are the years with the major construction works were being done for the operation of petroleum sector in Azerbaijan which resulted in several significant consequences. Start of production at the West and Central Azeri in 2005, and the first gas production in the Shah Deniz stage and the first profit oil produced at the East Azeri are some examples of these significant events besides inauguration of BTC pipeline. That is the reason for high level of FDI till 2006. Another high level of FDI showed itself around 2015 which can be explained by decreasing oil prices which made it significant for multinational oil companies to support their activities in Azerbaijan.

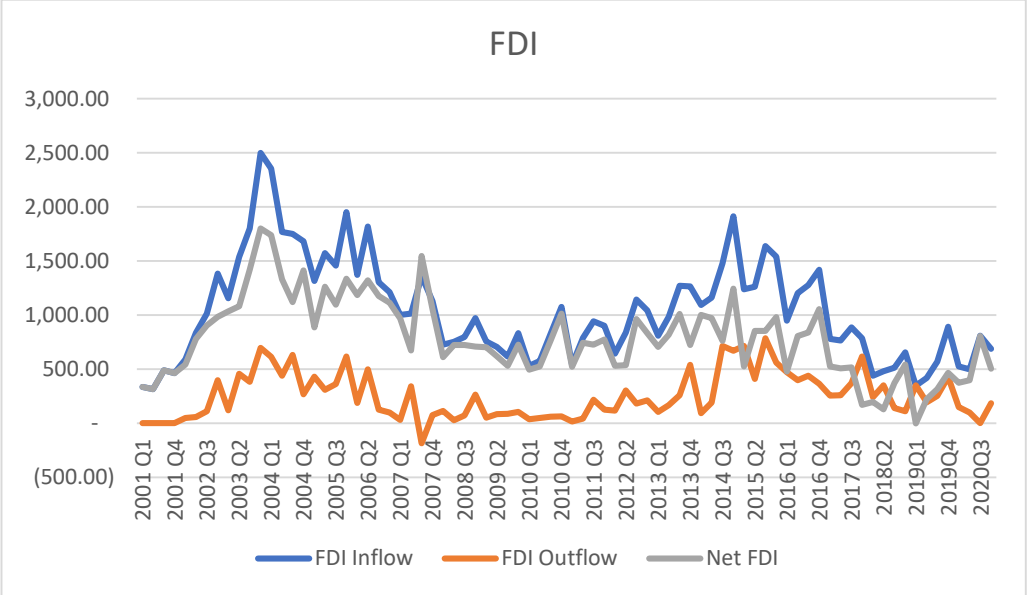

Figure 4. FDI Inflows, FDI Outflows, and Net FDI Inflows of Azerbaijan in Millions of US Dollars

Source: Central Bank of Azerbaijan Republic

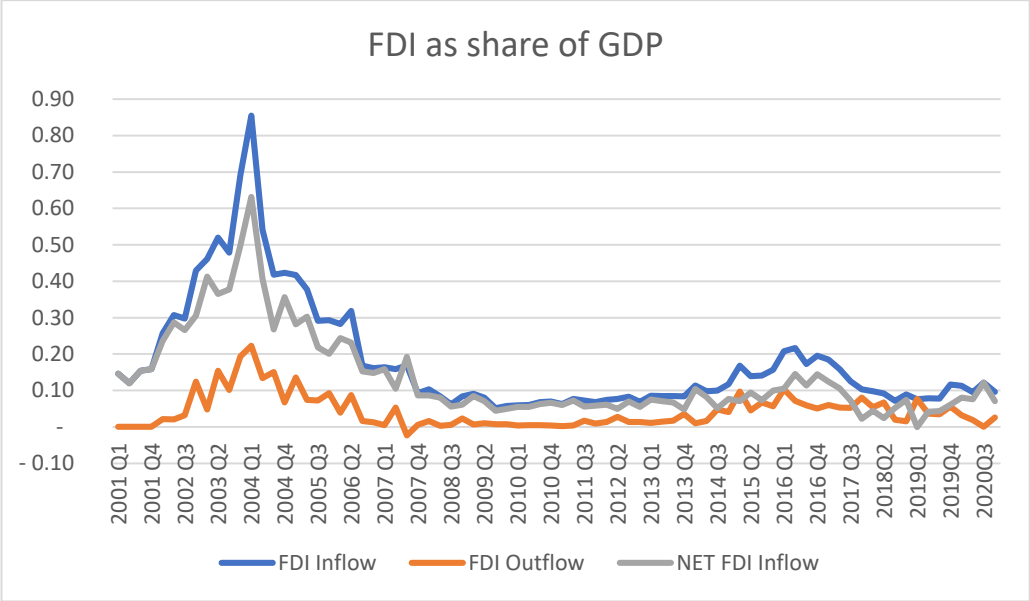

Figure 5. Shares of FDI Inflows, FDI Outflows, and FDI Net Inflows in GDP of Azerbaijan

As it can be seen from Figure 5, FDI concluded significant part of the GDP in the first phase when construction of the overall petroleum sector in Azerbaijan was actual. That is consequence of both low levels of GDP before active phase of petroleum sector's activity and most importantly because of high levels of FDI in Azerbaijan.

As it can be seen from Figure 6, portfolio outflows are volatile as FDI is. However, the level of Foreign Direct Investments has not been caught by portfolio investments. Another interesting point is that portfolio outflows are usually higher than portfolio inflows which is because of the petroleum fund of Azerbaijan which invests capital that comes from the petroleum sector outside of Azerbaijan for stabilization of capital flow in the economy. The deficit is usually high in the period between the financial crisis in 2008 and big slump in oil prices in 2015. It would be beneficial to remind that in 2015 devaluation of manat occurred. Since 2015 portfolio outflows have decreased significantly.

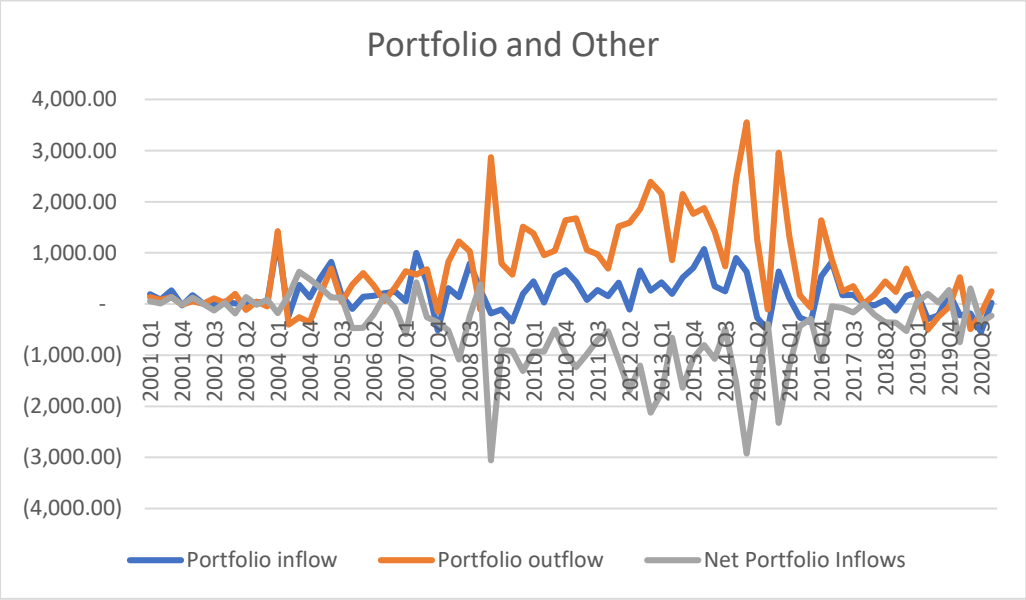

Figure 6. Foreign Portfolio Inflows, Outflows, Net Inflows of Azerbaijan in Millions of US Dollars

Source: Central Bank of Azerbaijan Republic

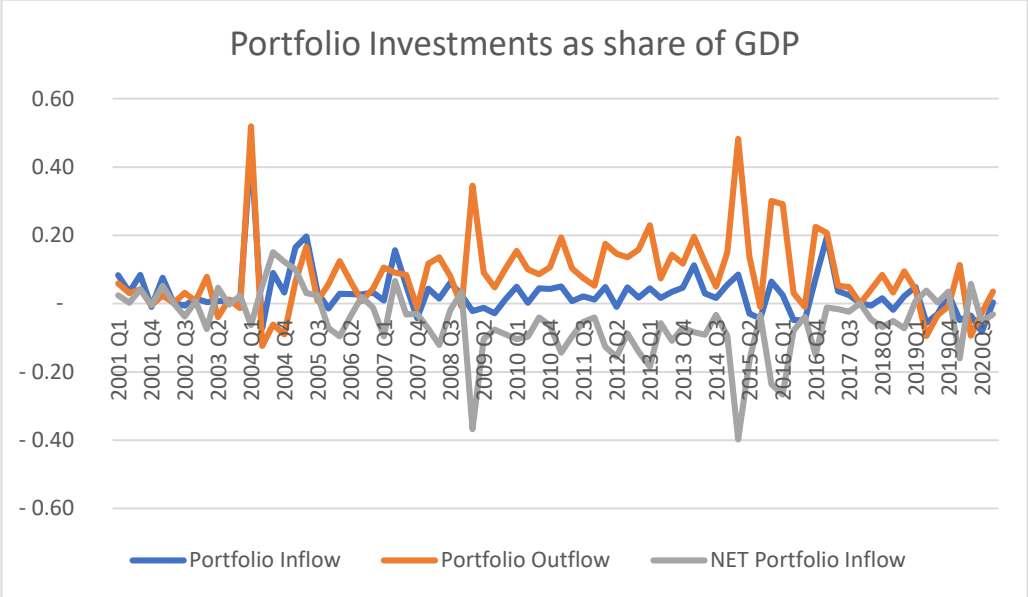

Figure 7. Ratios of Foreign Portfolio Inflows, Outflows, and Net Inflows in GDP of Azerbaijan

Fortunately, Azerbaijan economy has a mostly positive balance of goods thanks to high exports. As presented before, Azerbaijan exports are significantly dependent on petroleum industry. As it is obvious from Figure 8, the start of the high activity in the petroleum sector in Azerbaijan shows itself in the trade balance of Azerbaijan. Although Azerbaijan's current account had experienced negative balances several times before 2005, it has been positive in the rest of the period. Starting from 2005 both exports and imports have had increasing trends. However, with the decrease in the price of oil in 2015 exports surged essentially. Although with that decrease in exports current account has been positive.

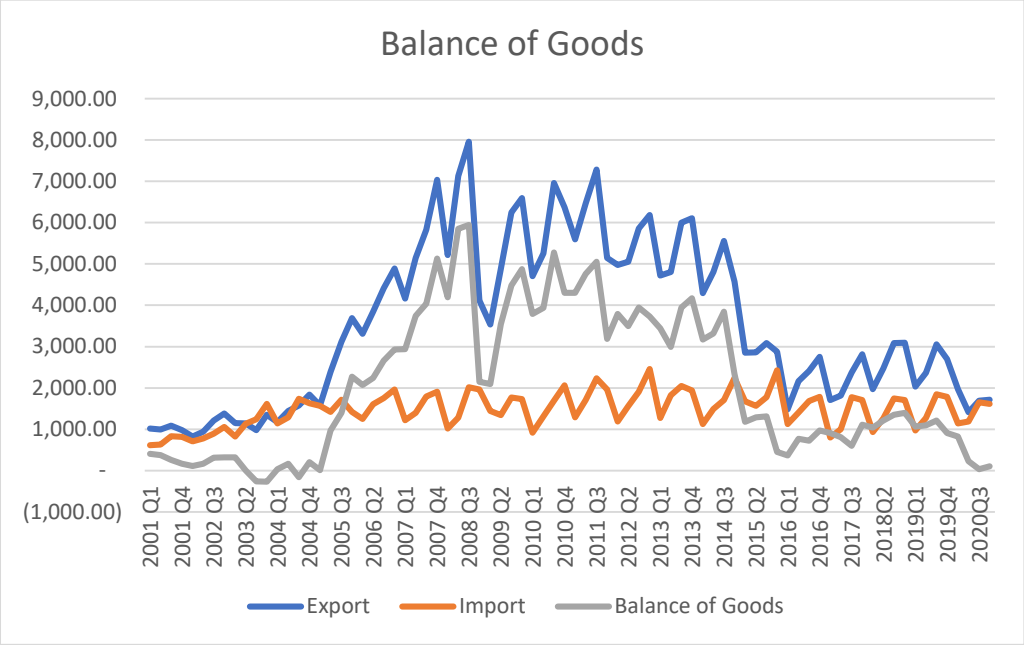

Figure 8. Exports, Imports, and Foreign Trade Balance of the Azerbaijan in Millions of US Dollars

Source: Central Bank of Azerbaijan Republic

Figure 9 describes quantity of imports and exports as share of GDP. As it can be seen exports of Azerbaijan conclude significant part of the GDP also. It concluded even 80% of GDP just before the financial crisis when oil prices were high. Correlation of the GDP growth and exports growth of the Azerbaijan economy in the last 9 years of the analyzed period is 84% while it is 88% with imports. It makes analysis of imports significant to come up with a fully considered reason.

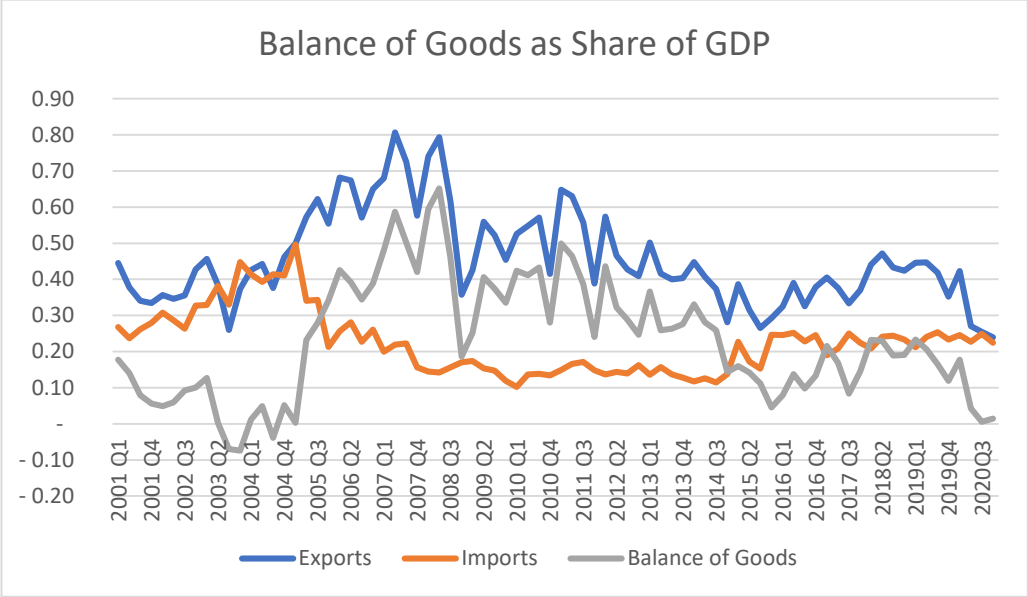

Figure 9. Ratios of Exports, Imports, and Foreign Trade Balance in GDP in Azerbaijan

Source: Central Bank of Azerbaijan Republic

3.3.2. Analysis of the Imports

After analyzing Balance of Payments of the Azerbaijan economy another crucial point about the economy is classification of imports in relevance to Broad Economic Categories' grouping system of United Nations'. As indicated above, a thorough analysis shows that correlation of the GDP growth of the Azerbaijan economy and imports is 0,87% in the period of the last 9 years which in turn, shows that components of the imports must be analyzed.

According to the Figure 10 prepared in accordance with the data supplied by the Central Bank of Azerbaijan (CBAR) intermediate goods have been concluding the most part of the imports of the Azerbaijan in the period from 2012 till 2020. Although Capital goods had been in the same levels with consumer goods till 2015, after the rocketing of oil prices consumer goods had been the 2nd most imported goods.

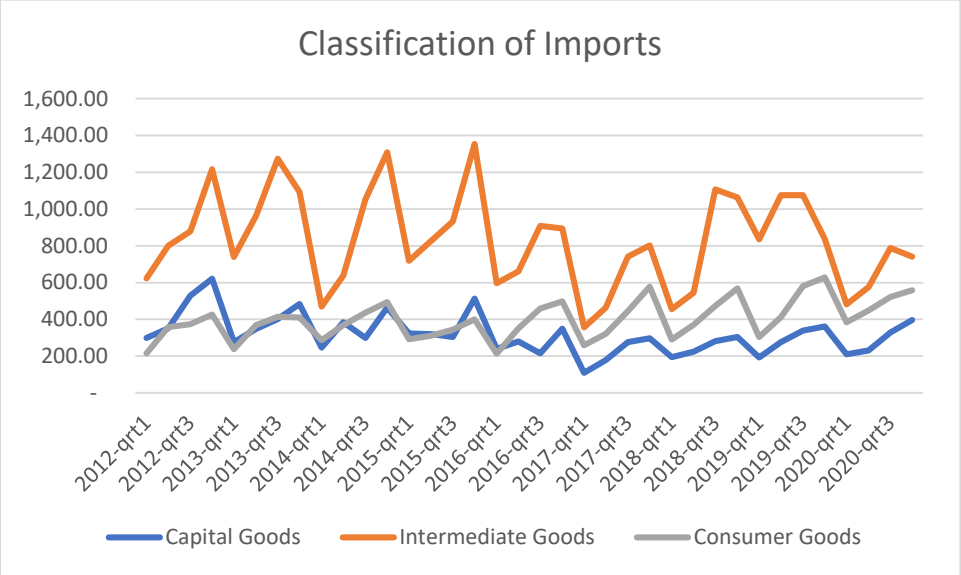

Figure 10. Classification of Imports According to Their Last Usage in Millions of US Dollars

Source: Central Bank of Azerbaijan Republic

The share of consumer goods among all the imports also shows their increasing trend throughout the last years. Although it concluded averagely 20% of all the imports in the beginning of the last ten years, on average 35% of the imports includes consumer goods in 2020. Decreasing oil prices may be a reason for that since after the oil price dipping in 2015 consumer goods imports have been increasing constantly.

On average, 20 and 53% of the imports are capital and intermediate goods respectively which sums up to 73% of all imports. The correlation of imports and GDP growth shows that imports play a crucial role in the GDP growth. Adding the fact that capital and intermediate goods conclude 73% of imports, which is quite essential number, implies that intermediate and capital goods are important for growth in the Azerbaijan economy. However, increasing consumer goods throughout the last years is a treat for growth. This statistic is presented in Figure 11.

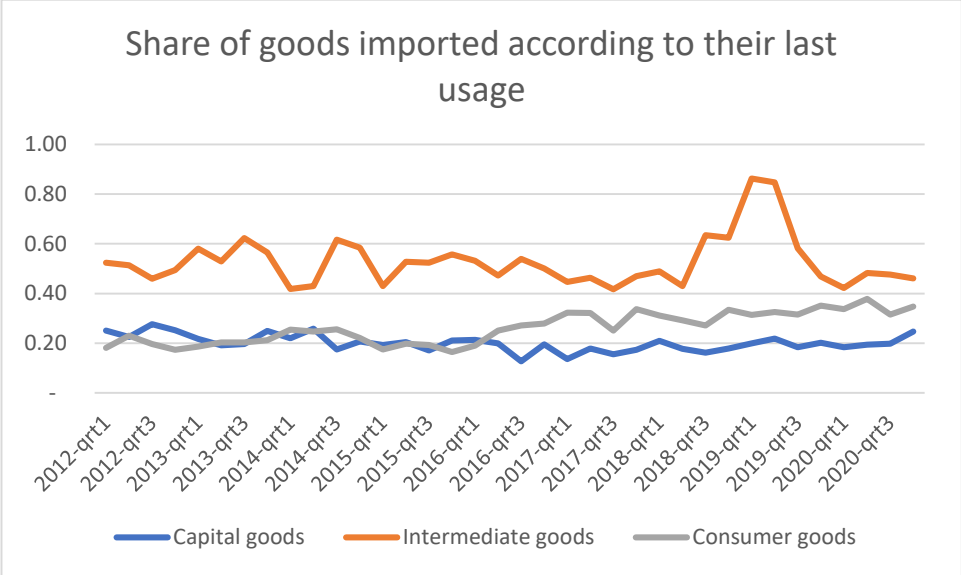

Figure 11. Shares of Capital, Intermediate and Consumer Goods in Total Imports According to Their Last Usage in Azerbaijan

Source: Central Bank of Azerbaijan Republic

3.4. Conclusion

The review of the economy gives some significant insights about the economy. Firstly, it is obvious that transfers from State Oil Fund of Azerbaijan Republic plays a significant role in the economy through subsidizations based on it. The magnitude of the essence of the transfers for the economy will be analyzed through empirical analyze. Another important implication for the analyze is that manufacturing sector is not quite important to represent the non-oil tradable sector solely.

Following the above-described situation of the economy, one of the main purposes of this paper is to reach a conclusion about the dependency of the economy from oil and whether this dependency reached being Dutch Disease. This analysis will enable us to comment on the successes of policymakers to promote the non-oil sector. To follow this purpose, data and methodology used in this research will be analyzed in the next chapter which will be followed by empirical analyses.

CHAPTER 4

THE VARIABLES AND THEIR STATISTICAL PROPERTIES

The study covers the period from 2001 till the end of 2020. This chapter presents the variables that will be used in the following models. The statistical properties of the data of the variables are analyzed and their sources are presented.

4.1. The Variables

The data used in this analysis and the sources are shown in the Table 1.

Table 1. The Variables and Sources of the Variables' Data

Variables	Variables' Data Sources
Real GDP	Central Bank of Azerbaijan Republic
Exports in the Petroleum Sector	Central Bank of Azerbaijan Republic
Real Effective Exchange Rate	Central Bank of Azerbaijan Republic
Output in the Agriculture Sector	State Statistical Committee of Azerbaijan
Output in the Manufacturing Sector	State Statistical Committee of Azerbaijan
Government Expenditure	State Statistical Committee of Azerbaijan
Investment Expenditure	State Statistical Committee of Azerbaijan
SOFAZ Transfers	State Oil Fund of Azerbaijan
Consumer Price Index	Central Bank of Azerbaijan Republic
Foreign Direct Investment	Central Bank of Azerbaijan Republic
Oil Price	Federal Reserve Bank of USA

Besides these variables, the price shocks are also generated by using oil prices by employing two different techniques. They are namely Mork's (1989) and Hamilton's (1995) techniques. Generated negative and positive price shocks and the difference of the methods will be described in the section 4.2.

Another innovation that this paper contributes for the literature is about choosing the variable to represent non-oil tradable sector. We chose summation of the agriculture sector and manufacturing sector to represent the output in the non-oil tradable sector. However, manufacturing sector is chosen more frequently to represent the non-oil tradable sector in the literature. The main reason behind our analogy is that output level in the agriculture sector is higher than the manufacturing sector although the difference is not too much. To obtain real values of the variables, CBAR's GDP deflator values are used and 2010: Q4 is taken as the base year.

4.2. Properties of the Variables' Data

Descriptive Statistics

The descriptive statistics in Table 2 reveals that all variables reach their peaks in 2014 just before the huge commodity price slumps in 2015. And their minimum values occurred in the start of the period considered in the analysis which was 2001.

Table 2. The Descriptive Statistics about Variables in Million US Dollars

Variables	Mean	Minimum Value	Period with the Min. Val.	Maximum Value	Period with the Max. Value
Real GDP	7670.74	2286.92	2001/1	16262.93	2014/4
Export in the Petroleum Sector	3192.34	398.42	2002/1	7581.26	2008/3
Non-Oil Tradable Sector's Output	893.03	324.38	2001/1	2054.00	2014/3
Government Expenditure	856.05	308.20	2001/1	1896.80	2014/4
Investment Expenditure	1959.08	322.07	2001/1	5419.20	2014/4
SOFAZ Transfers	950.30	37.10	2002/1	4265.30	2011/4

Figure 12 displays quarterly US dollar values of Azerbaijan's GDP and non-oil GDP in period 2001Q1-2020Q3. As Figure 12 shows, the GDP and non-oil GDP follow similar trends but their values get more distanced from each other between 2006Q1 and 2014Q4. In the first quarter of 2015 the distance becomes narrower. That can be explained by decreasing oil prices that led to a heavy wave of devaluation hitting the Azerbaijan economy. Despite the non-oil GDP has an increasing trend in Figure 12, it can be said that it is not efficient enough for an economy. Oil export and non-oil tradable output of Azerbaijan also show a similar pattern to the GDP of Azerbaijan. However, there is an important difference: oil export of Azerbaijan saw its peak just before the global financial crisis in the 20-year period while the non-oil tradable sector's output saw its peak before devaluation in 2015 just as real GDP.

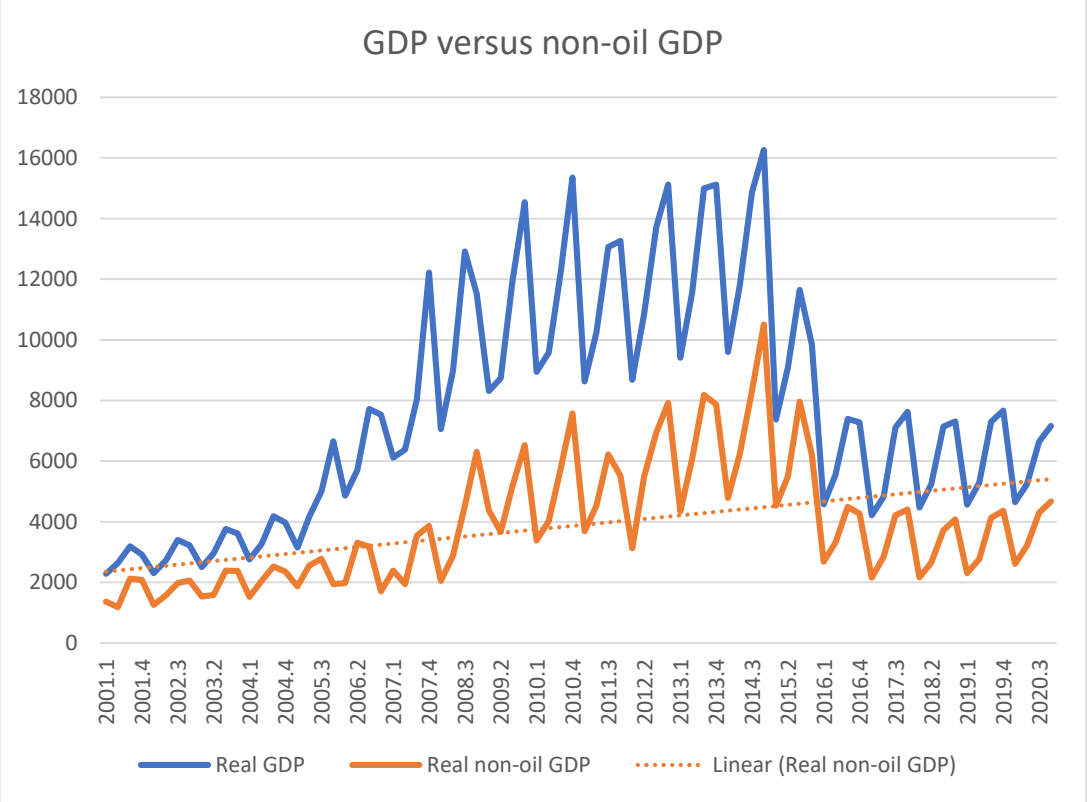

Figure 12. Real GDP versus Real non-oil GDP in Millions of US Dollars in Azerbaijan

Source: Central Bank of Azerbaijan Republic

Figure 13 shows the growth rates of real GDP, non-oil tradable sector's output and oil exports of Azerbaijan. As Figure 13 indicates, generally the growth rates of real GDP and non-oil tradable sector's output move in the same direction. However, the non-oil sector's output growth rates are higher than real GDP growth rates. Besides, Figure 13 exhibits that the growth rates of both the general economy and non-oil tradable sector follow the same trend with crude oil exports' growth rates.

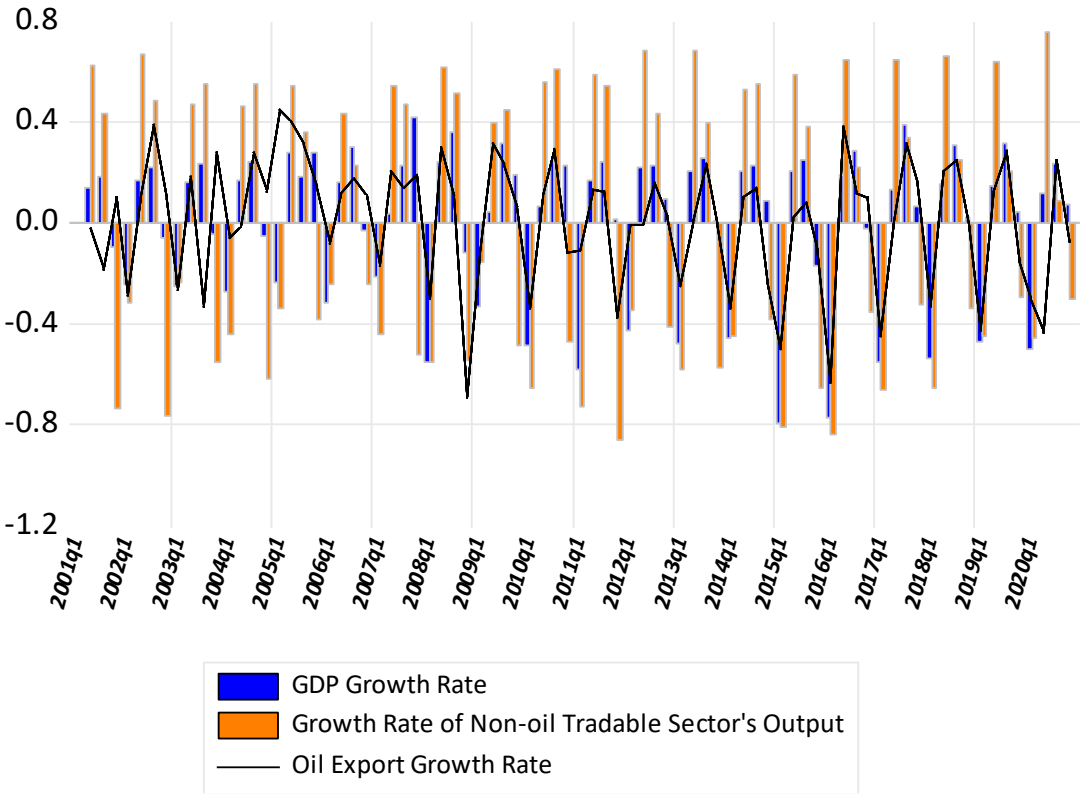

Figure 13. Growth rates of Azerbaijan's real GDP, non-oil tradable sector's output and oil exports

Table 3 displays correlation coefficients of the growth rates of real GDP, non-oil tradable sector's output and oil exports of Azerbaijan. The growth rates of GDP and non-oil tradable sector's output are correlated with the coefficient of 0.7. Besides, oil

exports' growth rate is moderately correlated with the growth rates of real GDP and non-oil tradable sector's output.

Table 3. Correlation coefficients of growth rate of real GDP, non-oil Tradable Sector's Output, and Oil Export

Growth rate	GDP	Non-oil Tradable Sector's Output	Oil Export
GDP	1.00	0.70	0.68
Non-Oil Tradable Sector's Output	0.70	1.00	0.53
Oil Export	0.68	0.53	1.00

Figure 14 shows the rates of changes in REER data. According to the data, the degree of the change in REER increases in 2009 after substantial decreases in oil prices in

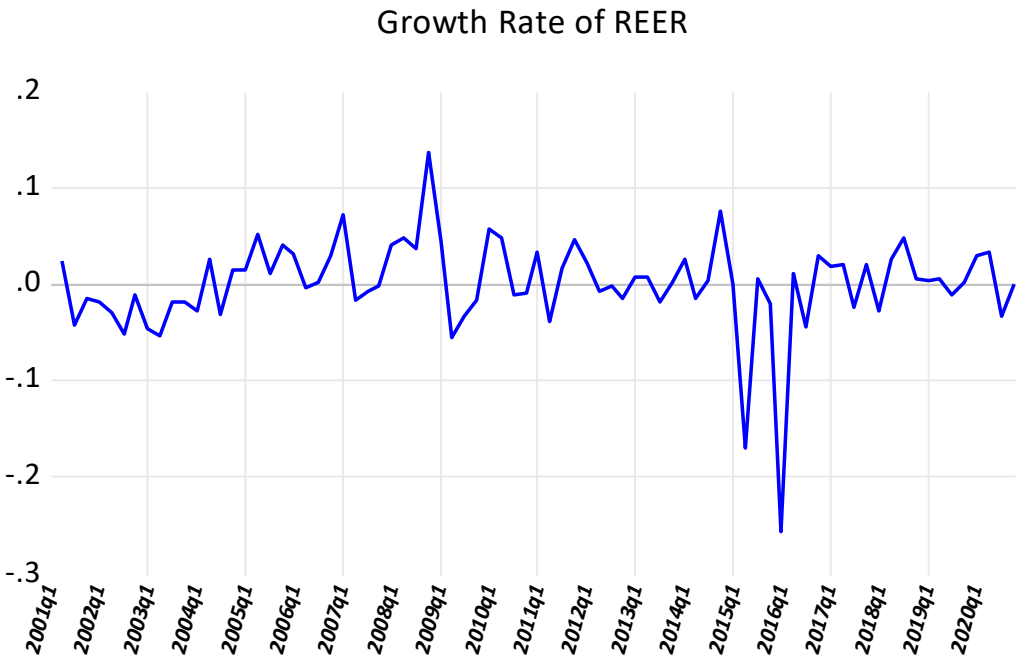

Figure 14. Rates of Changes in Real Effective Exchange Rate

Source: Central Bank of Azerbaijan Republic

2008. In addition, the effects of plummeting oil prices in 2014-2015 are reflected with very large decreases in the rates of changes in REER.

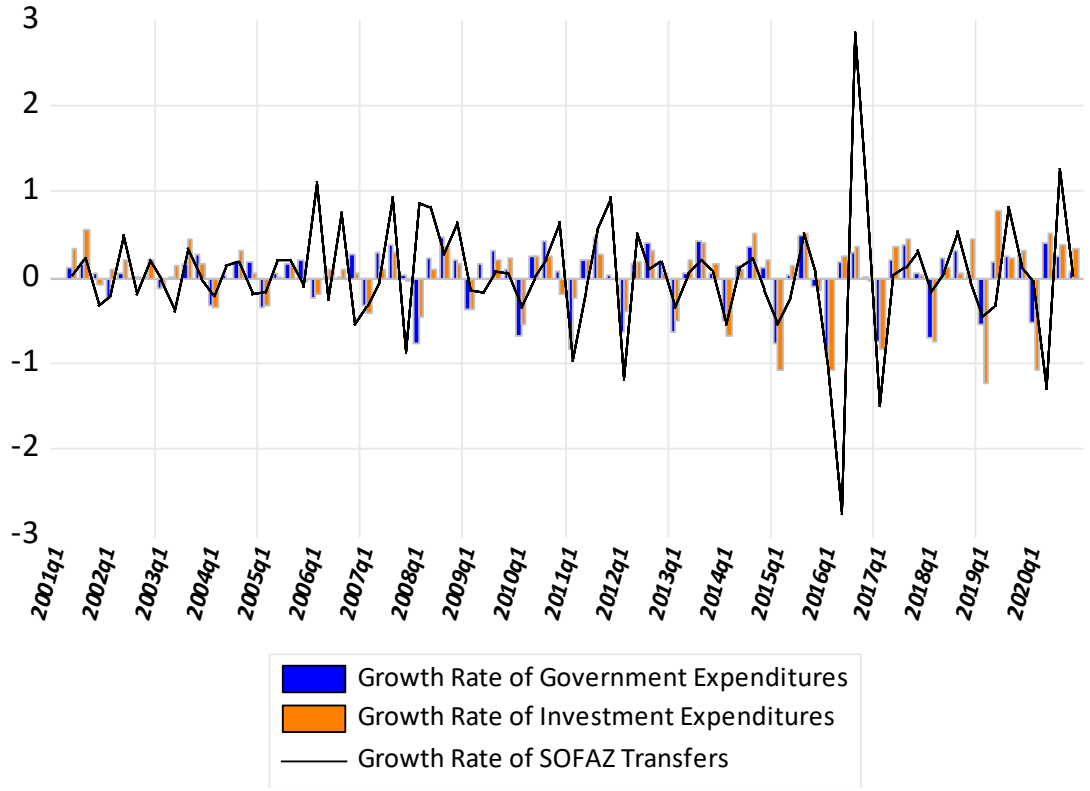

Figure 15. Growth Rates of Government Expenditures, Investment Expenditures and Transfers from SOFAZ

Table 4 includes correlation coefficients of growth rates of government and investment expenditures, and transfers from the oil fund. Although, the table shows the high correlation between the growth rates of investment and government expenditures, the rates of change in the transfers from SOFAZ has a low correlation with the growth rates of investment and government expenditures.

Table 4. Correlation coefficients of growth rates of government and investment expenditures, and transfers from SOFAZ

Growth rates	Government Expenditure	Investment Expenditure	Transfers from SOFAZ
Government Expenditure	1.00	0.86	0.36
Investment Expenditure	0.86	1.00	0.31
Transfers from SOFAZ	0.36	0.31	1.00

To capture potential asymmetric effects of changes in prices in this thesis, two sets of variables are established by using Mork's (1989) and Hamilton's (1996) approaches. In order to describe these approaches, it is assumed that the natural logarithm of price is P and the change in logarithm of the price is ΔP. In addition, t denotes time.

Mork's (1989) asymmetric price shocks' calculations:

Mork (1989) distinguishes between negative and positive oil price shocks. Negative shocks are given as MOPD and positive shocks as MOPI below as follows:

$$\text{MOPD} = \Delta P \quad \text{if} \quad \Delta P_t < \Delta P_{t-1}$$

$$\text{MOPD} = 0 \quad \text{if} \quad \text{otherwise}$$

$$\text{MOPI} = \Delta P \quad \text{if} \quad \Delta P_t > \Delta P_{t-1}$$

$$\text{MOPI} = 0 \quad \text{if} \quad \text{otherwise}$$

The Figure 16 depicts the estimated values for oil price following Mork (1989).

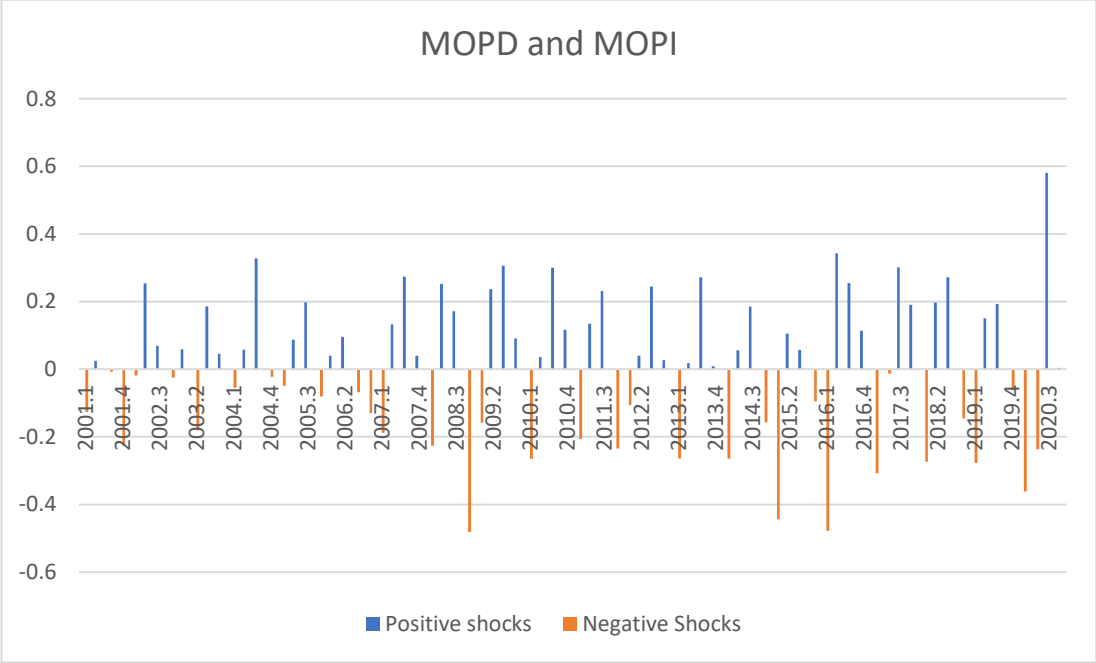

Figure 16. Price Shocks generated Using Mork's Approach

Source: Oil Prices are obtained from Federal Reserve Bank of United States of America

Hamilton's (1989) asymmetric price shocks' calculations:

Hamilton's approach is totally different from previously described approach. Hamilton's (1996) analysis reveal that increases in oil prices may not have instant effects. Hamilton (1996) states that an increase in price is just a correction of previous decreases. That is why, according to him, the oil price change is only effective if it is the largest in comparison to the values in the previous 4 periods. Hamilton's approach can be described as below where positive shocks are given as NOPI and negative shocks as NOPD:

$$\text{NOPI} = \text{MAX}(0, \text{P}_t - MAX(\text{P}_{t-1}, \text{P}_{t-2}, \text{P}_{t-3}, \text{P}_{t-4}))$$

$$\text{NOPD} = \text{MIN}(0, \text{P}_t - MIN(\text{P}_{t-1}, \text{P}_{t-2}, \text{P}_{t-3}, \text{P}_{t-4}))$$

P_t is the natural logarithm of price of oil at time t.

Hamilton's approach differs from Mork's approach. In Hamilton's approach, both positive and negative shocks may be equal to zero. Figure 17 depicts generated price shock values for the natural logarithm of oil price data following Hamilton (1996).

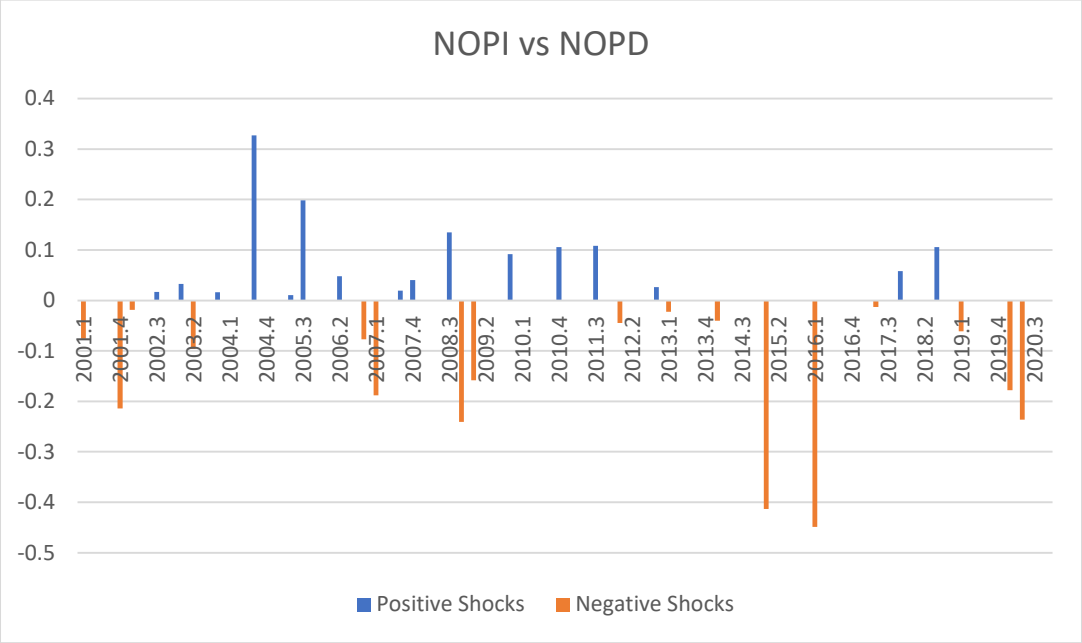

Figure 17. Price Shocks Generated Using Hamilton's Approach

Source: Oil Prices are obtained from Federal Reserve Bank of United States of America

Before proceeding to empirical analyses of the models, all of the variables' time-series characteristics are checked.

4.3. Time-series properties of the Variables

The analyses of this section are carried out with logged variables. To identify the stationarity of the logged variables Augmented Dickey-Fuller (ADF) and Phillip-Perron (PP) tests are employed in this section.

ADF Unit Root Tests' Results: Table 5 provides ADF tests with "only intercept terms" and "both trend and intercept terms" and shows that the levels of all of the variables are non-stationary. Except the real GDP, the first differences of all of the variables are stationary at 5% significance level. Table 5 displays that the first difference of the real GDP is stationary at 10% significance level although its second difference is stationary at 1% significance level.

Table 5. Results of the Augmented Dickey-Fuller Unit Root Tests
***, **, * indicate statistical significance at 1, 5, 10% levels respectively.

Variable	**Intercept**		**Trend & Intercept**	
	Levels	**1st Difference**	**Levels**	**1st Difference**
L-Real GDP	0.447	0.075*	0.921	0.091*
L-Non-Oil Tradable Sector's Output	0.469	0.000***	0.814	0.000***
L-REER	0.661	0.000***	0.897	0.000***
L-Oil Export	0.631	0.000***	0.945	0.000***
L-Government Expenditure	0.158	0.015**	0.240	0.066*
L-Investment	0.045**	0.003***	0.175	0.012**
L-CPI	0.860	0.000***	0.360	0.000***
L-FDI	0.141	0.000***	0.086*	0.000***
L-Oil Price	0.836	0.000**	0.786	0.000***

PP Unit Root Tests' Results: Table 6 provides PP tests with "only intercept terms" and "both trend and intercept terms" and it shows that the levels of all of the variables

are non-stationary. First differences of all of the variables are stationary at 1% significance level.

Table 6. Results of the Phlipps-Perron Unit-Root Tests

***, **, * indicate statistical significance at 1, 5, 10% levels respectively.

Variable	Intercept		Trend & Intercept	
	Levels	**1st Difference**	**Levels**	**1st Difference**
L-Real GDP	0.042*	0.000***	0.132	0.000***
L-Non-Oil Tradable Sector's Output	0.000***	0.000***	0.000***	0.000***
L-REER	0.560	0.000***	0.830	0.000***
L-Oil Export	0.264	0,000***	0.727	0.000***
L-Government Expenditure	0.000***	0.000***	0.000***	0.000***
L-Investment	0.001***	0.000***	0.000**	0.000***
L-CPI	0.902	0.000***	0.591	0.000***
L-FDI	0.038**	0.000***	0.066*	0.000***
L-Oil Price	0.086*	0.000***	0.109	0.000***

In the following analyses, the first differences of the logged variables are used.

4.4 Conclusion

Chapter 4 displays the variables and some of their statistical properties used in empirical analyses of the thesis. Given the time period 2001Q1-2021Q4, the first differences of the logged variables are found to be stationary. In the next chapter the methodology and identification of the models are introduced.

CHAPTER 5

SPECIFICATION OF EMPIRICAL MODELS TO ANALYSE DUTCH DISEASE IN AZERBAIJAN'S ECONOMY

5.1 Introduction

The empirical analysis is designed to investigate 5 questions about Azerbaijan's economy in the context of the Dutch Disease:

- Does the petroleum industry affect REER to appreciate?
- Does the expanding petroleum industry decrease activity in the non-oil tradable sector?
- Is Azerbaijan's economy a subsidized economy?
- How much does the oil fund have its impact on the economy?
- Do positive and negative price shocks affect the economy asymmetrically?

As it is clear from the Dutch Disease theory the first and second questions are aimed to get an analysis of the flow of the Dutch Disease channels in the economy. The first question helps to identify the relationship between the booming sector and Real Effective Exchange Rate. Meanwhile, the second question investigates whether the first channel in the Dutch Disease results with the shrinking non-oil tradable sector. If a REER appreciation because of the petroleum sector in Azerbaijan's economy was translated into shrinking non-oil tradable sector, we would surely claim that the economy had contracted the Dutch Disease.

The third question is aimed to give strong insights about the use of revenues from the petroleum sector in the economy. More importantly, the essence of the windfall gains in the economy will be investigated through the hypothesis that Azerbaijan's economy is a subsidized economy. That means the standing of the service sector and traditional

non-oil sector is dependent on the petroleum sector. In turn, the fourth question is aimed to state the usage of the oil fund in the economy and to see the place of the fund in the flow of the resource money in the economy.

Moreover, as it is seen the fifth question aims to investigate on the possible asymmetric effects of the price shocks. That question is raised on behalf of the seminal works of Mork and Hamilton. They raised the issue that positive and negative price shocks have their asymmetric effect. In other words, while positive price shocks result in the appreciating REER, we cannot say REER depreciates because of the negative commodity price shocks.

5.2. Methodology

In order to investigate Dutch disease effects in Azerbaijan's economy Vector Autoregressive (VAR) models, developed by Sims (1980), are used in this thesis. The main purpose of employing VAR models is to capture the joint dynamics of the chosen variables. A VAR model has a basic representation as follows:

$$\boldsymbol{Y_t = \delta + \sum_{i=1}^{p} A_t\, Y_{t-i} + \sum_{i=0}^{p} B_t\, Z_t + U_t} \qquad \textbf{(*)}$$

where t is time, p gives the maximum number of lags, Y_t is the vector of endogenous variables, and Z_t is a vector of exogenous variables. U_t is the vector for error terms evolving as a white-noise process:

- $U_t \sim Normal(0, \sigma_U^2)$ where σ_U^2 is the variance of the error term,
- $E[u_t]=0$

The above-described model is known as the Reduced-form VAR model which is one of the types of the VAR(p) models. Another widespread VAR model form is called

structural VAR. Its main difference is that it enables users to observe the contemporaneous effects of endogenous variables as well as their lagged effects. VAR analysis is just one of the time series analysis techniques. To build an efficient and unbiased model several characteristics of the model will be controlled using various technics.

The vector autoregressive models are widely used since the seminal work of Sims (1972). The multi-variate framework of VAR models allows feedbacks among endogenous variables, and their dynamic features benefit forecasting. In the following sections, the methodologies of VAR models are discussed. The variables that will be used in the VAR models are all stationary as displayed in Chapter 4.

5.2.1 Specification of VAR Models

- **Optimal lag length selection:** To choose the optimal lag length, three information criterias – Akaike Information criteria (AIC), Schwarz- Bayesian (SBC), and Hannan-Quinn (HQ) are employed. The model with the minimum number of information is the most efficient (Rossi et al., 2020).
- **Investigation of the Stability of VAR Models:** Covariance stationarity of a VAR model requires that all the eigenvalues of **A** in equation (*****) are less than one in modulus. Stable VAR(p) models have infinite order moving average forms.

5.2.2 Interpretations of VAR Models

- **Granger Causality Tests**

  The notion of Granger Causality was presented by Granger (1969). The concept of Granger Causality lies behind the significance of a variable to help to predict another variable. If a variable – y_1 is significant to predict another variable – y_2 then it is said that y_1 Granger cause y_2. In a VAR

framework instead of interpreting the coefficients of all lags of the endogenous variables for other endogenous variables, VAR employs the concept of the Granger Causality tool. In VAR modeling, a variable is said to Granger-cause another variable if an endogenous variable's all lags are jointly significant in helping to predict another variable. The null hypothesis in the Granger Causality test states that the tested variable is not significant in explaining the dependent variable and rejection of the null hypothesis means that lags of the tested variable are jointly significant in explaining the dependent variable. More formally, tested variable Granger-cause dependent variable.

- **Impulse Response Functions**

  The main purpose of the Impulse Response Functions is to depict the responses of every endogenous variable to a shock in one or more variables (Laurer, 2010).

- **Variance Decompositions**

  Variance Decomposition analysis is useful to analyze the decomposition of the variance in a variable for exogenous shocks given to each of the endogenous variables. In other words, it is useful to see the importance of a shock in explaining variance in a variable. The concept of Variance Decomposition also helps to identify the shocks which are effectless in the short term but may be important in explaining long-run fluctuations.

5.3. Specifying VAR Models

Applying theory's indications to the Azerbaijan economy, at the first sight, it must be noted that the resource movement effect of the booming sector is ignored in this thesis. This is done for the sake of the oil and gas sector being a capital-intensive sector. So

labor is not much more demanded in the oil and gas industry. However, this assumption does not mean that the effects of booming do not show themselves in any part of the economy. As it is obvious that because of the booming sector under the assumption of full employment real wages in the booming sector will rise. In turn, real wages in the non-tradable and non-oil tradable sectors must rise to compete in the labor market. As a result, wages increase over the whole economy. Moreover, we can easily see that the share of Azerbaijan's non-oil tradable sectors' output in total production has decreased significantly, while the Real Effective Exchange Rate has experienced appreciation. But the main question is that is it sourced because of the inflow of huge oil revenues or there are some other reasons to trigger it? The main purpose of this thesis is to investigate the effect of oil revenues in various units of Azerbaijan's economy. In other words, the booming sector's effects on the especially non-oil tradable sector, Real Effective Exchange Rate, and various other variables will be observed attentively.

For the sake of comprehensivity of the research to cover all of these topics, three different models are estimated in this paper.

5.3.1. VAR I Model

The first baseline model is established to find the effects of the petroleum sector in a relatively broad manner. The first main variable in our model is thought of to be real GDP growth to reflect overall economic activity.

To investigate the existence of the Dutch Disease for Azerbaijan's economy, the growth rate of the non-oil tradable sector's output is chosen as the main variable. Roemer (1985) analyzing Nigeria, Mexico, and Venezuela, and Jazayeri (1986) studying Iran and Nigeria chose the manufacturing sector. On the other hand, Olusi and Olagunju (2005) used agriculture output for Nigeria. In the literature, the manufacturing sector is generally accepted as the main non-oil tradable sector, emanating from the Netherlands' case. The manufacturing sector was the most

important tradable sector before the discovery of the gas field in Groningen in 1959. Another reason for manufacturing to be chosen is its role in output growth, which may be seen as the main engine for development (Kaldor 1966, Szirmai et al. 2013, Cantore et al. 2017). Others like Fagerberg and Versbagen (2002) also announced industrialization, especially manufacturing, as the main engine for growth. However, it would be hard to see the manufacturing sector as the main tradable industry in the non-oil sector of the Azerbaijani economy. To be more accurate, after the fall of the Soviet Union there was not any single tradable sector that would play an important role in economic growth. Niftiyev (2020) states that Azerbaijan's industrial output in 1994 was 38% less than in 1990. In 1994, the agricultural output was 44% less than its level in 1990, as stated by Aras and Suleymanov (2016).

For the sake of comprehensiveness, we decided to include two major tradable sectors in the non-oil segment of the Azerbaijan economy: agriculture (includes fishery, forestry, and hunting too) and manufacturing. The effects of oil exports on non-oil activity are captured via the non-oil tradable sector's output changes.

Real Effective Exchange Rate (REER) is also included in VAR I Model. As it is known from the DD theory, one of the results of increasing oil activity in an oil-exporting country is the large foreign capital inflows resulting in the REER appreciation. REER appreciation is expected to increase the foreign prices of domestic goods decreasing their competitiveness. The dependency of REER on oil price fluctuations as the main channel for the DD has been at the center of some Dutch Disease studies. As indicated by Edwards (1985):

> "Most of these studies have focused on the behavior of the real exchange rate as the main transmission mechanism from the booming sector to the rest of the economy."

Therefore, the analysis of the Dutch Disease symptoms requires the identification of the responses of real exchange rate to the changing oil prices (Jbir and Zouari Ghorbel, 2011). Besides, the appreciation of REER encourages importation of foreign goods at the expense of domestic production. Following these, the REER

appreciation is expected to trigger shrinkage in non-oil GDP with decreases in exports and domestic production.

Oil export growth is included in VAR I Model to capture the effects of oil activity on the economy. As stated by Corden and Neary (1982), any kind of activity in the booming sector can trigger the economy through transition channels of Dutch Disease. If any technological improvement is observed in the resource rich economy, it is expected to reflect itself in increasing oil exports.

Besides the above endogenous variables of VAR I Model, changes in oil prices and foreign direct investment flows are taken into account as exogenous variables affecting the economy of Azerbaijan. A dummy variable is also considered to take into account the substantial decreases in oil price in 2015 resulting in the large devaluations of Azerbaijani Manat.

In this context, the main reason to include oil price as an exogenous variable is due to the fact that Azerbaijan possesses just 0.4 and 0.7% of total oil and gas reserves around the world (British Petroleum Company, 2018) and hence it has not significant power to affect world oil prices. The oil price variations change international directions of petroleum trade these reflect their effects in domestic production of exports. Moreover, the FDI inflows to Azerbaijan are expected to affect its economy and they are mainly determined by global economic conditions rather than Azerbaijan's internal economic dynamics. Therefore, variations in FDI inflows constitute an exogenous variable in VAR I Model.

In summary the structure of the VAR I model will be as following:

The endogenous variables of VAR I Model are:

- the growth rate of the crude oil exports,
- the growth rate of real GDP,
- the rate of change of REER, and
- the rate of growth of the real non-oil tradable output.

The exogenous variables of VAR I Model are:

- the growth rate of the Foreign Direct Investment in Azerbaijan,
- the growth rate of the real oil prices, and
- a dummy variable to capture the shocking price decrease in the petroleum sector in 2015.

5.3.2. VAR II Model – Capturing Effects of Oil Windfalls on Expenditure Variables

The second model is specified to capture the effects of the petroleum industry on the expenditures side of the Azerbaijan economy, and to investigate on the magnitude of the subsidization of the economy by its oil sector. That is why we excluded the GDP variable of VAR I Model and included government expenditure and investment expenditure.

The main channel for oil windfalls to accrue into Azerbaijan economy is transferring from SOFAZ since they comprise a significant share of budget revenues, higher than 45% for the last 4 years. That is why SOFAZ transfers are added as a variable to capture these transfers' effects on two spending channels. Moreover, the degree of subsidization of the non-oil tradable sector is expected to be investigated by the inclusion of SOFAZ transfers.

Another source for the foreign capital to flow into the economy is FDI. It is included in the model as an endogenous variable. And the inflation rate, calculated using CPI, is taken into account since it is an important variable on expenditure decisions.

To summarize, the structure of the VAR II model is as follows:

The endogenous variables of VAR II Model are:

- the growth rate of crude oil exports,
- the growth rate of the transfers from SOFAZ,
- the growth rate of the government expenditures,

- the growth rate of the investment expenditures,
- the growth rate of the non-oil tradable sector's output,
- the rate of change of inflation, and
- the growth rate of foreign direct investment in Azerbaijan.

The exogenous variables of VAR II Model are:

- the rates of changes in the real oil prices and
- a dummy variable to capture shocking price decrease in the petroleum sector in 2015.

5.3.3. VAR III Model – Asymmetric Effects of Price Shocks in the Resource Market

The third model will be constructed to observe the potential asymmetric effects of price shocks in different variables and its implications for the Dutch Disease. Hamilton (1996, 2003, 2011) claimed that because of lack of mobility in the labor market labor does not afford to move from a sector declining in demand to a sector increasing in demand, thus the output will fall. And he believes that the fall will be higher while the increase is the near-term highest than the same size of the increase which is not the same size. Mork (1989) approached the asymmetric effects from the oil-importing side. He claimed that in the oil-importing country, rising oil prices appear to negatively affect the aggregate economic activity more than decreasing oil prices would stimulate it. His analysis revealed that increasing oil price has a strongly and significantly negative effect on GDP while the effect of decreasing oil price on GDP is not significant. From the windows of Azerbaijan, as an oil exporter country, its exports are mostly crude oil. For that purpose, Mork's (1989) and Hamilton's (1996) approaches, besides the approach of Due et al. (2003), are employed in this thesis. For this estimation, the oil export variable is excluded from the first model, and shocks that were acquired with mentioned approaches are included in the model.

In summary, the structure of the VAR III model is described as below:

The endogenous variables of VAR III Model are:

- Negative oil price shocks,
- positive oil price shocks,
- the growth rate of real GDP,
- the rate of change of REER, and
- the rate of change in the CPI.

The exogenous variables of VAR III Model are:

- the growth rate of the oil export,
- a dummy variable to capture shocking price decrease in the petroleum sector in 2015.

5.4. Conclusion

After a careful analysis of the theory and the literature about the Dutch Disease and resources' effects in the economy, it has been decided to continue the analysis with three VAR models. They are designed to include investigation of the general possible channels that resource revenues may have their impacts in the economy. The first VAR model is designed to observe the flow of the effect from activity in the petroleum sector till the shrinkage in the non-oil tradable sector passing through appreciation in REER. Effect of the petroleum sector for the GDP is also investigated in this model. The second model is prepared to analyze the effect of the oil fund in the economy by analyzing the impact of the transfers from the oil fund on expenditure units namely government and investment expenditure. Another crucial part of the model is that it will give insights about subsidization of the non-oil tradable economy by including non-oil tradable sector's output in the model. Additionally, a model is constructed to analyze the effects of the positive and

negative price shocks in the economy and to investigate whether they have asymmetric effects in the economy. One of the main contributions of this paper is to include the booming sector by using oil export in currency units in the model rather than commodity price. This is done for the sake of the not including bias of the production differences in quantity in the model and considering the overall revenue from the petroleum sector.

In the next chapter the empirical results of the models will be presented and crucial insights from the results will be given in order to analysis the effects of the revenues from the resource sector.

CHAPTER 6

ESTIMATES AND INTERPRETATIONS OF THE VAR MODELS

Three models are determined to analyze the flow of the revenue from the resource sector and to assess their effects in the Azerbaijan economy. The first model is set to investigate the direct effects depicted in the Dutch Disease theory which indicates the contraction in the economic growth through shrinkage in the non-oil sector and appreciation of the Real Effective Exchange Rate. The second model is designed to assess the effect of the SOFAZ in the economy by introducing the transfers in the model which expenditure variables are also included. This is done for the sake of investigating on the effects of the spending of the resource revenue in the economy. Resource sector is introduced in both models by including value of exports of the petroleum sector. Meanwhile, the resource sector is introduced in the third model by including generated price shocks in the first model excluding export variable. This will show another stance of the Dutch Disease which is domination of the negative price shocks on the positive price shocks.

The rest of the chapter is designed to present the results of the estimation of the models in order. After the results are described the results and their implication will be presented in a separate section.

6.1. VAR I MODEL - Dutch Disease Effects Through Non-Oil Sector

The estimation of the VAR I model is designed to capture the flow of the processes through the channels which the classical Dutch Disease theory states: increasing

activity in the petroleum sector results in appreciating REER which in turn decreases the non-oil tradable sector's output. Interpretation of the results revealed some crucial points about the effect of the petroleum sector on the Azerbaijan economy.

According to the results, growth in the oil export increases the growth in both GDP and output in the non-oil tradable sector and has much more positive effects on the change in REER. An increase in the REER due to the increasing activity in the petroleum sector is the first signal of the Dutch Disease. However, this increase may not get translated in the form of the negative effects on the non-oil tradable sector. Also, changes in REER can explain a significant part of the variance in the non-oil tradable sector's growth. The petroleum industry also affects the non-oil tradable sector positively which contradicts the Dutch Disease theory. This may be a result of subsidization of the non-oil sectors in the economy with the windfalls from the petroleum sector.

The estimation continues by finding optimal lag length for the model, testing for autocorrelation, and later checking for stability by using the roots of the model. After ensuring that the model is efficient standard VAR tools, namely Granger Causality, Impulse Response Functions, and Variance Decomposition Analysis will be applied in the model.

6.1.1. VAR I Model - Optimal Lag Length Selection

As Table 7 exhibits, the optimal lag length for VAR I Model is 3 with quarterly data. Autocorrelation of the residuals is tested by employing Lagrange Multiplier test, it is detected that in the model with 3 lags, autocorrelation does not exist in the model as presented in Appendix A.

Table 7. Lag Length Criteria Tests – VAR I Model

***, **, * indicate statistical significance at 1, 5, 10% levels respectively.

Lags	AIC	SBC	HQ
0	-4.028	-3.526	-3.828
1	-5.161	-4.157	-4.761
2	-6.180	-4.674	-5.580
3	-6.816*	-4.808*	-6.016*
4	-6.743	-4.233	-5.743
5	-6.713	-3.701	-5.513
6	-6.536	-3.022	-5.136

6.1.2. VAR I Model - Stability Tests

The autoregressive roots graph provided in Figure 18 shows that the absolute values of all of the eigenvalues are smaller than 1 where the largest one is 0.93. This leads to the conclusion that the VAR I Model is stable.

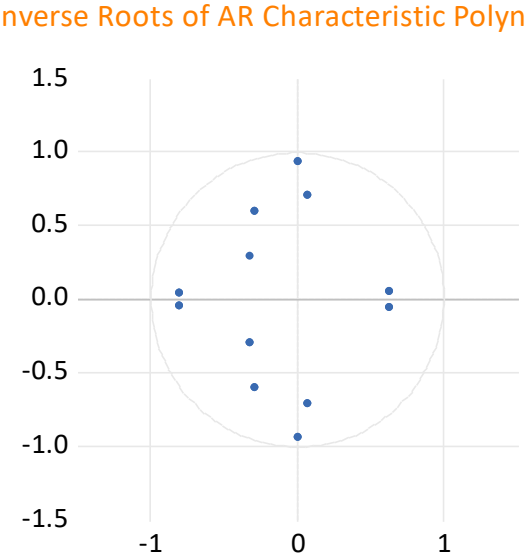

Figure 18. The Autoregressive Roots

6.1.3. VAR I Model - Granger Causality Tests

Table 8 provides the Granger causality tests for VAR I Model. It can easily be seen that the growth in the oil export variable Granger causes the real GDP growth. However, the oil export growth does not Granger cause the change in REER and the growth in the non-oil sector's output variables. In the next step, we can see that the change in REER is significant to explain the non-oil tradable sector's output and real GDP growth, which is one of the channels in the famous Dutch Disease theory. Contrarily, Gasimov (2014) found the opposite results compared to this results. He revealed that crude oil export growth Granger causes rate of change in REER and non-oil tradable sector's output's growth.

Table 8. Granger Causality – VAR I Model

Note: p-values are given in the entries of Table 8.

Variables	REER	Oil Export
Real GDP	0.003	0.001
Non-oil tradable	0.000	0.992
REER		0.485

6.1.4. VAR I Model - Impulse Response Functions

Impulse Response Functions display the dynamic behavior of the response variable to one standard deviation shock in the impulse variable. Ordering of the variables is crucial in forming impulse response functions. The Cholesky decomposition method suggested by Doan (1992) is employed to introduce shocks to each of the variables separately. While performing IRF we ordered the variables as oil export growth, REER change, GDP growth, and growth in non-oil tradable sector's output.

Impulse response function of GDP growth to export shock is depicted in Figure 19. Oil export growth shock increases real GDP's growth till quarter five and the peak response occurs at quarter 1 as 0.021 %. Although it decreases real GDP's growth in quarter 5, the quantity of the decrease is slight – 0.001%. 0.012% of increase in quarter 6 is followed by uncertain responses which are seen to be at negligible amounts. Overall, it is seen that oil export growth innovation is responded to by increases in GDP growth. The trend GDP growth response draws is similar to what Zulfigarov et al. (2018) found as they also revealed less frequent negative responses although it is beneficial to note that they included commodity price as a variable for the booming sector.

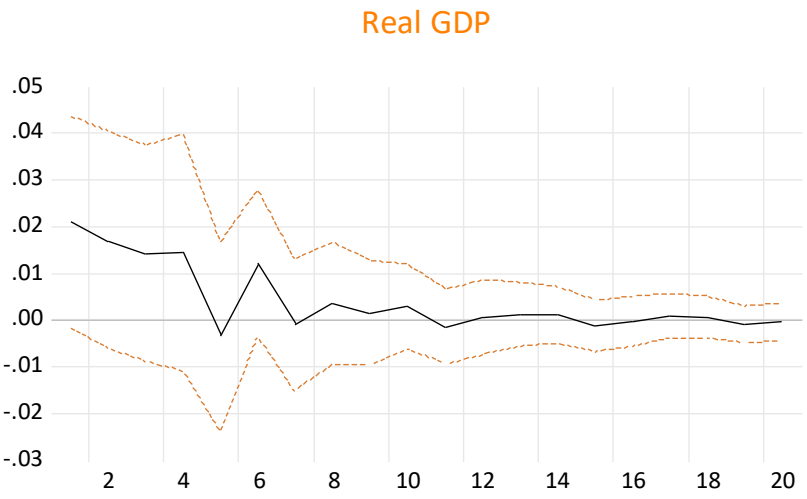

Figure 19. Impulse Response Function of GDP Growth to the Oil Export Growth Shock

Oil export growth shock is responded by non-oil tradable sector's growth at quarter 1 with a decrease which is a negligible quantity of being 0.002%. However, it increases growth in the output till quarter 10 except at quarter 7 which sees no responses at all. The response peaks at quarter 3 in the increasing segment of the responses by being 0.014%. It treats similarly by the means of instability by uncertain responses of increasing and decreasing. In general, it can be said that the shock cause to increase in

growth in the non-oil tradable sector's output just as it causes GDP growth. That is an interesting and determining point in a Dutch Disease analysis and the literature also includes both types of results. Olusi and Olagunju (2005) found that crude oil export affects agriculture output although the coefficient of effect is weak. According to the author, Nigeria is plagued with the Dutch Disesae. This is contrary to Roemer (1985) whose study was based on Nigeria, Mexico, and Venezuela, and Jazayeri (1986) who studied Iran and Nigeria. They may be falsified to employ the manufacturing sector as non-oil tradable sector since it is not the first non-oil sector according to volume in less developed countries. The Impulse Response Function of the growth in the non-oil tradable sector's output to the oil export growth shock is depicted in Figure 20.

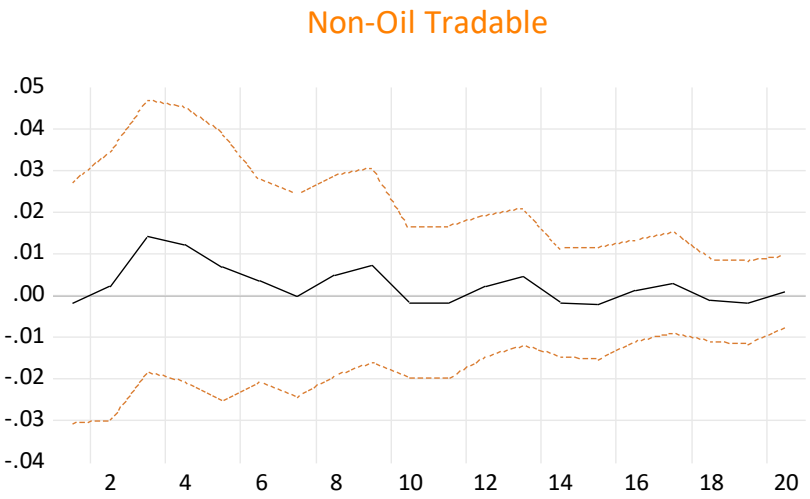

Figure 20. Impulse Response Function of Growth of the Output in the Non-oil Tradable Sector to the Oil Export Growth Shock

Contrarily, change in oil export shock affected REER growth in a relatively certain manner. As was expected, REER's growth increased because of the change in oil export shock till the impulse almost dies out in quarter 19. The peak is at quarter 3 being 0.0120%. That is quite sensitive since with the increasing flow of foreign capital to the economy REER will appreciate. Ostensen (2018) revealed the depreciation of REER as a response to the oil price shock. As was mentioned before, Dutch Disease

is not limited to only countries rich with oil and gas resources, other resources may have the same transition channels of Dutch Disease. For example, Aberdeen (2018) after her Dutch Disease analysis for Australia in the context of possessing huge metal reserves also revealed a persistent rise of REER. She used commodity price as an indicator of the resource sector. The Impulse Response Function of the change in the REER to the oil export growth shock is depicted in Figure 21.

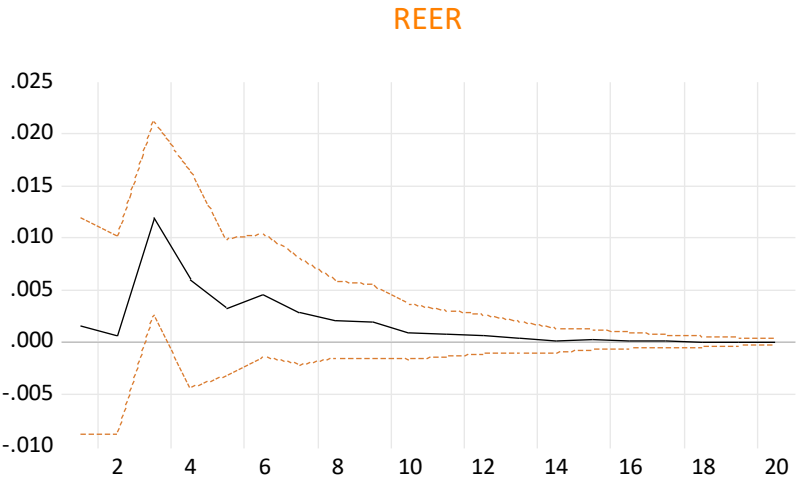

Figure 21. Impulse Response Function of REER Rate of Change to the Oil Export Growth Shock

One of the crucial points about IRFs is that all of them converge as all impulses die out gradually. That is imposed on the model by stability in which all the eigenvalues are smaller than 1. In general, despite of transmission of oil capital to appreciating REER, it didn't convert to the decreasing non-oil tradable sector and even caused it to increase.

Following the growth of crude oil export shocks, we look up the growth of REER innovation on two of our variables to observe one step of the transmission channel to Dutch Disease. As it is known with the increasing inflow of foreign capital REER starts to appreciate and as a result, foreign goods become cheaper than domestic goods. In turn, it decreases the compatibility of domestic goods, which shrinks domestic production. With the help of the IRF, we observed that export shock increases REER

as expected. Now the purpose is to see the direction of response to REER shocks, as is seen from the Figure 22:

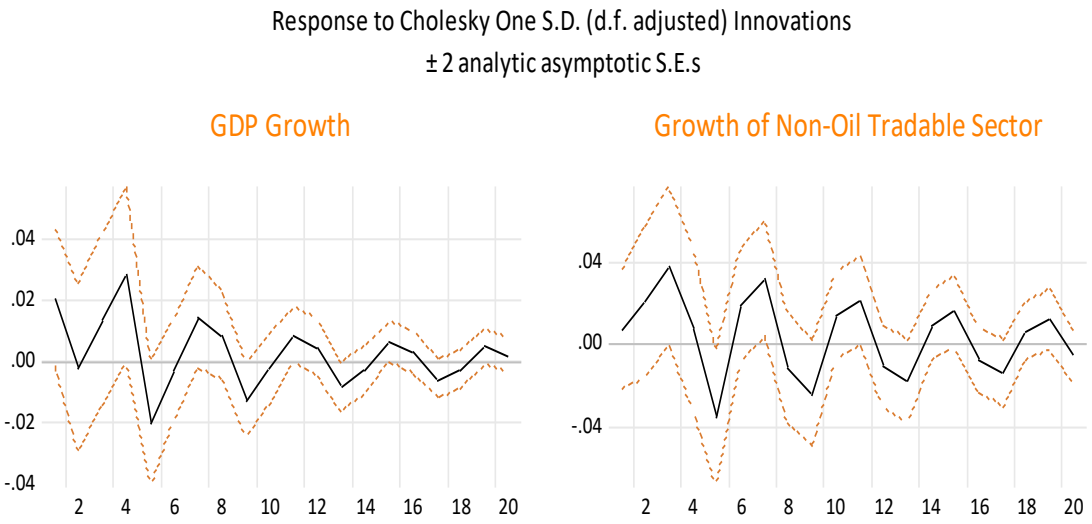

Figure 22. Impulse Response Function of Growth of GDP and Non-oil Tradable Sector's Output to the REER Growth

It is clear from Figure 22 that the responses are uncertain. REER's growth shock is responded by an increase in GDP growth which is followed by an insignificant quantity of decrease in quarter 2. In quarter 4 the response peaks at 0,029% which is followed by a decrease of 0,020%. Later it continued to indecisive trend until the impulse dies out. Output growth in the non-oil tradable sector also draws a similar pattern. It responded with a negligible amount of increase in quarter 1 and then peaks with the increase of 0,038% at quarter 3. In quarter 5 it responds with the highest amount of decrease which is 0.035%. Then it continues with responses of increases and decreases with relatively dying impulse. Generally, it cannot be decisive on whether it increases or decreases the growth of both GDP and output in the non-oil tradable sector.

In conclusion, the growth of crude oil export strictly has its effects on all variables included in the model. As it is one of the key steps in the Dutch Disease transmission mechanism, the booming sector causes REER to appreciate. However, the IRF reveals

that the next step in the transmission which is the decline in the non-oil tradable sector's output due to appreciating REER is not actual for Azerbaijan. It seems that both in the terms of growth in the economy generally and in the non-oil tradable sector oil export has its increasing effects and REER appreciation strictly does not result in an overall decrease in the non-oil tradable sector.

With the proceeding estimated models it would be much more possible to say thoughts about transmission channels. IRF shows that the oil and gas sector is crucial in defining REER as it will increase with the increasing inflow of foreign capital. However, the transmission of high REER to decreasing non-oil tradable sector does not happen, since it cannot be said that appreciating REER decreased non-oil tradable.

6.1.5. VAR I Model - Variance Decomposition Analysis

Variance decomposition analysis of variables demonstrates the percentage of variance in each variable caused by other variables and own shocks. For example, Figure 23 shows the Variance Decomposition of real GDP growth. It is obvious from the figure that only 6% of the variance in real GDP growth is due to oil export growth. At the same time, in the long term, 12% of the variance in GDP's growth is revealed to be due to REER's change which is quite an impressive number. Meanwhile, the most significant one is the non-oil tradable sector's output's growth which shows that in the long term 17% of the variance in real GDP's growth is explained by growth in the non-oil tradable sector's output. This shows the importance of the non-oil tradable sector for growth in the economy. These results are somehow different from the analysis of Olusi and Olagunju (2005) of Nigeria. They revealed that the booming sector's growth is the key explanatory variable of GDP growth. This finding shows the contraction of Nigeria's economy to the DD. Even though the magnitude they revealed is of small values it still does not change the importance of the crude oil export to Nigeria's economy.

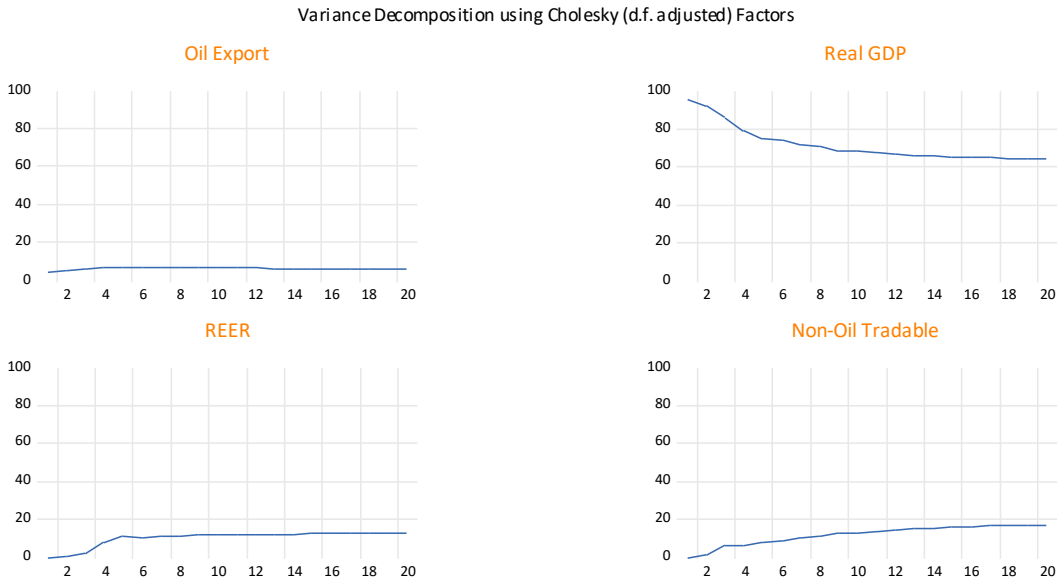

Figure 23. Variance Decomposition of Real GDP Growth

Indeed, variance decomposition of the non-oil tradable sector's output growth reveals that crude oil export growth causes just 1% of the variance in the non-oil sector's output growth. Moreover, 17 and 12% of the variance in the long term in the output is caused by GDP and REER growth respectively. Like results about variance decomposition of GDP growth, Olusi and Olagunju (2005) revealed that crude oil export growth explains 10% of the variance in agriculture output's growth. This again implies the existence of the Dutch Disease in Nigeria's economy. An interesting point was made by Gasimov (2014) which is the explanation of 50% of the variance in the manufacturing sector by crude oil export. This shows the importance of choosing convenient variables for decision-making. It would be precise to remind that manufacturing is not chosen solely to present one side of the economy in the Dutch Disease framework since it is not the most important factor in the non-oil tradable sector of the Azerbaijan economy. Variance decomposition of growth in the non-oil tradable sector's output is depicted in Figure 24.

Meanwhile, 8% of the variance in REER's growth is revealed to be due to oil export growth. Moreover, 10% of the variance in REER's growth is explained by GDP growth. The Variance Decomposition analysis reveals quite a small number for the

effect of non-oil tradable output growth. It is seen that 3% of the variance in REER's growth in the long term is due to growth in non-oil tradable output. Variance decomposition of the change in REER is depicted in Figure 25.

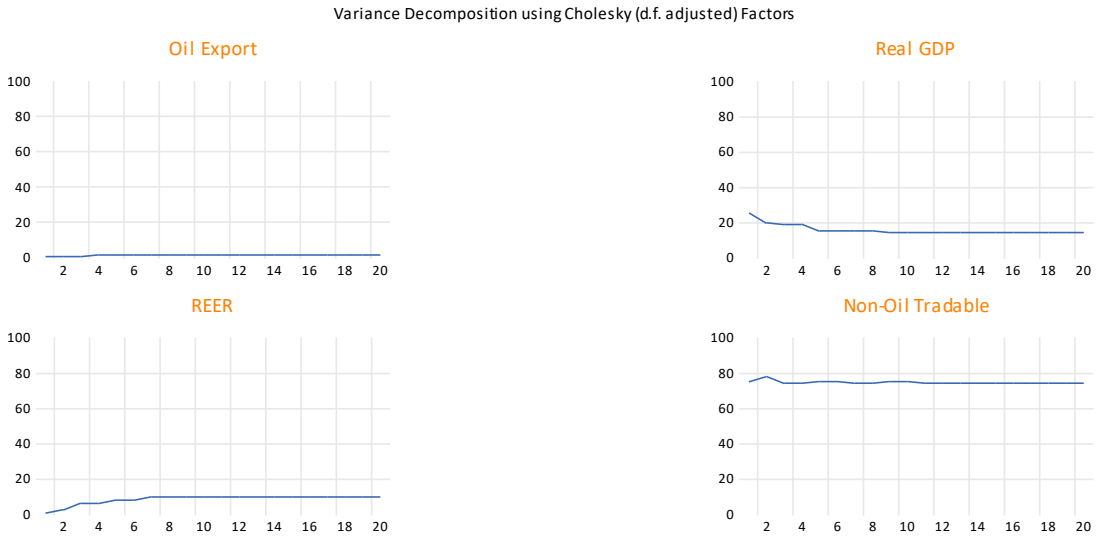

Figure 24. Variance Decomposition of Non-oil Tradable Sector's Output Growth

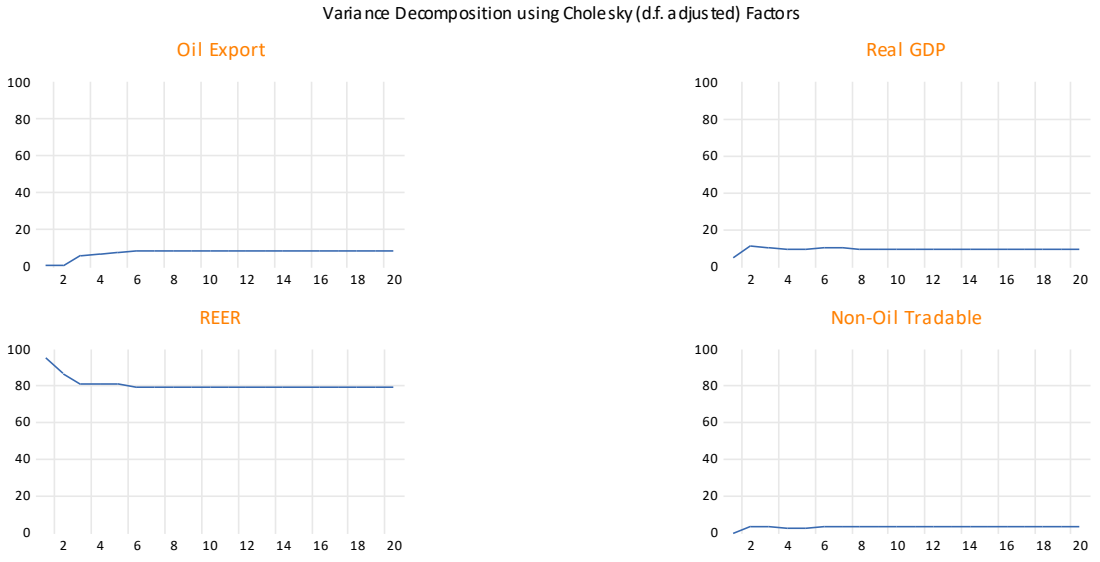

Figure 25. Variance Decomposition of REER Growth

Overall, it would be hard to deny the fact that the VAR I model reveals Azerbaijan's economy's contraction to the Dutch Disease: REER appreciation has been caused by the booming sector. However, that appreciation is not translated into absolute deindustrialization. It was revealed that a shock in the booming sector has resulted in increases in both GDP growth and the non-oil tradable sector. Ito (2017) revealed the same results for Russia. He found that manufacturing output increases are associated with oil price increases and slightly even with REER appreciation. The author links the positive relationship between commodity price and manufacturing output to the subsidization of energy prices for the manufacturing sector. The same assumption would be consistent with the Azerbaijan economy too. However, this will get clearer by estimating other models.

6.2. VAR II MODEL -Dutch Disease effects through Expenditure Channel

The VAR model I revealed that the growth of the non-oil tradable sector's output is positively related to the growth in the booming sector. The latter also causes REER to appreciate. However, in the Dutch Disease framework, it is claimed that REER appreciation must negatively affect the non-oil tradable sector which seems reasonable in theory. For a deeper analysis of the flow of resource money to the economy and its effects on the expenditure side, the second model is estimated. It again showed that the non-oil tradable sector's output growth is affected by the growth of SOFAZ transfers to the budget. Transfers from the oil fund also affect expenditure variables like government and investment expenditures positively.

This model is estimated to learn the reasons behind positive relationships between the booming and the lagging sector. For this purpose, we used two contributors of GDP which have the potential to generate value by expanding economic activities. One of the main variables in this model is transfers from the State Oil Fund of Azerbaijan Republic. It is added to the model to capture the effects of the flow of oil windfall revenue to the economy. This variable will let us comment on the nature of the positive relationship between booming and non-oil tradable sectors. CPI is also added to the

model to present inflation to the model as a control variable since it is important for spending and investment decisions. Moreover, since Foreign Direct Investment is another channel for the flow of capital to the economy, it is added to the model as a control variable. A dummy for each to represent the structural break in 2015 and prices of Brent Crude oil are present as exogenous variables in this model.

The most important conclusion of the VAR model II is that it revealed one of the most unique features of the Azerbaijan economy: it is an economy in which subsidization plays an essential role. The model concluded that although the growth of the export in the petroleum sector does not affect other variables significantly, transfers from oil fund plays an important role for especially government expenditure and the non-oil tradable sector.

Estimation results of the VAR model II are presented in the following sections.

6.2.1. VAR II MODEL – Optimal Lag Length

The same procedure took place to choose the optimal lag length. However, the results are not as straightforward as it was in the baseline model. Each test defined a different length as the optimal lag length. Eliminating the result of SC, autocorrelation tests indicate that 3 is enough for the optimal lag length as autocorrelation does not exist in the model. So, we will proceed with the model with 3 as the optimal lag length. It satisfies all the necessities for the model. The results of the autocorrelation test are presented in Appendix A.

Table 9. Lag Length Criteria Tests - VAR II Model

***, **, * indicate statistical significance at 1, 5, 10% levels respectively.

Lags	AIC	SC	HQ
0	-4.96	-3.52	-3.49
1	-5.28	-4.71*	-4.31
2	-6.07	-4.56	-4.37
3	-6.43	-4.36	-4.55*
4	-6.86*	-3.84	-4.21
5	-6.54	-3.34	-3.96
6	-6.31	-2.98	-4.45

6.2.2. VAR II MODEL -The Stability of the Model

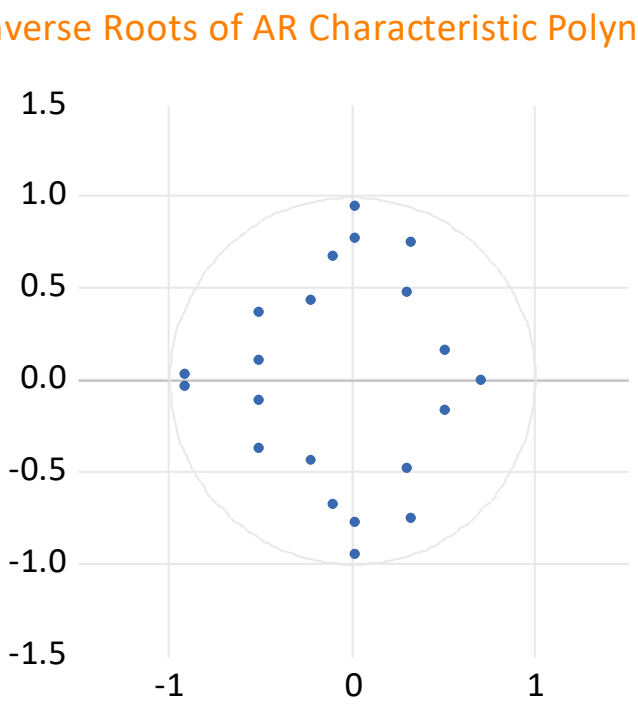

Figure 26. The Autoregressive Roots

The stability of the model is also checked. As it can be seen from Figure 26, since all of the eigenvalues are less than one, the model is stable.

6.2.3. VAR II MODEL – Granger Causality

First, after estimating, the Granger causality of the variables is checked which revealed interesting points. It is clear from the results that SOFAZ transfers are very important in defining various macroeconomic variables in the economy. According to the results, growth in the transfers causes the growth of the non-oil tradable sector's output, government expenditure, and investments while growth in crude oil export has not any causing effect on those variables. So, this is a sign of the existence of an oil fund in a resource-rich economy. It will ensure that overflow of the resource windfall to the economy does not take place and REER will not be under pressure to increase.

Table 10. Granger Causality - VAR II Model

Note: p-values are given in the entries of Table 10.

Variables	Crude Oil Export	Transfers from SOFAZ
Government Expenditure	0.63	0.01
Investment Expenditure	0.30	0.06
Non-Oil Tradable Sector's Output	0.42	0.00

6.2.4. VAR II MODEL – Impulse Response Functions

IRF is used to capture the response of growth in expenditure variables of GDP and output of non-oil tradable sector to the shock in the booming sector and SOFAZ transfers' growth. In Figure 27, the IRF of variables to the innovations in the petroleum sector's export growth is presented. It is seen that shocks in the booming sector have negligible effects on the variables. Interestingly, the growth of government

expenditure and investment responds negatively till quarter 3. However, this could be related to positive responses of inflation till 4th quarter. This means that decision-makers may have waited for a more stable economic environment and to decide due to the economic situation. Indeed, these results are not consistent with what Zulfigarov and Neuenkirch (2020) found. They showed also decreases in quarters 2 and 3 but rather positive responses in the first quarter. In general, the effects are not so strong. According to the AD-AS model, government expenditure will be higher at high levels of oil revenues (Farzanegan and Markwardt, 2009). This effect is high in countries like Iran and Nigeria in which with the increasing foreign reserves aggregate demand increases significantly. This effect does not apply to Norway which highly probably may be due to GPFG and budgetary rule which ensures the oil revenue has less impact on the economy (Bjørnland and Thorsrud, 2013). The same trend of responses applies to FDI growth which responded with decreases till the 4th quarter. Also, it is seen that growth in transfers is also negatively affected in the first quarter which is followed by increasing responses. In general, it can be said that the shocks in crude oil export are responded to by increases in the growth of SOFAZ transfers. Another point is about the response of the change in inflation to the shocks from export growth in the petroleum sector. The latter is responded to by increasing rates of change in inflation which may possibly be because of increasing aggregate demand.

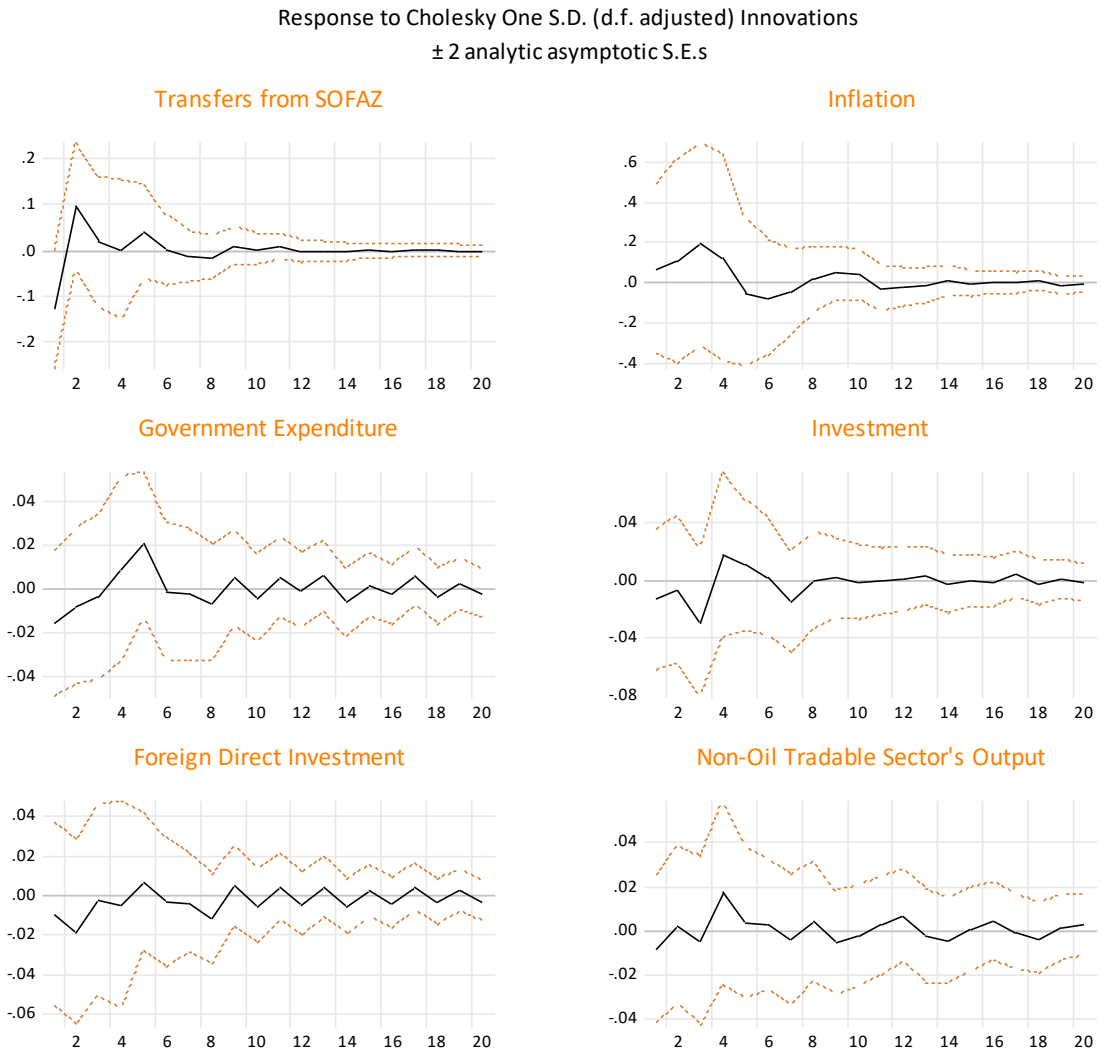

Figure 27. Impulse Response Function to Innovations in the Oil Export Growth

IRF of variables to impulses from innovations in SOFAZ transfers reveals significant points. They are presented in Figure 28. According to the results growth in both government expenditures and investments respond positively for 4 quarters. After a decrease in the 5th quarter, negligible quantities of responses of both increasing and decreasing are observed. In general, it can be said that impulse from SOFAZ transfers has an increasing growth effect on government and investment expenditure.

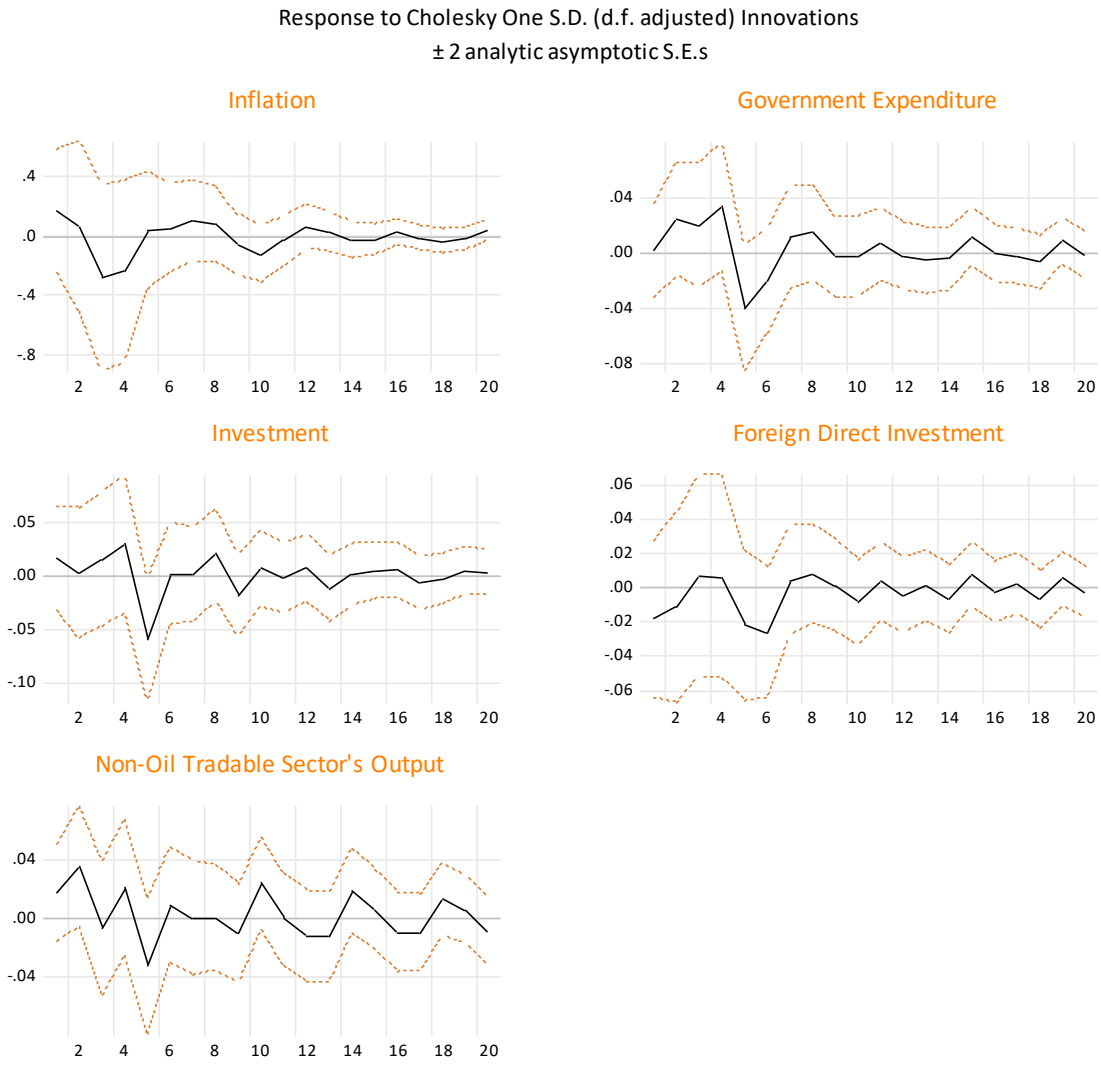

Figure 28. Impulse Response Function to Innovations in the SOFAZ Transfers

It is also revealed from IRF that a shock in SOFAZ transfers, has positive effects on growth of non-oil tradable sector's output till 4th quarters except a negligible decreasing response at quarter 3. Generally, and most significantly, it seems that SOFAZ transfers have positive effects on the growth of the non-oil tradable sector. These results mean that as Ito (2017) claimed for Russia, oil windfall gains are used to subsidize the non-oil tradable sector. Bayramov and Abbas (2017) investigated the economies of three resource-rich countries in the Caspian basin namely Azerbaijan, Kazakhstan, and Russia. They revealed that the significant economic slowdown after

the price shock in 2014 was due to the characterization of these countries. They described these countries as “subsidized economies”.

6.2.5. VAR II MODEL – Variance Decomposition Analysis

Variance decomposition analysis of the growth in government expenditure reveals many important points. According to the results, although the change in the transfers from SOFAZ cannot explain the variance in the short term, it explains 9% of the variance in the long term. Change in the oil export is again not a significant variable for growth of government expenditure. It explains just 2 % of the variance in the growth of the government expenditure. Growth in the non-oil tradable sector’s output is responsible for 19% of the variance, so it is significant for government expenditure’s growth. The results are presented in Figure 29.

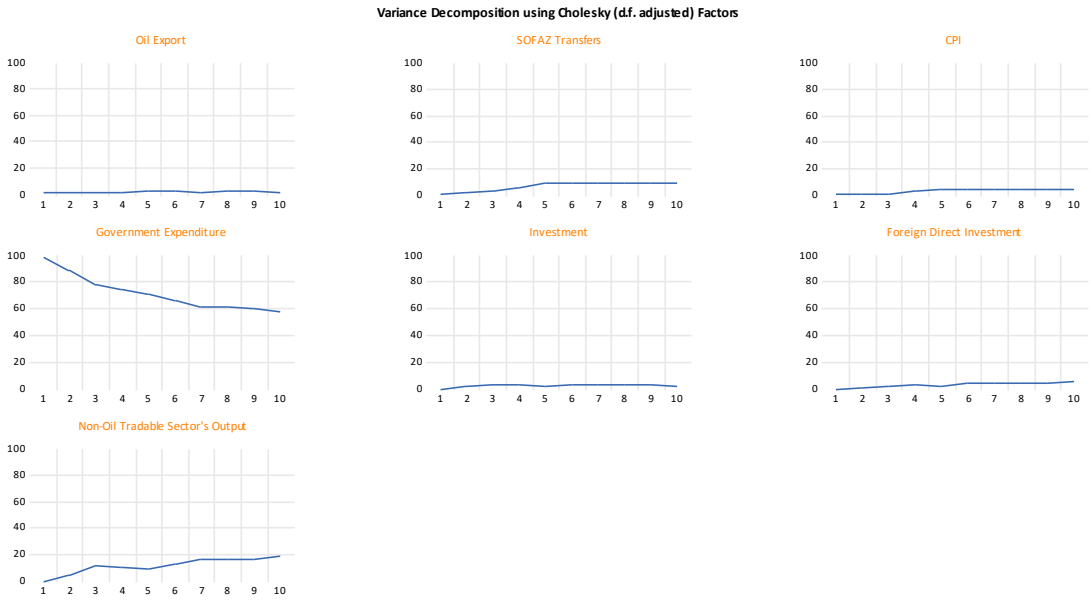

Figure 29. Variance Decomposition of Government Expenditure Growth

Subsidization of the non-oil tradable sector is confirmed with the variance decomposition which results are presented in Figure 30. Growth of the government

expenditure explains 48% of the variance in the growth of the non-oil tradable sector's output in the short term, while the number is 29% in the long term.

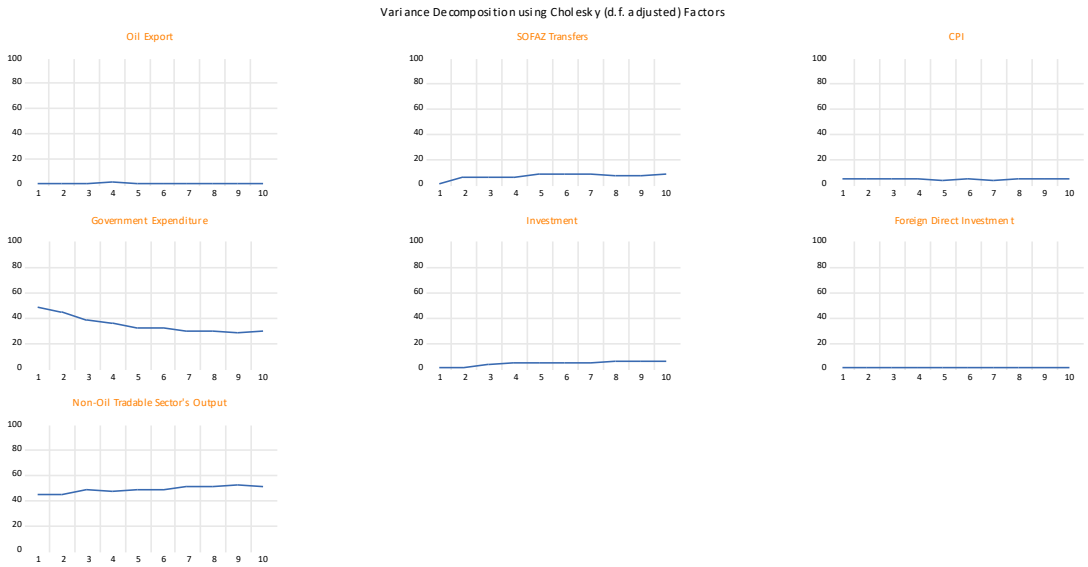

Figure 30. Variance Decomposition of Non-oil Tradable Sector's Output's Growth

Change in the SOFAZ transfers is responsible for 7% of the variance in the long term. As FDI is mostly directed to the petroleum sector in the economy, growth in the FDI explains only 1 % of the variance in the non-oil tradable sector's output's growth. The number is 6 % for the investment growth.

The growth of the private investment's variance decomposition analysis showed that private investment is strongly affected by public investment which is a sign of the crowding-out effect. Growth in government expenditure explains on average 24 % of the change in investment. At the moment, change in the transfers explains 7 % of the variance in the growth of the investment. The results are presented in Figure 31.

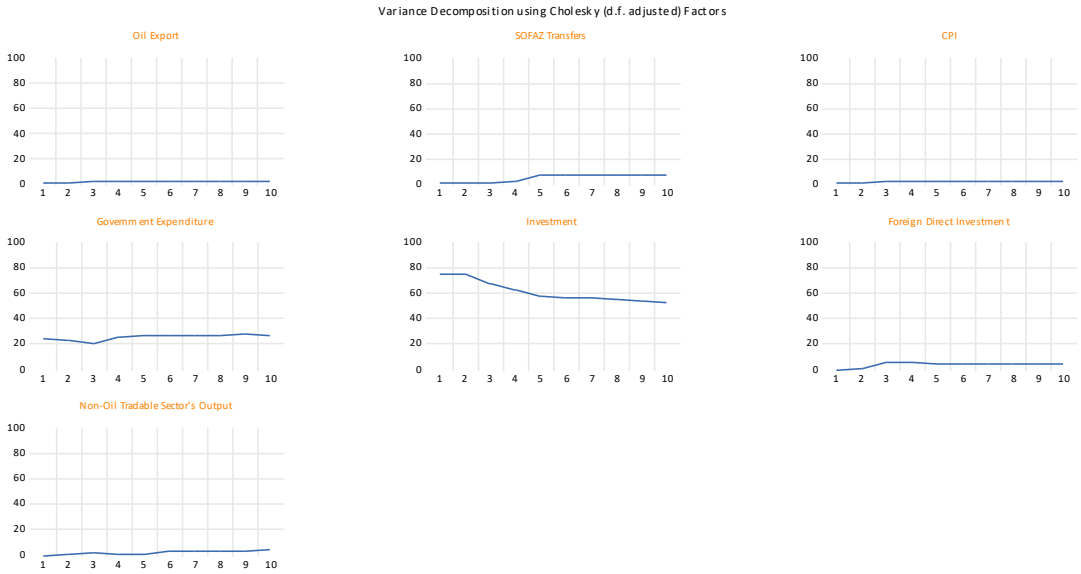

Figure 31. Variance Decomposition of Investment Expenditure's Growth

6.3. VAR III MODEL – Effects of Asymmetric Price Shocks

The next model we estimated is designed to capture possible asymmetric effects of positive and negative oil price shocks. As depicted before 2 sets of oil price shocks are generated by employing Mork's (1989) and Hamilton's (1996) approaches. Moreover, Consumer Price Index (CPI) to capture possible effects of price shocks on inflation is added to the baseline model. Price shocks variables are used instead of the oil export variable which will be used as an exogenous variable.

The model concluded that although price shocks generated by using Hamilton's approach do not significantly affect other variables as theory states, Mork's approach is compatible. That is to say that as Mork stated positive and negative oil price shocks are responded asymmetrically. Although negative price shocks do not happen to depreciate the REER, positive price shocks affect the REER positively. Another point backing up this hypothesis is that overall GDP growth responds differently to the negative and positive commodity price shocks. While negative price shocks fail to decrease GDP growth, it responds positively to the positive price shocks which can be

explained by policy response against consequences of the downturns in the booming sector.

Firstly, the estimation results of the model with the shocks produced by using Mork's approach will be presented in the following section which is followed by the second part of the estimation of the VAR III model.

6.3.1. VAR III MODEL – Mork's Approach

6.3.1.1. VAR III Model with Mork's Approach – Optimal Lag Length

The three model selection criteria tools state different lags as optimal lag for VAR model III formed by employing Mork's approach. However, proceeding to the Autocorrelation test we can observe that at lag three there is no autocorrelation in the model. While we add the normality test to the results, we can see that three can be taken as optimal lag for this model relying on its capability of capturing all the dynamics of the model.

Table 11. Lag Length Criteria Tests - VAR III Model with Mork's Approach

***, **, * indicate statistical significance at 1, 5, 10% levels respectively.

Lags	AIC	SC	HQ
0	-12.96	-11.52	-12.07
1	-12.28	-11.56	-12.02
2	-12.07	-11.71*	-12.39
3	-12.43	-11.36	-12.55*
4	-13.67	-10.84	-12.50
5	-13.86*	-9.34	-12.25
6	-12.73	-9.98	-12.31

6.3.1.2. VAR III Model with Mork's Approach – The Stability of the Model

The model is stable since all the eigenvalues of the model are inside the unit circle which results are presented using a graph in Figure 32:

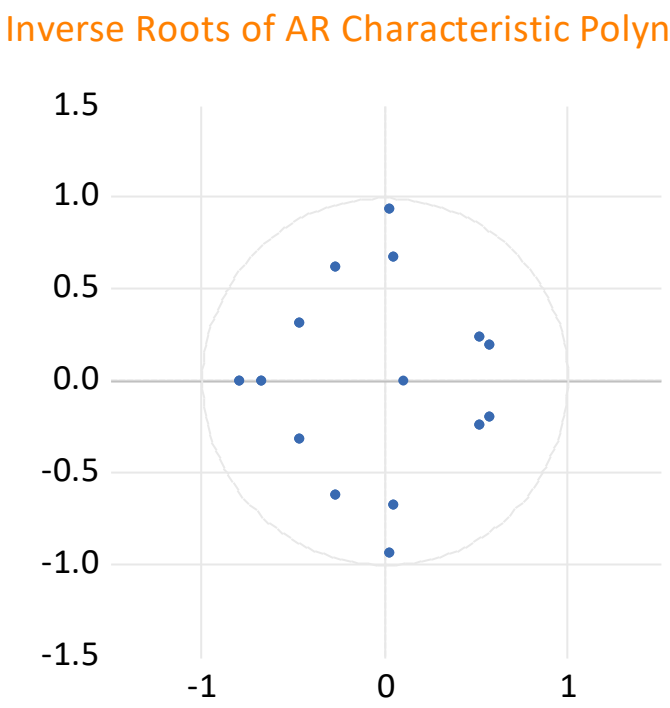

Figure 32. The Autoregressive Roots

To note, Zulfigarov and Neuenkirch (2020) also set p=3 while estimating the VAR model for Azerbaijan. Taking all of the outcomes into consideration, we proceeded with 3 as the optimal lag length.

6.3.1.3. VAR III Model with Mork's Approach – Granger Causality Test

After estimating the model successfully, the model is checked for Granger causality test results. Firstly. It is observed that both positive and negative oil price shocks

Granger cause GDP growth. However, change in inflation is strictly caused by none of the shocks. One of the interesting points about asymmetric effects is that a positive oil price shock causes REER while the latter is not caused by negative price shocks. This can be explained by the existence of the oil fund which may be because of expansionary policy at times of increasing oil prices but not a contraction at the crisis times of the petroleum sector. Besides, CBAR also acts in relevance to the economic situation and uses tools more deeply to prevent the economy from any crisis. Results are presented in Table 12:

Table 12. Granger Causality - VAR III Model with Mork's Approach

Note: p-values are given in the entries of Table 12.

Variables	Negative Shocks	Positive Shocks
GDP Growth	0.00	0.01
Change in REER	0.64	0.01
Change in CPI	0.17	0.25

6.3.1.4. VAR III Model with Mork's Approach – Impulse Response Functions

Impulse Response Functions of variables to negative and positive oil price shocks are depicted in Figure 33. Impulse response functions for the negative shocks in the first model reveal that negative shocks responded by GDP growth with a decrease in the first 3 quarters which is a general situation. It peaks in the first quarter by decreasing 0.032% while the 4th quarter is the peak for the increase in GDP growth with 0.018%. The general trend of decreasing GDP growth because of negative price shock is quite straightforward as the booming sector plays a vital role in economic growth. Similarly, negative price shock is also responded by CPI change with decreasing trend despite an increase at the first quarter which is a peak of 0.0008%, the negative price innovation is responded with a decrease till 6th quarter and saw the largest decrease at quarter 4 with 0.005%. After the 6th quarter, the impulse slightly dies out. The decreasing trend of CPI change may be explained by CBAR's tightening the economy

with increasing interest rates to attract foreign capital and mostly to stabilize the economic situation. Response of REER growth is also not so volatile. It starts with an increase at the first two quarter followed by a decrease at quarter 3. Its peak is 0.004% both in the segments of increasing and decreasing. The impulse dies out slightly starting from quarter 6.

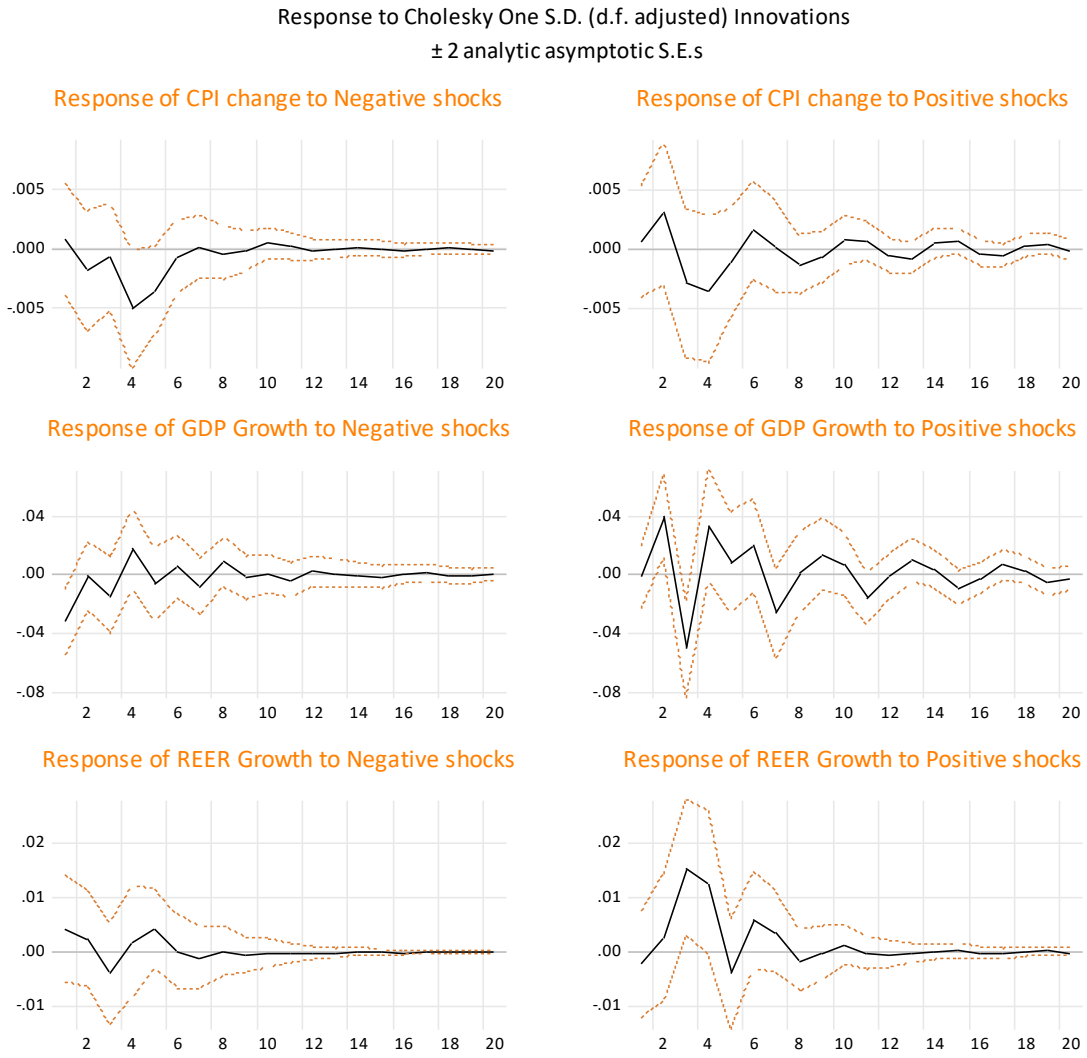

Figure 33. Impulse Response Functions of Growth of CPI, REER, and GDP to the Asymmetric Prices generated by Mork's Approach

Responses are more volatile to positive oil price shocks than to negative shocks. GDP growth response peaks in quarter 2 by increasing 0.04% which is followed by a decrease of 0.05% in quarter 3. The response becomes positive strictly in the next quarter. Generally, because of volatility and life of impulse the result of overall impulse is arguable. The response of inflation to a positive price shock is volatile too. It also starts by responding positively and peaking in quarter 2 with 0.031% which is followed by constant decrease till quarter 5. It peaked at quarter 4 by 0.035%. Effects of positive price shock show themselves in the relatively long term in inflation too. Despite a decrease of a negligible amount in the first quarter, positive price shocks cause growth in REER to change positively which peaked at quarter 3 by the amount of 0.015%. Having insignificant amounts of decrease, the impulse started to die slightly after quarter 8. In general, it is seen that positive price shocks cause many major changes in all of the variables. This may be due to the policy of CBAR and SOFAZ to not let the economy feel the negative price shocks' effects.

6.3.1.5. VAR III Model with Mork's Approach – Variance Decomposition Analysis

While we dig into variance decomposition analysis, we can easily observe interesting points. One of the main advantages of the variance decomposition analysis is that they can give strong ideas about the long-term relationship between variables which is too obvious in Figure 34 which is the variance decomposition of GDP growth. It is seen that in the short term 19% of the variance of GDP growth is explained by negative commodity price shocks. It steadily decreases to 9% in period 10 which is long-term. Contrarily, positive shocks explain not any part of the variance in the GDP growth at period 1 and increase to explain 22% of the variance in the long term. While CPI is not significant to explain variance in the GDP growth, REER explains 9 % of the variance in the GDP growth.

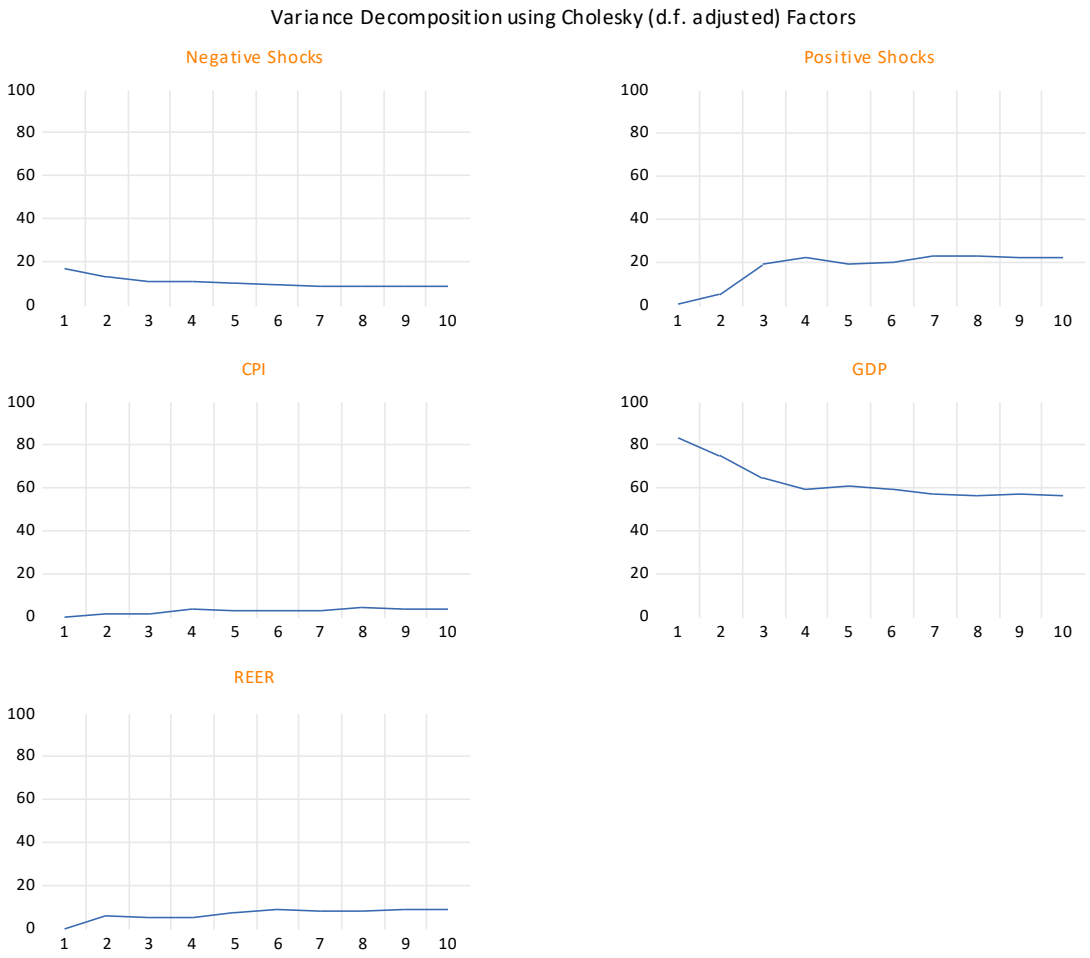

Figure 34. Variance Decomposition of GDP Growth

If we look through the variance decomposition of the change in the REER which is depicted in the Figure 35, we can see that negative oil price shocks have not any importance in explaining variance. Although positive price shocks are similar in the short term, they explain 9% of the variance in the long term. The important point is that GDP growth constantly explains above 15 % of the variance. Although, CPI explains 1 % in the short term it explains 10% of the variance in the long term.

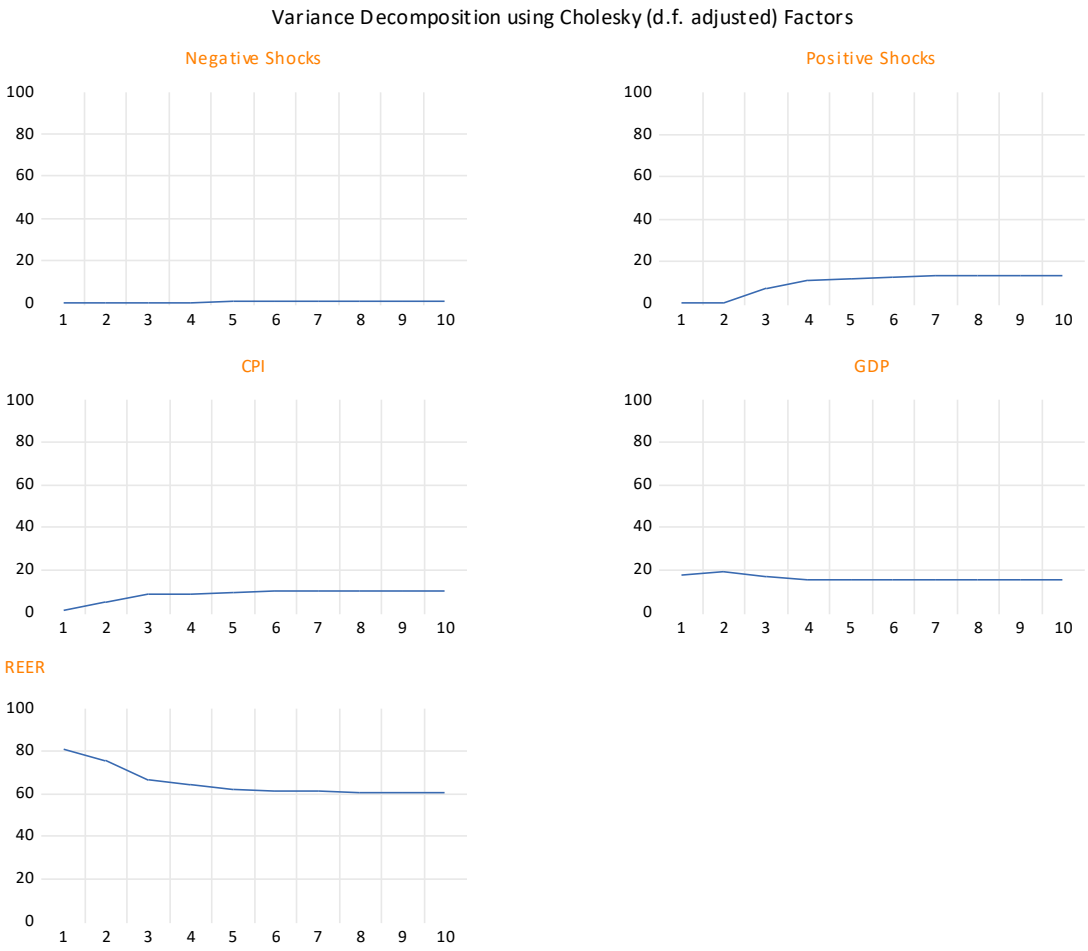

Figure 35. Variance Decomposition of Change in REER

6.3.2. VAR III MODEL – Hamilton's Approach

6.3.2.1. VAR III Model with Hamilton's Approach – Optimal Lag Length

As it was in the VAR model 3, different lags are stated as the optimal lag in this model too. Applying the same procedure, we can see that three is the optimal lag in this model too. Autocorrelation is not present in the model with lag 3 as the optimal lag. Results of the autocorrelation test are presented in Appendix A.

Table 13. Lag Length Criteria Tests - VAR III Model with Hamilton's Approach

***, **, * indicate statistical significance at 1, 5, 10% levels respectively.

Lags	AIC	SC	HQ
0	-13.0	-12.43	-12.77
1	-14.74	-13.05*	-14.07
2	-15.46	-12.64	-14.34
3	-15.97	-12.01	-14.39*
4	-15.98	-10.89	-13.95
5	-16.28*	-10.07	-13.81
6	-16.25	-8.91	-13.33

6.3.2.2. VAR III Model with Hamilton's Approach – The Stability of the Model

We can see that the model is stable from Figure 36. So, we proceed with the estimation of the model taking optimal lag as 3.

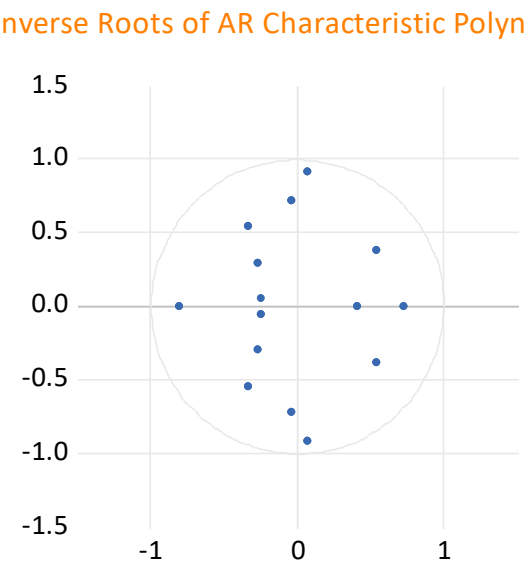

Figure 36. The Autoregressive Roots

6.3.2.3. VAR III Model with Hamilton's Approach – Granger Causality

After estimating the model with lag 3, before proceeding to Impulse Response Functions we analyzed The Granger Causality. The situation is somehow different in the second model which used shocks generated by Hamilton's approach than the model employing Mork's approach. It is revealed that in the model only negative price shocks cause GDP growth. Contrary to GDP growth, only positive shocks cause CPI. Meanwhile, none of the shocks causes REER.

Table 14. Granger Causality - VAR III Model with Hamilton's Approach

Note: p-values are given in the entries of Table 14.

Variable	Negative Shocks	Positive Shocks
GDP	0.02	0.43
REER	0.65	0.35
CPI	0.42	0.06

6.3.2.4. VAR III Model with Hamilton's Approach – Impulse Response Functions

IRF in the second estimation of the third model reveals somehow different results which is depicted in the Figure 37. Overall, according to IRF negative price shocks are responded to by GDP growth in an uncertain way which increases and decreases shifts in order. It starts with an increase and peaks in quarter 2 by increasing 0.025% which is followed by a peak decrease of 0.016%. Despite volatility, it can be said that a negative oil price shock does not decrease GDP growth. This is surprising for Azerbaijan since oil contributes the biggest part of export and it is significant for Azerbaijan's GDP. The reason may be the increasing demand for oil in the world market because of decreasing oil prices. A negative price shock is responded by a decrease in inflation in the first 2 quarters by a peak of 0.0047% in the first quarter. It is followed by an increase in 3rd and 4th quarters which the latter is a peak at 0.0030%. Generally, as expected it is seen that negative price shock decreases inflation just as

in the first model. What is surprising is that negative price shock increases REER at all quarters. Although this result is controversial to what economic theory implies, the same result was found for Norway too (Ostensen, 2018). It somehow gives insight that price increases do not cause REER appreciation which disproves Dutch Disease.

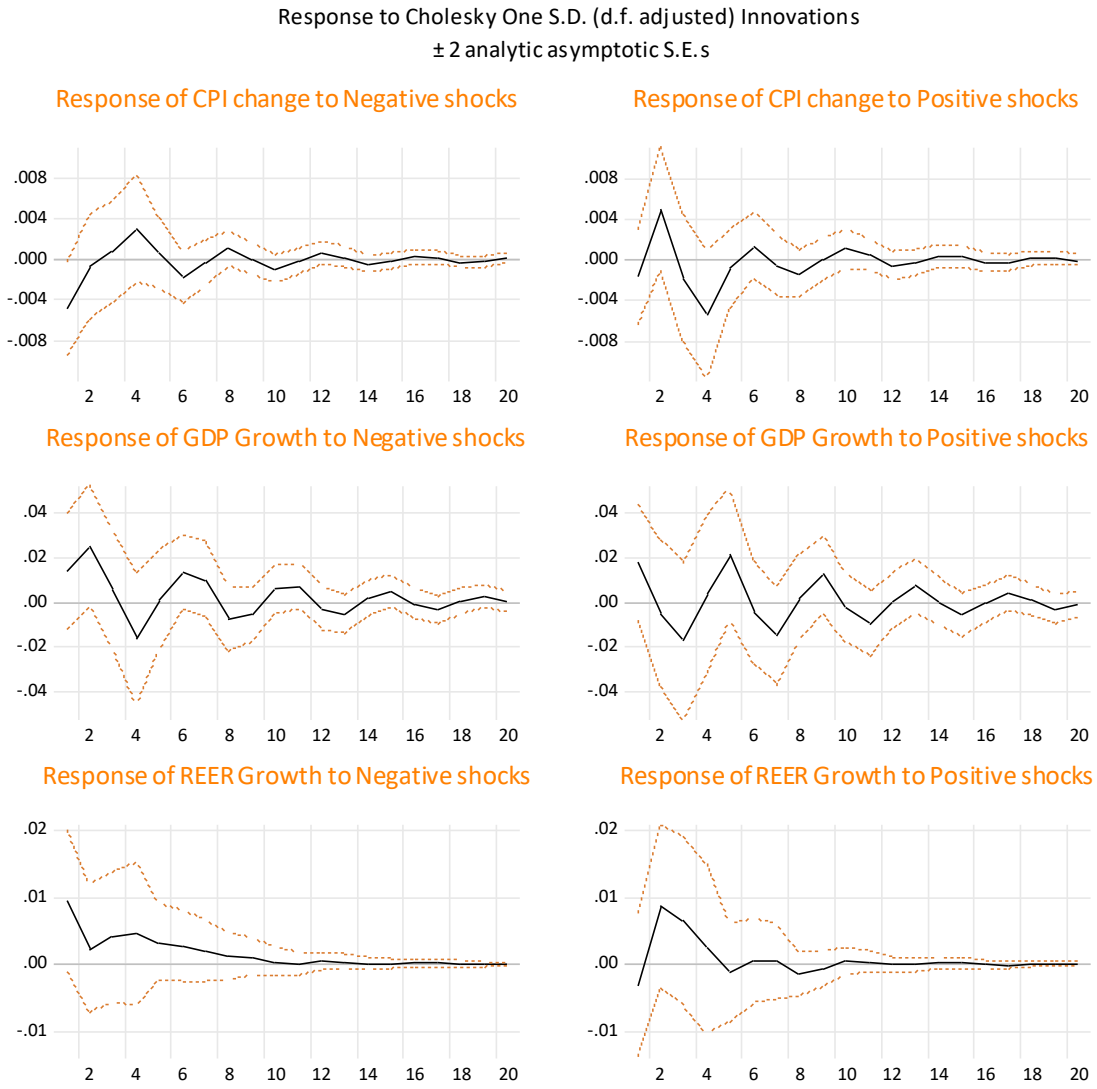

Figure 37. Impulse Response Functions of Growth of CPI, REER, and GDP to the Asymmetric Prices generated by Hamilton's Approach

Similarly, impulses from positive price shocks also see uncertain responses by growth in GDP. As with the negative shocks, positive shocks are also responded to by an increase in the first quarter which is followed by the constant shifting of increase and decrease. The same applies to the positive price shocks in the means of inflation change responses. Although REER growth responded with a decrease in the first quarter, it seems that REER growth does not decrease in the response to positive shocks, in general. In conclusion, it can be said that the general behavior of responses of these variables is not so much different from each considering the total overview. However, it must be stated that results are not convenient to what the Dutch Disease theory implies. First, positive price shocks are not responded to by GDP growth negatively which is one of the baseline assumptions of the Dutch Disease. Secondly, REER growth does not respond decreasing to negative oil price shocks and responds similarly to positive price shocks. The response to the first one reasonably trigger suspicions about a shock that our model does not capture. There have been some analyses showing the dominance of positive price shocks over negative price shocks. Mehrara (2008) revealed that output responds with little or no increase to positive price shocks while negative price shocks are responded with huge decreases in Nigeria. This is a Dutch Disease symptom. Ostensen (2018) revealed that negative price shocks do not result in huge increases in output for Norway. Results of this analysis also give insights that negative price shocks do not decrease GDP growth which shows Azerbaijan is not suffering from Dutch Disease.

6.3.2.5. VAR III Model with Hamilton's Approach – Variance Decomposition Analysis

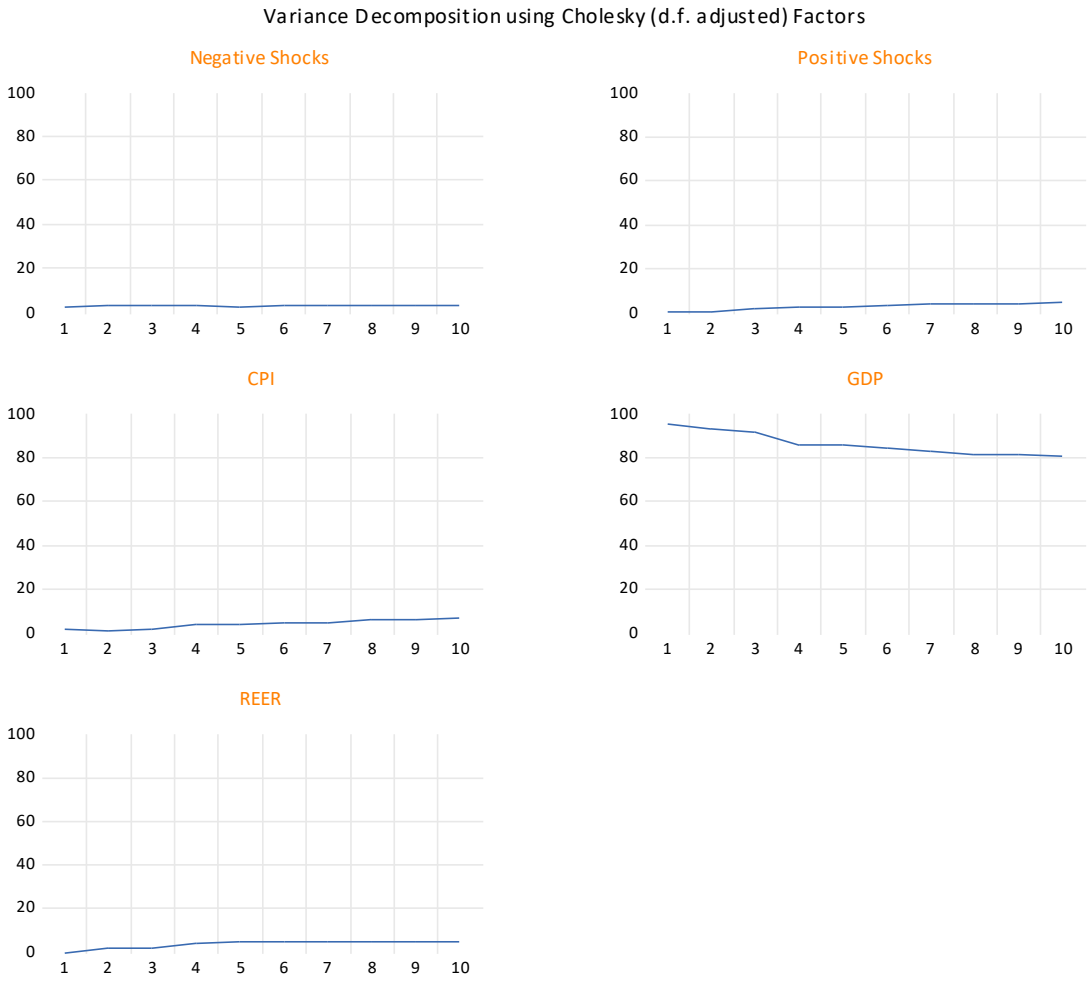

Figure 38. Variance Decomposition of GDP Growth

Although shocks generated by using Mork's approach showed significance in explaining the variance in the GDP growth we can say that both negative and positive commodity price shocks showed rather little significance in explaining the variance in the GDP growth. Negative price shocks can explain only 3% in the long term, while positive price shocks explain 5%in the long term. Change in the CPI explains 7 % in the long term which is the highest among these variables. Figure 38 depicts the Variance Decomposition analysis of the GDP growth.

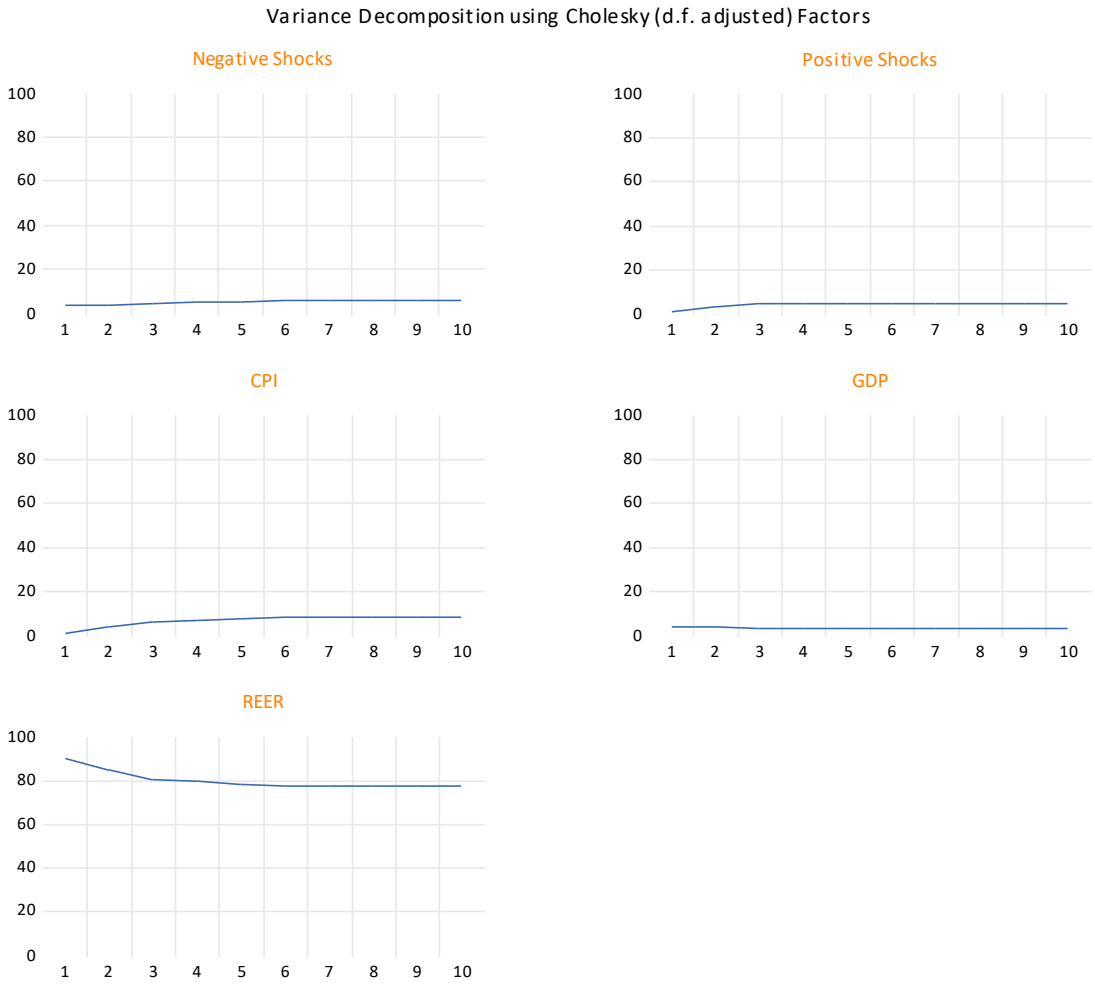

Figure 39. Variance Decomposition of Change in REER

The situation is not too different for variance decomposition of the change in the REER. Change in the CPI explains 8 % of the variance in the long term. This number is respectively 6 and 5% for the negative and positive price shocks. The graph of variance decomposition analysis of the REER is presented in Figure 39.

Overall, it can be said that price shocks generated by Mork's approach showed that negative price changes have a relatively small effect than positive price shocks. Although the change in REER is affected positively by the positive price shocks, it is almost unaffected by negative price shocks. However, we cannot say that there is a

difference between the effects of negative and positive price shocks generated by Hamilton's approach.

6.4. Results and Implications

In this chapter, three VAR models are established and analyzed to investigate the contraction of Azerbaijan's economy to the Dutch Disease: VAR I model, VAR II model, and VAR III model. VAR I model is established to investigate on the direct flow of the Dutch Disease process as the theory states. VAR II model integrates booming sector variables with two expenditure units of GDP and non-oil tradable sector to analyze effects of the windfall gains further. Lastly VAR III model focuses on the assymmetric effects of negative and positive oil price shocks generated by using Hamilton and Mork's approach.

As the VAR's main modelling evaluation method, the impulse response functions show increasing activity in the petroleum sector results in the appreciation of REER: REER responds by increasing to a shock from the booming sector. This finding is consistent with what the Dutch Disease theory states. However, what is not consistent with the theory is that non-oil tradable sector is not negatively affected with the expanding booming sector in Azerbaijan during the period of the analysis. The same result holds for the GDP gowth. So VAR I model concludes that the Dutch Disease is not present in Azerbaijan's economy. It is strengthened by adding two findings. Firstly, oil export's growth Grangerly cause the GDP growth. Secondly, impulse from the booming sector results with positive responses from the GDP growth. Another important point about Azerbaijan's economy is the importance of the non-oil tradable sector for the overall growth which can be seen in the Variance Decomposition analysis of the GDP growth.

Following the findings of VAR I model, VAR II model clarified more points about the effects of the windfall gains in the economy, which is consistent with the purpose of the establishment of the model. Firstly, the model revealed that transfers from SOFAZ Granger-cause both government and investment expenditure besides non-oil

tradable sector's output although petroleum sector's output is not significant for neither of them. Continuing the analysis, it is seen that transfers also affect the non-oil sector positively besides both expenditure units of GDP. This result helps us to answer the research question about subsidization of the economy. Moreover, the finding of the first model is supported with this finding of the VAR II model: the positive effect of the petroleum sector on the lacking sector is because of use of its gains in subsidization of the non-oil tradable sector. This can be seen in the Variance Decomposition analysis of the non-oil tradable sector's output's growth as government expenditure growth is one of the main variables to explain the variance.

The third model revealed some important points about the possible asymmetrical effects of negative and positive price shocks. In the model with the shocks generated by using Mork's approach it was revealed that asymmetrical effects of price shocks are present. In other words, although positive price shocks explain REER, negative commodity price shocks do not Granger cause REER. Impulse response functions revealed observations of significant reductions initially till 3rd quarters after negative price, while fluctuations in GDP growth are driven by positive oil price shocks. Overall, it can be said that negative oil price shocks lack to decrease GDP growth, while the latter increases after positive shocks. This result is consistent with what Zulfigarov and Neuenkirch (2020) found. Asymmetry is supported by IRF revealing that positive price shocks cause REER to appreciate while negative price shocks do not make REER to depreciate. This contradicts with the IRF analysis of the change in CPI. it is seen that inflation decline after negative oil price shocks, while despite of fluctuations it is unaffected by positive oil price innovations.

However, the findings are different in the model with price shocks generated by using Hamilton's approach. GDP growth observed fluctuations after both negative and positive price shocks. In a more stable manner, REER change responds to both price shocks positively. Overall, it can be said that the responses of REER change and GDP growth are positive to the positive price shocks, while negative price shocks fail to affect them negatively which is possibly because of the policy stance that counteracts the consequences of the commodity price decreases.

CHAPTER 7

CONCLUSIONS

The slump in the oil prices in 2020 motivated by the Covid-19 pandemic triggering worldwide aggregate demand is the main motivation of this paper in analyzing the dependence of Azerbaijan's economy on resource revenue from the petroleum sector. This paper tried to investigate on contraction of the economy to the Dutch Disease, importance of the transfers from SOFAZ for the expenditure aggregates and the non-oil tradable sectors. Besides, possible asymmetric effects of positive and negative price shocks are investigated. Employing VAR framework three different VAR models are built to empirically analysis the economy. The comprehensiveness of the analysis through different models is one of the main things this paper contributes to the literature on Azerbaijan's economy.

Analysis of the oil and gas sector's effects and importance through three different models gave significant insights into Azerbaijan's economy and windfall gains. The first and foremost, it is revealed that Azerbaijan's economy does not suffer from Dutch Disease at all. Even though foreign exchange reserve inflow to the economy causes REER appreciation, it is not translated into negative affection of GDP and the non-oil tradable sector. This implication is appropriate to the conclusion of Hasanov (2010). He also argued that Azerbaijan had not contracted the Dutch Disease although oil revenues cause REER appreciation.

According to the model, transfers from the oil fund play the role of locomotive in the economy. The Pairwise Granger-causality revealed that it is significant for government expenditure, investment expenditure, and the most importantly the non-oil tradable sector. Moreover, the Impulse Response Analysis revealed the positive response of the non-oil tradable sector's output to the shocks from the transfers from

the oil fund. This explains the reason for the positive relationship between the petroleum sector and non-oil tradable sector. The subsidization of the non-oil tradable sector using revenues from the petroleum sector is the reason for development of the traditional tradable sector.

Moreover, the analysis of asymmetric price shocks revealed significant points. Firstly, it was found out that asymmetric price effects are actual for the economy. Positive price shocks are resulted with positive response from both REER and GDP growth. However, negative price shocks failed to affect any of the variables significantly negatively. Relying on findings of Mehrara (2008), Iwayemi and Fowowe (2010), we can conclude that dominance of positive price shocks is another sign of not catching the Dutch Disease for Azerbaijan's economy. The authors implied that dominance of negative price shocks over positive price shocks is a sign of the Dutch Disease. This could be sourced by the actions of the CBAR that are aimed to prevent the consequences of the oil price decreases for the overall economy. Besides, it must be noted that without the oil fund overcoming the negative results of decreasing price shocks would be difficult for CBAR.

7.1. Policy Implications

Analyzing the policies that had been taken gives somehow an explanation about not contracting the Dutch Disease. In fact, analyzing government programs during the last 20 years gives the idea that the main aim of government programs has been straightforward: building a self-sustaining non-oil sector. In other words, supporting the development of the regions of the country besides the non-oil sector has been at the center of the government's intentions. However, the fact that the huge part of the reserves directed to the mentioned government programs comes from the oil fund and is used to subsidize the non-oil sector of the economy reveals that it is strongly dependent on oil and gas reserves. If it will be delayed diversifying the economy in the future which is the fact till 2020, with the decreasing reserves the economy would possibly suffer the downturns in the resource sector. So more straightforward steps must be taken to achieve a self-sustainable economy in the short term.

Insisienmay et al. (2015) based on their corresponding work on another South-East Asia country – Lao proposed that investing resource revenues in infrastructure and education would be quite an efficient policy to prevent the Dutch Disease. Our analysis of programs by the government revealed that theoretically they have been aimed to do so. However, their efficiency is questionable. According to a magazine – US News Azerbaijan is ranked 65th out of 73 countries in 2021 in a list for comparison of educational levels which was 61st in 2020. In addition to indirect investments, government programs to develop the non-oil tradable sector have been established. However, it seems that they have not yet achieved their aims to develop the non-oil sector, to ensure that it will sustain on its own which will bring new investments to the sector. Rather those investments have made the non-oil sector to be dependent on subsidies from the government. The main purpose while diversifying the economy must be to motivate investment in the private sector. It can be implied that it has been drowning in the crowding-out effect of government expenditure which seems to be a case from our analysis. Motivation to invest in the private sector would highly possibly increase output and export in the non-oil tradable sector, which in turn would bring new investments and sustainability.

Usui (1997) in his paper about resource windfalls in Indonesia, argued that devaluating currency is a beneficial policy to fight Dutch Disease which will increase the competitiveness of the non-oil tradable sector. This is somehow suitable for the Azerbaijan economy. In fact, the share of non-oil sector in the exports of Azerbaijan had been 4,4% in the 5 years before the devaluation of Azerbaijani Manat in 2015. The corresponding value had been 7,7% in the 5-year aftermath of the 2015 devaluation. Indeed, Azerbaijan may benefit from the devaluation of the currency with significantly thought policies.

One of the positive things about Azerbaijan's management of resource revenues is the existence of a fund to efficiently manage windfalls. Hiroyuki and Soukvisan (2018) argued that Indonesia and Malaysia's success in the management of oil revenues is due to the establishment of 'Revenue Sharing Fund' and 'National Trust Fund' respectively. In comparison, Lao PDR and Myanmar have not yet established a fund

to set revenues aside and to invest and manage efficiently. Oil funds' role in the management of windfall gains has been widely mentioned in the literature. Bjørnland et al. (2019) argued that GPFG is the main reason for Norway's success to prevent the Dutch Disease. This is also a case for Azerbaijan's economy. As it was clarified transfers from SOFAZ plays an important role for the survival of the non-oil tradable sector.

Overall, although Azerbaijan's economy has not yet caught the Dutch Disease syndrome, it can surely be said that the economy is vulnerable. More straightforward steps need to be taken to build a self-sustaining non-oil tradable sector which is also a stimulus for real growth in the economy as long as it not too late.

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APPENDICES

A. AUTOCORRELATION LM TEST RESULTS

Table 15. Autocorrelation LM test results of VAR model I

Null hypothesis: No serial correlation at lag h

Lag	LRE* stat	df	Prob.	Rao F-stat	df	Prob.
1	17.50915	16	0.3534	1.105227	(16, 162.6)	0.3542
2	12.33971	16	0.7203	0.766962	(16, 162.6)	0.7208
3	13.93058	16	0.6039	0.869965	(16, 162.6)	0.6046
4	19.27588	16	0.2546	1.223219	(16, 162.6)	0.2553

Table 16. Autocorrelation LM test results of VAR model II

Null hypothesis: No serial correlation at lag h

Lag	LRE* stat	df	Prob.	Rao F-stat	df	Prob.
1	78.13858	49	0.0051	1.707007	(49, 202.4)	0.0055
2	43.57571	49	0.6920	0.878828	(49, 202.4)	0.6981
3	56.01866	49	0.2283	1.162494	(49, 202.4)	0.2348
4	53.36318	49	0.3102	1.100638	(49, 202.4)	0.3175

Table 17: Autocorrelation LM test results of VAR model III – Morks' approach

Null hypothesis: No serial correlation at lag h

Lag	LRE* stat	df	Prob.	Rao F-stat	df	Prob.
1	38.99412	25	0.0369	1.624816	(25, 183.5)	0.0374
2	35.35761	25	0.0819	1.459185	(25, 183.5)	0.0829
3	18.60021	25	0.8159	0.734611	(25, 183.5)	0.8169
4	25.89397	25	0.4133	1.042350	(25, 183.5)	0.4151

Table 18. Autocorrelation LM test results of VAR model III – Hamilton's approach

Null hypothesis: No serial correlation at lag h

Lag	LRE* stat	df	Prob.	Rao F-stat	df	Prob.
1	37.60538	36	0.3956	1.051298	(36, 196.0)	0.3995
2	50.82779	36	0.0517	1.467318	(36, 196.0)	0.0531
3	43.35185	36	0.1865	1.228931	(36, 196.0)	0.1896
4	42.24045	36	0.2194	1.194201	(36, 196.0)	0.2227

B. TURKISH SUMMARY / TÜRKÇE ÖZET

Doğal kaynaklar her zaman bir ülke için bir kolay gelir kaynağı olarak görülmüştür. Bu gelirle ekonominin gereksinimi olan sermayeyi temin edebilir, ekonominin kalkınması için ihtiyacı olan altyapıyı inşa edebilirler. Fakat, doğal kaynak sektöründen sağlanan sermayenin genellikle ekonominin ihtiyacından daha fazla olduğu görülmektedir. Bu durum ekonomilerde literatürde "Hollanda hastalığı sendromu" adı ile bilinen bir olgunun gözlemlenmesine yol açmaktadır. Hollanda hastalığı sendromu fenomeni 1959-cu yılda Groningen kentinde doğal gaz yataklarının bulunmasından sonra süregelen bir ekonomik durum silsilesinden sonra ilk defa 1977-ci yılda "The Economist" isimli dergide kullanılmıştır. 1970'li yıllarda yaşanan petrol fiyatı şokları literatürde bu alana dikkatin artmasıyla sonuçlandı. Hollanda hasatalığı, aslında ekonomi için sermaye akışının pozitif gözükse de, onun ekonomideki büyümeni tetiklemesinden ziyade negatif etki ederek büyümesinin karşını aldığını söyleyen bir olgudur. Teoriye göre bunun sebebi üretim fatörlerinin gelenksel sanayi sektöründen çekilerek patlama yaşayan yeni üretim sektörüne aktarılarak geleneksel sanayi sektörünün daralmasına yol açmasıdır. Başka bir sebep ise Reel Efektif Döviz Kurunu değer kazanmasıyla birlikte geleneksel sanayi sektörünün üretiminin diğer ekonomilerin üretimleriyle rekabet alanın daralması ve böylelikle geleneksel sanayi üretiminin azalmasıdır.

Bahsedilen olay dizileriyle birlikte literatürde kaynak zenginiği konusuna dikkat artmasıyla birlikte önce Sachs and Warner (1995, 1999), Gylfason et al., (1999), Gylfason (2001), and Stijns (2005) gibi teorik olan araştırmalar, daha sonra ise Sahra altı Afrika, Asyadakı gelişmekte olan ülkeler ve Amerika Birleşik Devletleri, Kanada, Norveç gibi gelişmiş ülkeler üzerine ampirik araştırmalar literatürde kendini sıkça gösterdi. Fakat Azerbaycan konusu yeteri kadar araştırlmamıştır.

Britanya Petrol Şirketinin (2018) yayınladığl rapora göre Azerbaycan dünya üzerindeki toplam petrol ve gaz yataklarının 0,4 ve 0,7 % kısımına sahiptir. Bu genel

olarak bakıldığında küçük bir rakam olsa da, Azerbaycan Merkez Bankasının yayınladığı rapora bakınca Azerbaycan ekonomisi için ne kadar değerli olduğu gözükmektedir. Şöyle ki, 2020-ci yılda Azerbaycanın GSYİH-nın 38%-i petrol sektöründen gelmiştir. Azerbaycan İstatistik Kurumun yayınladığı başka bir veride ise 2005 ve 2016 yılları arasında Azerbaycana yapılan yatırımın 73,8 %-nin madencilik sektörüne yapıldığını söyleye biliriz. Daha da önemlisi Merkez Bankasının yayınladığı ihracat verilerine bakarsak, 2001 ve 2020 yılları arasında en düşüyü 86% olmakla, ihracatda petrol sektörünün ne kadar önemli bir paya sahip olduğunu görürüz. Bu verilerle birlikte Hollanda hastalığı sendromunun Azerbaycan ekonomisinde var olup-olmamasını, ekonominin doğal kaynaklardan ne düzeyde asılı olduğunu araştırmak literatür için önemli bir yer tutuyor.

Azerbaycanla ilgili literatürde önemli bir yer tutması için yapılan bu araştırmada Vektör Otoregressif model kullanılmış ve onun Granger nedensellik testi, Etki-tepki analizi ve Varyans dekompozisyon analizi tekniklerinden yararlanmıştır. 3 VAR modeli kullanılan bu araştırmada ilk model petrol ihracatının GSYİH, Reel Efektif Döviz Kuru ve petrol dışıticari sektörünün üzretimi üzerinde etkisi analiz edilmiştir. İkinci modelde analizi biraz daha geliştirmek amacıyla petrol ihracatı ve SOFAZ-dan transferlerin devlet harcamaları, yatırımlar ve petrol dışı ticari sektörün üzerindeki etkileri analiz edilmektedir. Bu modelde asıl amaç petrol sektörü tarafından gelen sermayenin sübvansiyon olarak ekonomide etkisi ve petrol fonunun etkisini analiz etmektir. Son model ise Mork (1989) ve Hamilton (1996) tarafından geliştirilen iki ayrı tekniği kullanarak oluşturulan petrol fiyatı şoklarının ekonomide tesirini analiz etmektir.

Literatürde Azerbaycan ekonomisinin Hollanda hastalığı sendromuna yakalanmasıyla ilgili yeteri kadar araştırma yapılmamış olsa da, yapılan araştırmalarda bazı önemli çıkarımlar gözlemlenmektedir. Şöyle ki, Laura ve Singh (1999) kararvericilere Hollanda hastalığını sendromunun Azerbaycan için beklenen olduğunu ve petrol fonu yaratılmasını tavsiye ederken Clemens (2008) yatırımların petrol dışı ticari sektöre yönlendirilmesinin sendromun karşısını alabileceğini iddaa ediyor. Hasanov (2010) petrol fiyatıyla Reel Efektif Döviz Kurunun pozitif ilişkisi olmasını gözlemlese de,

Holanda hastalığı sendromunu Azerbaycan ekonomisi için onaylamamaktadır. Zulfugarov ve Neuenkirch (2020) Azerbaycan petrol dışı ticari sektörünün petrol gelirlerinden asılı olduğunu gözlemlemektedir. Petrol fiyatı şoklarının asimmetrik etkileriyle ilgili yazarlar GSYİH-in yalnız pozitif fiyat şoklarından sonra tepki vermesini Azerbaycan Merkez Bankasının asimmetrik olarak negatif fiyat şokları zamanı negatif etkinin karşını almak için pozitif fiyat şoklarından farklı olarak inisiyatif almasında görmektedir. Negatif fiyat şoklarının ekonomide etkisiz kalması Arezki ve İsmael (2013) tarafından da açıklanmıştır.

Dördüncü bölümde Azerbaycan ekonomiyle ilgili detaylı bilgilere yer verilmiş, petrol sektörünün ekonomideki payını gösterecek şekilde verilerle desteklenmiştir. Azerbaycan Sovyetlerin dağılmasıyla birlikte ekonomik olarak stagflasyon durumunu tecrübe etmiştir. Şöyle ki özgürlüğünün ilk yılında büyüme kaydedememesine rağmen 1600 % enflasyon gözlemlenmiştir. 1994 yılında 8 ülkeden 13 büyük multinasyonal petrol şirketiyle bağlanan ünlü Ürün Paylaşım Sözleşmesi imzalanmasıyla ekonomi yeni bir döneme ayak basmıştır. Fakat istatistikler bu dönemin petrol sektörü gibi diğer sektörler için de efektif olmadığını gösteriyor. Birleşik Devletler Sanayi Geliştirme Organizayonu tarafından açıklanan rapora göre 2015 yılında Azerbaycan 0,011 Rekabetcil Sanayi Performansı Endeksiyle 148 ülke içinde 103-cü yer, $ 307,3 kişi başına imalat katma değeriyle de aynı sırada yerini bulmuştur. Petrol ihracatının aktif hale geldiği 2005 yılından başlayarak süregelen artımla petrol gelirlerinin devlet harccamalarındaki payı 2013 yılında 58 % ile zirveyi görmüştür. 2014 yılında gözlemlenen petrol fiyatı düşmesiyle birlikte azalan pay, nitekim 2020 yılına kadarki son 5 yılda ortalama olarak 45 % olmuştur. Araştırma dönemi içinde tarım ve imalat sektörlerinin üretimlerinin devamlı yükseldiği gözlemlense de, üretimin petrol sektöründe daha çok olduğu aşikardır. Bu veriler eşliğinde doğal kaynak gelirlerinin Azerbaycan ekonomisinde yerini araştırmak literatür için önemli bir yer tutuyor.

Beşinci bölümde veri ve metodoloji seçimiyle alakalı bilgiler yer almaktadır. Literatüre önemli katkı verecek şekilde bir araştırma yapılması için öncelikle Holanda sendromuyla ilgili kapsamlı bir araştırma için tüm kanalları kapsayacak VAR modelleri tanımlanmalı ve daha sonra bu modeller için ekonomide bu olay akışında

yeterli denile bilecek aktörler seçilmelidir. Araştırmalar sonucu kapsamlı bir araştırma için yeterli olacak üç VAR modeli belirlendi. İlk model Holanda hastalığı sendromuna bulaşması zamanı temel olay dizileri dikkata alınmaktadır. Şöyle ki, petrol sektöründeki aktivitenin ekonomik büyüme, Reel Efektiv Döviz Kuru ve petrol dışı ticari sektör üretimi üzerindeki etkisinin araştırılması ilk modelin belirlenmesinde temel amacı oluşturmaktadır. Literatüre baktığımızda sıklıkla petrol sektöründeki aktivitenin petrol fiyatlarıyla tanımlandığı gözlemlenmektedir. Fakat, petrol fiyatlarındaki değişimlerin üretimdeki değişiklerle nötr hale getirilmesini dikkata alarak bu araştırmada aktivitenin Amerikan Dolarıyla petrol sektöründeki ihracat olarak tanınmlandı. Bu da direkt petrol sektöründen gelen gelirin etkisini anali etmek şansı yaratıyor. Aynı şekilde bu araştırmada genel olarak literatürde olduğun farklı olarak yapılan bir diğer seçim petrol-dışı ticari sektördeki çıktı değişkeninin seçimi olmuştur. Şöyle ki, literatürde genel olarak petrol dışı ticari sektörün çıktısı için üretim sektörü baz alınmaktadır. Fakat, Azerbaycan özelinde baktığımızda üretim sektörünün petrol dışı ticari sektörde payının fark ne kadar az olsa da, tarım sektöründen daha az olduğunu görüyoruz. Bu sebeple petrol dışı ticari sektörünü modelde temsil etmek için üretim ve tarım sektöründeki çıktıların toplamı olmasında karar kıldık. Belirlenen ismi geçen üç endojen değişken de Azerbaycan Merkez Bankası tarafından açık kaynak olarak yayınlanmaktadır. Tarım ve üretim sektörünün çıktıları ise Azerbaycan Devlet İstatistik Kurumundan alınmıştır. İkinci VAR modeli, Azerbaycan Devlet Petrol Fonunun ekonomi içinde petrol gelirlerinin yönetilmesinde etkisini ve dolaylı yolla petrol fonundan ekonomiye aktarılan petrol gelirlerinin devlet harcamaları, yatırımlar ve petrol dışı ticari üretimin sübvanse edilmesini analiz etmek analiz etmek için belirlenmiştir. Böylelikle, bu modelde GSYİH ve Reel Efektiv Döviz Kuru değişkenleri çıkarılmış, devlet harcamaları ve yatırım değişkenleri ilave edilmiştir. İlave olarak, ekonomiye sermaye akışında önemli bir paya sahip olan Doğrudan Yabancı Yatırımlar da bu modele ilave edildi. Aynı şekilde harcamalar için önümli bir değişken olan enflasyonun etkisini de modelde içerilmesi maksadıyla Tüketici Fiyat Endeksi de modele endojen değişken olarak ilave edildi. İsmi geçen veriler Azerbaycan Merkez Bankası tarafından aylık açık kaynak olarak raporlanıyor. Son model ise asimmetrik fiyat etkilerini gözlemlemek için belirlendi. Mork (1989) ve

Hamilton (1996) tarafından belirlenen yollarla petrol fiyatlarından pozitif ve nagatif fiyat çokları elde edilmiş ve bu model ikisi için de birer kez değerlendirilmiştir. Mork'un geliştirdiği tekniğe göre eğer petrol fiyatındaki büyüme önceki sezondaki büyümeden daha büyük değilse, büyüme olsa dahi, ekonomiye pozitif şok olarak etki edemez. Aynı şekilde, eğer petrol fiyatındaki küçülme önceki dönemde gözlemlenen küçülmeden daha az değilse, ekonomiye negatif şok olarak etki edemez. Bir başka deyişle:

MOPD = ΔP eğer $\Delta P_t < \Delta P_{t-1}$

MOPD = 0 eğer aksi halde

MOPI = ΔP eğer $\Delta P_t > \Delta P_{t-1}$

MOPI = 0 eğer aksi halde

Hamilton'un tekniği ise biraz daha radikal davranış göstermektedir. Şöyle ki, eğer petrol fiyatı kendisi de dahil olmak üzere son 4 dönemde en yüksek fiyat değilse, ekonomiye pozitif fiyat şoku olarak etki edemez. Aynı şekilde, eğer son 4 dönemde en düşük fiyat değilse, ekonomiye negatif fiyat şoku olarak etki edemez. Bir başka deyişle:

NOPI = $\mathrm{MAX}(0, \mathrm{P}_t - MAX(\mathrm{P}_{t-1}, \mathrm{P}_{t-2}, \mathrm{P}_{t-3}, \mathrm{P}_{t-4}))$

NOPD = $\mathrm{MIN}(0, \mathrm{P}_t - MIN(\mathrm{P}_{t-1}, \mathrm{P}_{t-2}, \mathrm{P}_{t-3}, \mathrm{P}_{t-4}))$

Petrol fiyatı verisi ABD Federal Rezerv Bankasının açık kaynak olarak paylaştığı sitesinden indirildi vereel verilere dönüştürüldükten sonra yöntemleri kullanarak fiyat şokları belirlendi. Modelde negatif ve pozitiv fiyat şokları değişkenlerinin yanı sıra GSYİH büyümesi, Reel Effektif Dövzi Kuru ve Tüketici Fiyat Endeksindeki değişim değişkenleri de endojen olarak dahil edildi. Tüm VAR modellerinde, 2015 yılındaki petrol fiiyatlarının düşmesiyle birlikte Manatın değer kaybetmesini modelde göstermek için ekzojen değişken olarak kukla değişkeni kullanıldı. Birinci VAR

modelinde ilaveten petrol fiyatları ve Doğrudan Yabancı Yatırım da ekzojen değişken olarak seçildiler. İkinci modelde sadece petrol fiyatları ve yapısal değişimini göstermek için kukla değişkeni, üçüncü modeldeyse petrol sektörünün ihracatı ve kukla değişkeni kullanıldı. Değişkenlerin Augmented Dickey-Fuller testi kullanılarak birim kök değerlerine bakılmıştır. Sonuçlara göre tüm değişkenlerdebirim kökün mevcut olduğu görülmüştür. Bu gelişmeyle birlikte tüm değişkenler modelde 1. farklarıyla kullanılmıştır. Bu da değişkenlerin birim köklerinden kurtulmasına çıkarmıştır.

Verilere baktığımızda Azerbaycan ekonomisini betimlememiz için önemli noktalar görebiliriz. GSYİH ve petrol dışı GSYİH grafiklerine baktığımızda 2005 yılına kadar petrol dışı GSYİH-in toplam GSYİH-in büyük bir kısmına denk geldiğinin şahit oluyoruz.2005 yılı sonrası azalan farkın 2015yılından sonra petrol fiyatlarının düşmesiyle birlikte yeniden artdığını görüyoruz. GSYİH, petrol dışı ticari sektör ve petrol ihracatı verilerindeki büyüme oranlarının korelasyon analizine bakınca önemli bir nokta olduğunu görüyoruz. Şöyle ki, ismi geçen değişkenler karşılıklı olarak yüksek pozitif korelasyon değerine sahip oldukları görülüyor. Petrol sektörünün ihracatındaki büyümenin GSYİH ve petrol dışı ticari sektörünün çıktısındaki büyümeye pozitif etkisinin yanısıra petrol dışı ticari sektördeki büyümenin genel büyüme için ne kadar önemli olduğunu aralarındaki 0,7 korelasyon değeriyle görüyoruz. Reel Efektif Döviz Kurundaki değişim grafiğindense 2005 yılıyla birlikte genel olarak bir yükselen trendin olduğu ve 2015 yılıyla birlikte bir değer kaybetme olduğunu görüyoruz. Bu araştırmamızdan Reel Efektif Döviz Kurunun petrol sektöründen pozitif etkilendiği bir sonuç çıka bileceğini göstermektedir. Fakat Azerbaycan Devlet Petrol Fonundan aktarımların büyüme oranıyla devlet harcamaları ve yatırımlardaki büyüme oranlarının korelasyonu farklı sonuçlar içermektedir. Şöyle ki, aktarımların büyüme oranının hem devlet harcamaları, hem de yatırımların büyüme oranlarıyla korelasyon değeri pozitif olsa da, düşük derecede olmaktadır. Fakat, bu aralarında bir nedensellik ilişkisinin olmadığını söylemiyor. Bu yüzden bu değişkenlerin ilişkisi ikinci VAR modeli değerlendirildikten sonra açığa kavuşacaktır.

Daha önce belirtilen VAR modelleri temel beş soruya yanıt bulmak amacıyla belirlenmiştir:

- Petrol sektörü Reel Efektif Döviz Kurunun değer kazanmasına sebep oluyor mu?
- Petrol sektöründeki büyüme petrol dışı ticari sektörün küçülmesine sebep oluyor mu?
- Azerbaycan ekonomisi bir "sübvansiyon ekonomisi" mi?
- Petrol fonu ekonomide ne kadar etki sahibidir?
- Pozitif ve negatif fiyat şoklarının ekonomide etkisi asimmetrik midir?

Birinci ve İkinci sorunun cevabının birinci VAR modelinin değerlendirmesiyle bulunması amaçlanmıştır. İkinci VAR modeli üçüncü ve dürdüncü soruların yanıtlanması için yeterli verileri sunacakken, beşinci sorunun yanıtı üçüncü VAR modelinin değerlendirilmesinin yapılmasıyla ortaya çıkacaktır.

Bu sorulara cevap bulunması için değerlendirilmesi yapılan VAR modellerinin değerlendirme prosedürleri ve değerlendirme sonuçları altıncı bölümde detaylıca anlatılmaktadır.

VAR Model I

Modelin değerlendirilmesi için öncelikle optimal gecikme uzunluğunun bulunulması için Akaike, Schwartz ve Hannan-Quinn bilgi kriterlerinin sonuçları göz önüne alınmıştır. Sonuçlara göre Akaike, Schwartz ve Hannan-Quinn bilgi kriterlerinin hepsi 3. gecikme uzunluğunu optimal gecikme uzunluğu olarak belirlemektedir. Üçüncü gecikme uzunluğu baz alınarak model kurulduktan sonra otokorelasyon ve istikrar testlerinin sonuçlarına bakılmıştır. İstikrar testinden çıkan sonuca göre 3. optimal gecikme uzunluğu baz alınarak kurulan model istikrar koşullarını sağlıyor. Şöyle ki, özdeğer değerlerinden en büyüğü 0,93 olmakla hiç biri 1 değerinden büyük değildir. Ekler kısmında sonuçları gösterilen otokorelasyon LM testinin sonuçlarına baktımızdaysa 3. optimal gecikme uzunluğunda otokorelasyonun olmadığını

görmekteyiz. Bu sonuçlara dayanarak model 3. optimal gecikme uzunluğunu baza alarak değerlendirildi.

Öncelikle model Granger nedensellik testine tabi tutuldu. Sonuçlara göre petrol ihracatındaki büyüme sadece GSYİH büyümesinin Granger nedeni olsa da, Reel Efektif Döviz Kuru büyümesinin Granger nedeni değil. Reel Efektif Döviz Kurunun büyümesi hem GSYİH, hem de petrol dışı ticari sektör çıktısındaki büyümenin Granger nedenidir.

Etki-tepki analizi bazı kaydadeğer sonuçlar ortaya çıkarmaktadır. Sonuçlara göre, genel olarak bakarsak, GSYİH büyümesi petrol sektörü ihracatındakı rastgele şoklara pozitif olarak tepki gösteriyor ve şoklar Zulfigarov ve d. (2018) tarafından açıklanan şoklarla neredeyse aynı grafiği çiziyor. Etki-tepki analizinin ilk model için açıkladığı başka önemli bir nokta ise petrol dışı ticari sektör çıktısının petrol sektörü ihracatındaki rastgele şoklara ilk dönemde negatif olsa da, genel olarak GSYİH büyümesinde olduğu gibi pozitif tepki vermesidir. Bu iki değişkenden farklı olaraksa, Reel Efektif Döviz Kuru büyümesi tüm dönemlerde petrol sektörü ihracatından gelen şoklara pozitif tepki vermiştir. Reel Efektif Döviz Kurundaki değişimden gelen rastgele şoklara tepkini analiz edersek, GSYİH ve petrol dışı ticari sektör çıktısının genellikle istikrarsız tepki vermiş olsa da, tepkinin genel olarak negatif olmadığı kanısına varmaktayız.

Vayans Dekompozisyon analizinin sonuçlarına göre GSYİH büyümesindeki varyansın diğer değişkenler arasında en büyük kısmı 17 % olmakla petrol dışı ticari sektör çıktısı büyümesi tarafından anlatılmaktadır. Petrol sektörü ihracatı büyümesiyse GSYİH büyümesinde yalnızca 6 % varyansı anlatıyor. Aynı şekilde petrol sektörü ihracatındaki büyümenin petrol dışı ticari sektör çıktısındaki büyümenin de varyansının önemsiz bir kısmını sadece 1 % kısmını anlattığını görmekteyiz. Varyansın 17 % kısmıysa GSYİH büyümesi tarafından anlatılıyor. Reel Efektif Döviz Kuru büyümesininse varyansının 8 % kısmı petrol sektörü ihracatındaki büyüme tarafından anlatılıyor.

Birinci VAR modelinin değerlendirilmesiyle iki önemli soru yanıtını buldu. Öncelikle, petrol sektöründeki artan aktivitenin Reel Efektif Döviz Kurunun değer kazanması ortaya çıktı. Bu Holanda hastalığı sendromunun ilk belirtilerinden birinin olması demektir. İkinciyse, petrol sektöründeki artan aktivitenin petrol dışı ticari sektörde daralmaya getirmediği, aksini büyümeye sebep olduğu görüldü. Bunların yanısıra petrol sektörünün büyümesinin teoride bilindiği üzere ekonomini küçültmediği de görüldü. Genel oalrak bakarsak, Azerbaycan ekonomisinin Holanda hastalığı sendromuna yakalanmadığı görüldü. Halbuki, Reel Efektif Döviz Kurundaki değer kazanmanın ekonominin yakalanmamasına rağmen tehlike altında olduğunu gösteriyor. İkinci modelin değerlendirmesiyle birlikte petrol gelirlerinin ekonomide etkisi daha ileri düzeyde açıklığa kavuşacaktır.

VAR Model II

İkinci modelde farklı olarak optimal gecikmez uzunluğu için bilgi kriterleri tarafından farklı gecikme uzunlukları söylense de, otokorelasyon ve istikrar testlerinin sonuçlarına bakılarak optimal gecikme uzunluğu 3 olarak kabul edildi ve model 3. gecikme uzunluğu baz alınarak değerlendirildi. İlginç ve önemli olan detaylardan biri Granger nedensellik testinin sonuçlarına göre petrol fonundan aktarımların devlet harcamaları, yatırımlar ve petrol dışı ticari sektörün çıktısının Granger nedeni olmasıdır. Petrol sektörü ihracatındakı büyümenin bu verilerin hiç birinin Granger nedeni olmamasıysa, ekonomide petrol fonunun petrol sektöründen gelirlerin direkt ekonomiye aktarılmadığını ve dolayısıyla, varlığını ve efektifliğini gösteriyor. Etki tepki analizlerinden çıkan sonuçlar da bunu destekliyor. Petrol sektörü ihracatındaki büyümeden gelen şoklar devlet harcamaları, yatırımlar ve petrol dışı ticari sektör çıktısı büyümesi tarfından yok sayılacak kadar küçük tepkiler görüyorken, petrol fonundan aktarımlardaki büyümeden gelen şoklara tepkiler daha büyük ölçüde gerçekleşmektedir. Tepkilerse genellikle, pozitif olmaktadır. Bahsetmeye değer bir başka noktaysa ilk döndemde negatif olsa da, petrol fonundan aktarımların büyümesinin petrol sektörü ihracatı büyümesine tepkisinin genel olarak pozitif ve büyük ölçüde gerçekleşmiş olmasıdır.

İki modelin sonuçlarına toplu olarak baktığımızda Azerbaycan ekonomisinde Holanda hastalığı sendromunun olmadığı kanaatına varmaktayız. Şöyle ki, petrol sektörünün gelirleri direkt olarak ekonomiye aktarılmadığı ve fonda toplandığı için ekonomide etkisi direkt algılanmıyor. Ve bu etki kararvericilerin verdikleri karar miktarında oluyor. Aktarımlar sayesinde petrol dışı ticari sektör sübvanse ediliyor ve bu da petrol dışı ticari sektörün petrol sektöründe artan aktivitiden negatif etkilenmemesinde kilit nokta oluyor. Diğer tarafdan bakarsak, bu sonuçlar Azerbaycan ekonomisinde sübvansiyonların ne kadar önemli yere sahip olduğunu göstermektedir. İto (2017) tarafından yapılan araştırmada Rusya için aynı sonuç çıkmış ve petrol gelirinin petrol dışı ticari sektörün büyümesi için kullanılması sonucu ekonominin sübvansiyon ekonomisi olduğu söylenmiştir.

Üçüncü VAR modeli ekonomide pozitif ve negatif fiyat şoklarının asimmetrik etkisinin analiz edilmesi amacıyla belirlenmektedir. Öncelikle Mork (1989) tarafından geliştirilen tekniği kullanarak elde edilen fiyat şoklarıyla model değerlendirildi. Sonuçlara baktığımızda ekonomide asimmetrik etkilerin var olduğunu göre biliyoruz. Şöyle ki, en başta Granger nedensellik analizinin sonuçlarına göre pozitif fiyat şokları Reel Efektif Döviz Kuru değişimlerinin Granger nedeniyken negatif fiyat şokları ismi geçen değişkenin anlatımında istatiksel oalrak önemli değildir. Etki-tepki analizinin sonuçlarına göre Reel Efektif Döviz Kuru pozitif fiyat şoklarına değer kazanmakla tepki gösteriyorsa,negatif fiyat şoklarına neredeyse tepki göstermiyor. Fakat, Tüketici Fiyat Endeksindeki değişiminde azalmalara sebep oluyor. Bu da Merkez Bankasının petrol sektöründe fiyat azalmaları zamanı kemerleri biraz daha sıkarak faizleri arttırmasıyla açıklanabilir. Varyans dekompozisyon analizinin sonuçlarına baktığımızdaysa, pozitif fiyat şoklarının Reel Efektif Döviz Kuru ve GSYİH büyümelerindeki varyansın büyük kısmını anlattığını ve negatif fiyat şoklarının varyansı anlatmakta yetersiz kaldığını görüyoruz.

Hamilton (1996) tekniği kullanarak oluşturulan fiyat şokları olan modelin değerlendirilmesiyle bazı önemli noktalar ortaya çıktı. Negatif fiyat şoklarının Reel Efektif Döviz Kurunun değerini yüselttiğini görmekteyiz. Aynı sonuç Norviç için yapılan araştırmada Ostensen (2018) tarafından da açıklanmıştı. Fakat bu, teoride

söylenenin aksini söyleyen bir çıkarım. Şu sonuçtan da ekonominin Holanda hastalığı sendromuna bulaşmadığı kanaatına bir daha varmaktayız. Mehrara (2008) bulgularına göre Nijeryada pozitiv fiyat şokları neredeyse GSYİH büyümesini etkileyemezken negatif fiyat şokları GSYİH büyümesini azaltmıştır. Ve şu bulgu Holanda hastalığı sendromunun bulgularından biridir. Bu modeldeyse bunun aksi görülmekte ve negatif fiyat şoklarının etkisiz kaldığı ortaya çıkmaktadır. Dolayısıyla bu model de Azerbaycan ekonomisinde Holanda hastalığı sendromunun olmadığını söylemektedir.

Elde edilen sonuçlar göz önüne alındığında, Azerbaycan ekonomisinin Holanda hastalığı sendromuna bulaşmadığı kanaatına varmaktayız. Daha açık olmak gerekirse, petrol sektöründeki artan aktivite sebebiyle ülkeye artan döviz reservi girişi Reel Efektif Döviz Kurunda değer kazanmaya sebebiyet verse de, GSYİH ve petrol dışı ticari sektörde küçülmeye neden olmadığını, aksine büyümelerde pay sahibi olduğunu göre biliriz. Bu sonuçlar Hasanov (2010) tarafından yapılan araştırmanın sonuçlarından farklı değil. Yazar da Azerbaycan ekonomisinin Holanda hastalığı sendromuna yakalanmadığı kararına varmaktadır. Fiyat şoklarının asimmterik etkilerini araştırdığımız üçüncü VAR modeli de bir bakımdan Holanda hastalığı sendromuna yakalanmadığı sonucunu ortaya çıkarıyor. Mehrara (2008), Iwayemi ve Fowowe (2010) tarafından yapılan araştırmalarda negatif fiyat şoklarının pozitif fiyat şokları üzerinde olan üstünlüğünün Holanda hastalığı sendromunun bir başka belirtisi olduğu açıklandı. Bu sonucu göz önüne alarak, üçüncü modeli değerlendirmemiz sonucunda ortaya çıkan pozitif fiyat şoklarının negatif fiyat şokları üzerinde üstünlük sağlaması ekonomide Holanda hastalığı sendromunun olmadığı anlamına geliyor. İkinci modelin sonuçlarından gözüktüğü gibi Azerbaycan Devlet Petrol Fonu oluşumu bu yönde atılmış ve hedefine ulaşmış bir adımdır. Bjornland ve d. (2019) tarafından Norviç için yapılan bir araştırma sonucunda petrol gelirlerinin yatırımı için oluşturulan Norviç Devlet Emeklilik Fonunun Norviç ekonomisinin başarısında önemli bir pay sahibi olduğunu çıkarımına varılmıştır.

Fakat araşıtmamızdan çıkan sonuçlar ekonomi için tehlikenin henüz var olduğunu da ortaya çıkarıyor. Şöyle ki, Azerbaycan ekonomisinde gerek devlet harcamalarının büyük kısmının devlet petrol fonundan aktarmalardan oluştuğunu, gerekse de, fondan

aktarmaların petrol dışı ticari sektörün sürdürülebilirliğinde büyük pay sahipi olduğunu göz önüne alırsak, petrol sektörünün ekonomide ne kadar önemli bir yerde durduğunu, ekonominin petrol sektöründen aktarılan gelirden kaynaklanan sübvansiyonlardan büyük ölçüde asılı olduğunu görmekteyiz. Dolayısıyla, Azerbaycan ekonomisinin petrol gelirleri olmadan sürdürülebilir bir ekonomi olmadığı kanaatına varmaktayız.

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