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*Bachelor Thesis*

# THE SENSITIVITY ANALYSIS OF THE CHANGE IN OIL PRICE ON NORWEGIAN GOVERNMENT BUDGET IN YEARS 2005-2015

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I hereby declare on my honors that I wrote this bachelor's thesis independently, and I used no other sources and aids than those indicated.

Hanna Yarova

Prague, 15.05.2017

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# Abstract

This study selectively surveys, unifies and extends the literature on the volatility of prices on commodity goods, in particular oil and its effect on the government budget of Norway in the period from 2005 until 2015. It employs an analytic framework that examines the sensitivity of the economical channels that connect the government budget of Norway to the offshore economy. Data was gathered from the reports provided by the Ministry of Finance, Statistics Norway and Norges Bank. Findings suggest that oil price is an important factor affecting the government revenues and expenditures and that from the assesses channels only the channel of Government Pension Fund Global in Norway is the least sensitive to fluctuation in the oil prices.

**Keywords:** oil prices, government budget, petroleum taxes, Norway, Government Pension Fund Global

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# INTRODUCTION

It is a conventional wisdom that many of oil-producing countries nowadays are trying to follow Norway's example. While most of the oil-producing countries in Latin America and Africa stumbled upon ups and downs in oil price fluctuations or Dutch disease, Norway has proved to be very prosperous. It experienced economic growth and macroeconomic stability due to highly adaptive policies that responds to changes and transparency in the management of revenues of the oil extraction.

In my opinion even today Norway's economic success remains an extremely interesting topic for discussions and research. Thanks to what policies or resources Norway's economy was able to grow so much that from a relatively poor country in 1970s according to OECD it jumped to the top list of countries with the highest living standards? Should Norwegian success only be accounted to oil? Why Norway is more successful than many other oil-producing countries and how it managed to escape the Dutch disease or so called "recourse curse" unlike most commodity-oriented economies? How does its economy cope with the gradual and abrupt changes in oil prices? What will be the country's future once its oil resources will be exhausted? Those are one of the crucial questions to consider about Norway.

The goal of this thesis is to provide a sensitivity analysis on the channels that oil prices have on the government budget of Norway. The following chapters of the thesis are focused on the literary and research review of the current state of economic analysis of the impact of oil prices on the economy of Norway. The thesis is structured in the following chapters: First chapter consists of the description of main theoretical economic concepts mentioned throughout the thesis – GDP, unemployment, inflation and exchange rate. The second chapter is focused on the theoretical overview of the oil markets and their impact on the economy. The third chapter is focused on the Norwegian economy, it's history, specialties and strengths. The fourth chapter is focused on the Norway's oil industry development and structure. The fifth chapter provides the introduction into the existing channels through which oil prices affect the government budget of Norway, after which discusses the channels that will be assessed by sensitivity in this research. This chapter also defines the variables that will be used to proxy the impact on each of the channels to the government budget and present the main findings and analysis of the research.

The discussion on the analysis of the variables in complex manner is provided in the chapter six, as well as the overall discussion of the other impacts channels. Lastly, in the final seventh chapter conclusions and critical evaluation of the key findings in line with the research questions will be introduced.

# 1 THEORETICAL ECONOMIC CONCEPTS

Before proceeding with my research about Norwegian economy and its oil market, I would like to establish the definitions of certain economic terms that will be used throughout this thesis.

## 1.1 GROSS DOMESTIC PRODUCT

Starting with the meaning of Gross Domestic Product. In OECD Glossary of Statistical Terms GDP is stated to be "an aggregate measure of production equal to the sum of the gross values added of all resident institutional units engaged in production (plus any taxes, and minus any subsidies, on products not included in the value of their outputs)". Also this source defines GDP as a sum of all final goods and services in the economy (except intermediate consumption).

Accordingly, GDP per capita is a term that measures total output of the country, it considers the gross domestic product and divides it by the number of population of this country. This indicator is helpful when there is a need to compare two or more countries during some year. GDP is also in some economic papers used as a way of measuring a country's standard of living by compared it to other countries.

There are two main types of GDP:

1) *Nominal GDP* is used for measuring the current market prices. Hence, it consists of all the changes in market prices for the year, whether it is inflation or deflation.

2) *Real GDP* on the other hand is calculated on the market price of some taken base year, which helps to measure the total output of the country's economy and to determine whether for instance the increase in the output was because of the increase in production or because of inflation and price level growth.

GDP could also be measured in 3 different ways[1]:

1) *Production approach* is defined by International Monetary Fund as "sums of the "value-added" at each stage of production, where value-added is defined as total sales less the value of intermediate inputs into the production process".

[1] http://www.imf.org/external/pubs/ft/fandd/basics/gdp.htm

2) *Income approach* is based on the total income of production of all goods and services in the economy. It is calculated by adding the Profits of households and Labor, Rental and Investment incomes.
3) *The expenditure approach* adds up the purchases of all goods and services made by final consumers. This method states that the GDP equals a sum of household consumption, investment, government spending and net export. Where the total investment is calculated on the basis of fixed, inventory and residential investment.

Also, an important term: Output gap. As defined by OECD Glossary of Statistical Terms, Output gap measures the difference between actual and potential GDP growth. Where potential output is the maximum number of goods and services an economy can produce, when it is working most efficiently. As stated by the International Monetary fund:

"Just as GDP can rise or fall, the output gap can go in two directions: positive and negative. Neither is ideal. A *positive output gap* occurs when actual output is more than full-capacity output. This happens when demand is very high and, to meet that demand, factories and workers operate far above their most efficient capacity. A *negative output gap* occurs when actual output is less than what an economy could produce at full capacity. A negative gap means that there is spare capacity, or slack, in the economy due to weak demand. An output gap suggests that an economy is running at an inefficient rate—either overworking or underworking its resources.".

## 1.2 UNEMPLOYMENT

"A man willing to work, and unable to find work, is perhaps the saddest sight that fortune's inequality exhibits under the sun." – Thomas Carlyle

To get an all-embracing definition of unemployment is rather problematic, because this term is usually defined in different ways by the economists. I would like to include here the definition of unemployment made by the OECD:

"The unemployed comprise all persons above a specified age who during the reference period were:

- Without work, that is, were not in paid employment or self-employment during the reference period;

- Currently available for work, that is, were available for paid employment or self-employment during the reference period;

- Seeking work, that is, had taken specific steps in a specified recent period to seek paid employment or self-employment." (OECD, 2001)

There are various types of unemployment, the three main types are:

1) *Frictional unemployment* which exists due to people changing jobs from one to another and is caused by the amount of time that it takes a person to search for a job, which usually depends on the skills of the employee, his level of education and his preferences. Certain percentage of frictional unemployment is inevitable and the process of finding job in this case cannot be instantaneous, because every worker has different preferences and motives, whilst every job has different requirements and the information flow is not always perfect. [2]
2) *Structural unemployment* which appears if the supply of labor is higher than the demand for the reason of wage rigidity mostly. The wage rigidity is usually cases by the minimum wage laws, efficiency wage and the monopoly power of labor unions.[3]
3) *Cyclical unemployment* which is sometimes confused with the structural unemployment. It arises when a demand for goods and services in the economy falls. Employers then accommodate this deterioration in the business cycle by laying off employees. When the demand starts to rise, the firms do not start hiring workers right away, until they are confident that the economic growth will last. [4]
4) *Seasonal unemployment* which arises due to the seasonal hiring patterns, as winter and summer holidays season can influence the fluctuations in employment rate.[5]

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[2] Mankiw N. Gregory (2000). Macroeconomics. 4th edition, Worth Publishers

[3] Mankiw N. Gregory (2000). Macroeconomics. 4th edition, Worth Publishers

[4] Linda Levine, Specialist in Labor Economics, Congressional Research Service, 2013. "The Increase in Unemployment Since 2007: Is it Cyclical or Structural?"

[5] Patrick Grady, Constantine Kapsalis, Munich Personal RePec Archive, September 2002. "The Approach to Seasonal Unemployment in the Nordic Countries: A Comparison with Canada"

## 1.3 INFLATION

According to the glossary of Eurostat statistics inflation is a rise in general price level of goods and services, it in turn lowers the value of money because with the same given amount of money a purchaser will be able to buy less number of goods and services than before. The Consumer Price Index is most often used for identifying inflation or deflation. It helps measure the fluctuations in the general level of prices of goods and services in the economy.[6] Changes in the CPI are useful for assessing the price adjustments influenced by the cost of living. Also, the GDP deflator is a metric that measures the inflation by transforming output that was measured at current prices into constant-currency in the base year. It is calculated by dividing nominal GDP by real GDP, as mentioned prior in this paper.

Also worth mentioning, is the term inflation rate which means "percentage change in the price index for a given period compared to that recorded in a previous period. It is usually calculated on a year-on-year or annual basis".[7]

There are different types of inflation, such as overall inflation or core inflation. The most common definition of core inflation is CPI minus food and energy.[8] While overall inflation includes all of the prices of products purchased.

## 1.4 EXCHANGE RATE

As most of the world's currencies face pressures to change over time it is important to introduce the term exchange rate, which measures the relationship between price of one country's currency with another. There is usually a need to specify whether what we have at hand is nominal or real exchange rate in description. Nominal exchange rate measures the relation of the price of one currency vis-à-vis with another currency, while real exchange rate states for the relation of value of country's goods to another country's goods (also could be a group of countries). It takes into

[6] http://stats.oecd.org/glossary/detail.asp?id=427

[7] http://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:Inflation

[8] Smith, J. (2004). Weighted Median Inflation: Is This Core Inflation? Journal of Money, Credit and Banking, 36(2), 253-263. Retrieved from http://www.jstor.org/stable/3839019

account the differences in price level between countries. The Real exchange rate helps measuring if some particular currency is undervalued or overvalued, which is helpful when dealing with international economics. Persistent changes in terms of trade, especially in the countries that are, for instance, oil producers there are many fiscal policies and tariffs implemented that could explain why real exchange rates differ among various countries. If the currency is overvalued in most cases, there are pressures for depreciation and if in turn it is undervalued there are pressures for the currency to be appreciated.

The IMF report by Luis Catao made in the year 2012 defines those two terms as following:

"The real exchange rate (RER) between two currencies is the product of the nominal exchange rate (the dollar cost of a euro, for example) and the ratio of prices between the two countries. The core equation is RER = eP*/P, where, in our example, e is the nominal dollar/euro exchange rate, P* is the average price of a good in the euro area, and P is the average price of the good in the United States".[9]

Eurostat's glossary also divides exchange rates into three categories that illustrate the role that authorities play in determining exchange rates. These are:

"1. **market rate**: is used to describe exchange rates set largely by market forces

2. **official rate**: is used to describe the exchange rate determined by authorities

3. for countries maintaining multiple exchange arrangements, the rates may be labelled **principle rate**, **secondary rate** and **tertiary rate**".[10]

## 1.5 ECONOMIC INDICATORS COMPARISON, CASE OF NORWAY

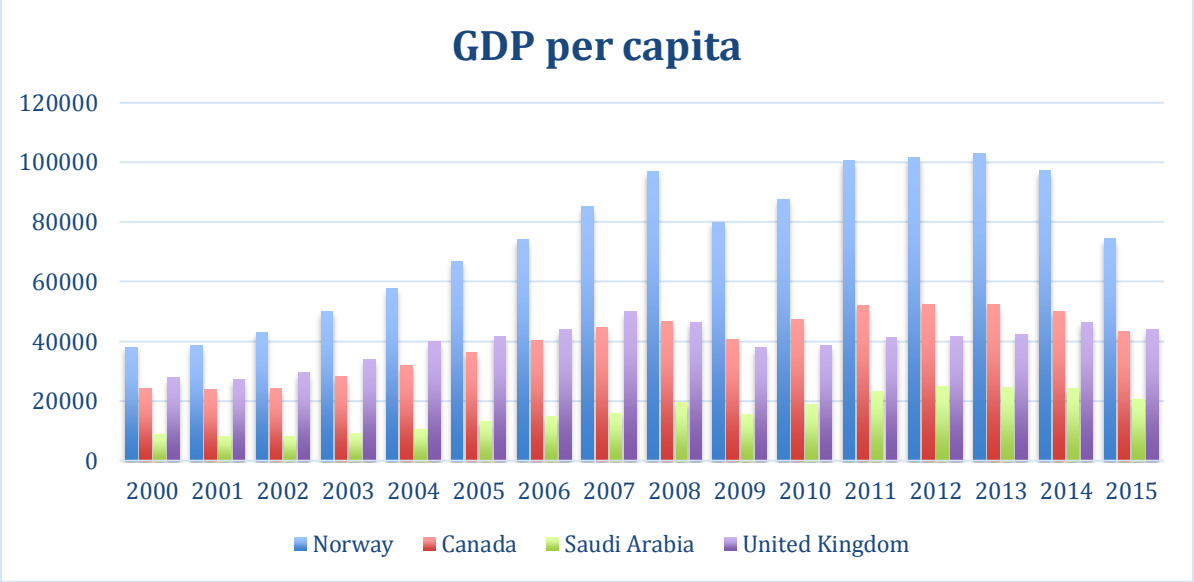
This section presents the comparisons of previously discussed economic indicators for Norway in comparison with other oil exporting countries. For notation convenience and tractability, I have chosen a range of four countries: Norway, Canada, United Kingdom and Saudi Arabia.

[9] http://www.imf.org/external/pubs/ft/fandd/basics/realex.htm

[10] http://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:Exchange_rate

The first graph illustrates GDP per capita. It could be seen that for the chosen period, Norway's GDP has been the highest of the selected countries, even though it had fallen significantly since the year 2014.

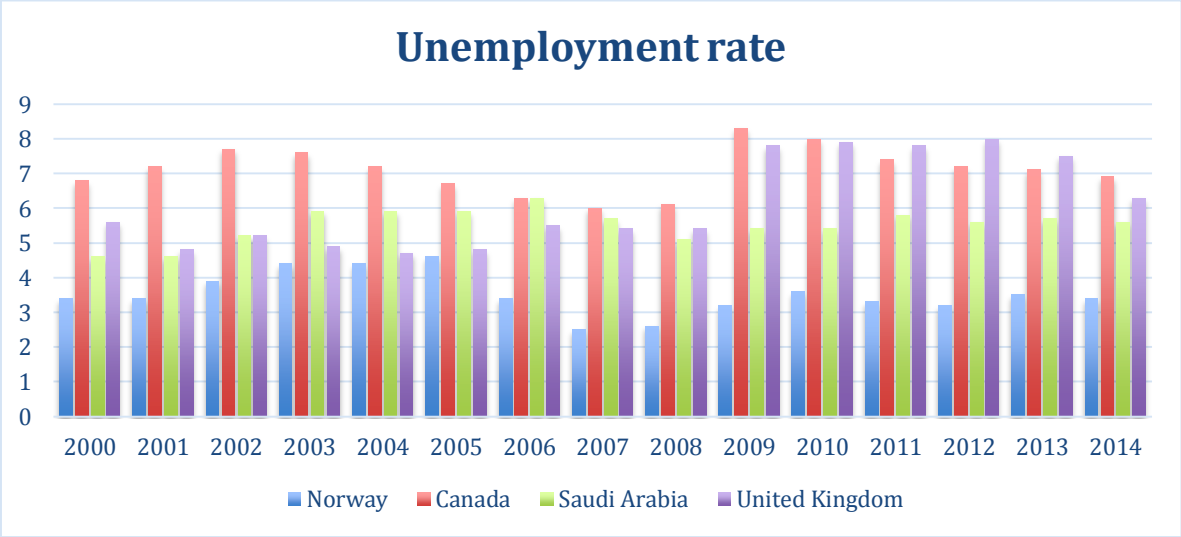
Figure 1. GDP per capita measured in current US$ in the period 2000-2015




Source: World bank

Second graph depicts the unemployment rate which during the period from 2000 until 2015 has been the lowest in Norway with comparison of selected countries.

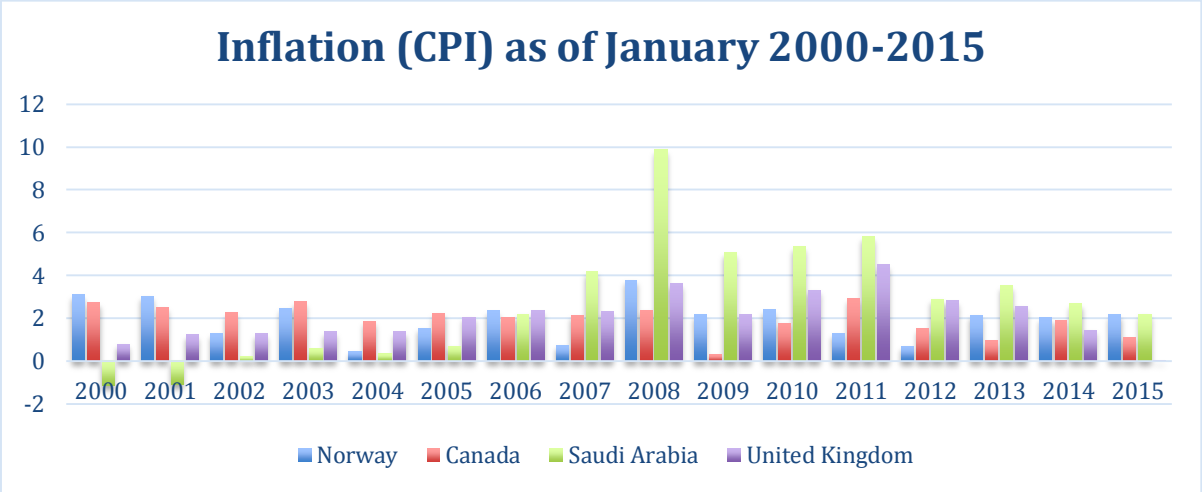
Figure 2. Unemployment rate as a percentage of total labor force in the period 2000-2015




Source: World bank

From the third graph, it can be seen that inflation measured in terms of Consumer Price Index in Norway is much more stable than in Saudi Arabia. It had risen sharply in 2008, and 2013. Since 2013 to 2015 it is merely on the same level.

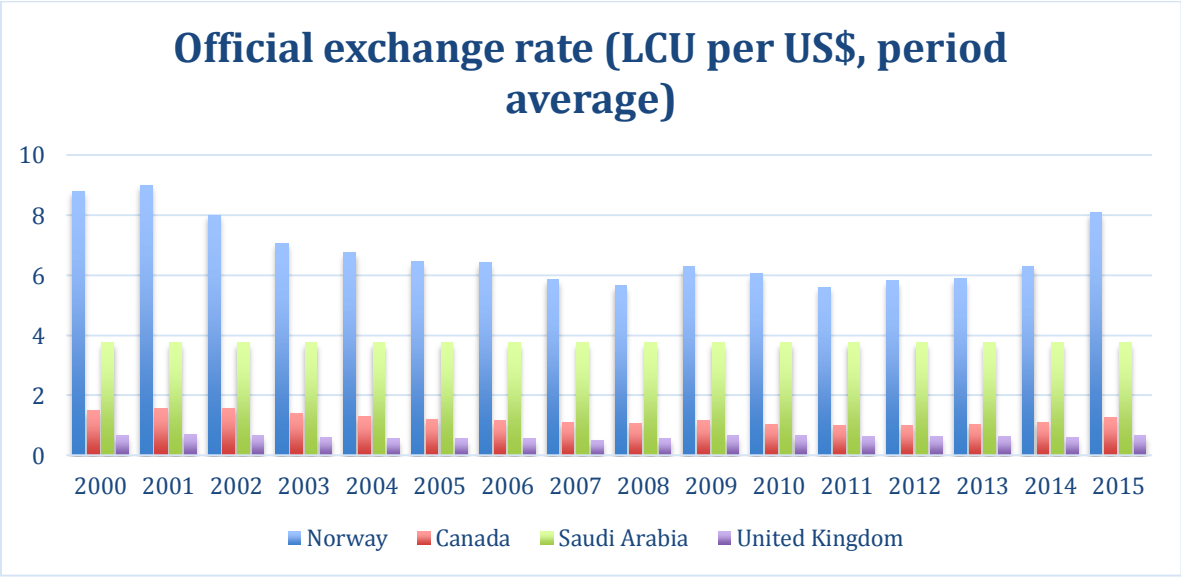
Figure 3. CPI (annual percentage) in the period 2000-2015




Source: World bank

The fourth graph shows the exchange rate of the four chosen countries measured in LCU per American dollar. This indicator has been high in Norway compared to UK for instance. Also from the year 2014 and 2015 here has been a rise in exchange rate in Norway due to the oil prices decrease (the reasons for that matter are discussed in the chapter 4.1.1.).

Figure 4. Exchange rate (LCU per US$, period average) in the period 2000-2015




Source: World bank

# 2 THEORETICAL OVERVIEW OF OIL MARKETS AND THEIR IMPACT ON THE ECONOMY

## 2.1 PROBLEM OF THE "RESOURCE CURSE"

"All in all, I wish we had discovered water". Sheik Yamani, former Oil Minister of Saudi Arabia[11]

"We are in part to blame, but this is the curse of being born with a copper spoon in our mouths". Kenneth Kaunda, former President of Zambia. [12]

Is it possible that some countries have enormous deposits of natural resources and still fail to develop economically? Nowadays the discussions of the so-called danger of 'resource curse' more and more makes it to the headlines in the newspapers and the quotes mentioned previously in this chapter very well describe the perception of the resource curse. This if can be called so fashionable theory indicates the relationship between large incomes from exports of natural resources and weak economic development of the country, which finds its roots in low development and low competitiveness of other sectors in the economy and leads to national currency appreciation, rise of inflation and unemployment.

First one to mention the term "natural; resource curse" is considered to be Gelb in 1988. Since then there were many researchers trying to analyze and explain this phenomenon.[13] One of most popular being Richard Auty in 1993. He wrote in his book that "a growing body of evidence suggests that a favorable natural resource endowment can be less beneficial to countries at low- and mid-income levels of development that the conventional wisdom might suppose".[14] Empirical evidence for the resource curse is not impervious, however more and more studies tend to confirm that countries rich on natural resources tend to grow slower than those without those resources. Illustrations which suggest that are Nigeria, Zambia, Sierra Leone, Angola, Saudi Arabia and Venezuela have abundant amount of natural resources although the growth

[11] University of California Press, Karl, T.L. 1997. The Paradox of Plenty: Oil Booms and Petro-States

[12] Cornell University Press, D. Michael Shafer 1994. Winners and Losers: How Sectors Shape the Developmental Prospects of States.

[13] World bank 2005. "From Curse to Blessing".

[14] Auty, Richard M. 1993. Sustaining Development in Mineral Economics: The Resource Curse Thesis. London:Routledge

level of those countries seems very slow in comparison with the Asian tigers: Korea, Taiwan, Hong Kong and Singapore that have relatively scant resources.

For instance, a very good case regarding the resource curse is made in the paper written by Jeffrey Sachs and Andrew Warner in 1999,[15] where they have explored a case of seven Latin American countries and through a regression model with cross-country data proved that a specific positive relationship exists between the natural resource booms and decrease in the growth rates of GDP in those countries. Empirically they have discovered that resource booms seem to result in an economic downturn rather than an increase. In their further work in 2001 Sacks and Warner had also indicated that countries rich with natural resources tended to be" high-price economies" and as a result they had a tendency to overlook the advancement from exports.

Moreover, an interesting fact is that some researches confirm that the dependency of the primary commodity resources increases the risk of conflicts and wars in the country. Mostly it is due to the fact that primary commodities dependence often comes with the poor laws and governance and vulnerability to various economic shocks.[16]

It is hard to question the theory of the resource curse also because there are already some developed and applied sets of rules and recommendations for governments of different countries to avoid it. A big international project was created, which is currently used worldwide. The Extractive Industries Transparency Initiative (EITI) is a global standard implemented in fifty-one countries to promote clear and accountable management of oil, gas and mineral resources. Norway was also recognized as a compliant EITI country in March 2011. There are papers available already that assess effectiveness of the EITI and its influence on economic development of countries. One of them being a paper written by Caitlin Corrigan where she examines approximately two-hundred countries and comes to a conclusion that EITI role is indeed fruitful to help some countries escape the resource curse. Although the paper also states that EITI had meager outcomes on fighting corruption and increasing the level of democracy. The author advises to repeat the analogous research in five to ten years when EITI administration will have enough time to thoroughly implicate all the planned policies.[17]

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[15] Sachs D. J. & Warner M. A., 1999. The big push, natural resource booms and growth. Journal of Development Economics 59

[16] Collier P. & Hoeffler A., 2002. «Greed and Grievance in Civil War». Washington, DC: World Bank

[17] Corrigan C.C. June 2014, Breaking the resource curse: Transparency in the natural resource sector and the extractive industries transparency initiative. Volume 40, Pages 17-30

## 2.2 OIL MARKET

Already for a long-time oil exports (crude oil and refined products) are a leading commodity in the world trade and almost every country in the world is in a way affected by the volatility of oil prices.[18] At least fifty countries are producing large amounts of oil and two-thirds of these productions are exported. Most oil-producing countries would be those which are situated in the Middle East, post-Soviet Union region and Africa. Other regions are considered more often as importers of oil goods.[19] It is a widely accepted hypothesis by most economists that was stated in brief by Adelman in The Energy Journal: "The world oil market, like the world ocean, is one great pool". Professor Adelman was a prominent MIT economist, who had made important contributions in areas that concern industrial organization and energy economics. His most famous work is "World petroleum markets".[20] In this book, he proposed a hypothesis that prior to 1962 (when the movements of nationalizations in various countries reshaped the oil industry) the world market was dominated by multinational corporations. Which he proved to be true: eighty-nine percent of the world's oil products was accounted to those companies. [21] Nowadays we can see that this has changed and mostly companies in the major exporting countries are owned by the state. Today those multinational companies account for twelve percent of world's oil production.[22] Also, worth mentioning is Adelman's theory of virtually inexhaustible oil supplies. He stated that the assumption of scarce resources and their inevitable depletion does not take into account constantly improving technology in the oil and gas industries. There are plentiful examples from history of the invention of new drilling techniques such as hydraulic fracturing and horizontal drilling. Every year technology advances and becomes more cost-efficient which proves Peak Oil theory inefficient according to Dr. Adelman. As he liked to say: Oil is not "inexhaustible", but it is extraordinarily abundant. Even though there have been written multiple opposing papers on Adelman's research, as for instance Robert Weiner's work that supports the theory of regionalization of the world oil market, Adelman's views are to be included nonetheless.

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[18] Smith, James L. 2009. "World Oil: market or mayhem?" The Journal of Economic Perspectives, Volume 23, Number 3, Summer 2009, pp. 145-164(20).

[19] Bentzen, Jan. 2007. "Does OPEC Influence Crude oil Prices? Testing for Co-movements and Causality Between regional Crude Oil Prices." Applied Economics, 39(10-12): 1375-88.

[20] Dr. Morris Adelman and Peak oil Theory. David Blackmon – http://www.forbes.com/sites/davidblackmon/2014/06/10/dr-morris-adelman-and-peak-oil-theory/#3f2773356549

[21] Adelman, M.A. 1972. The World Petroleum Market. Baltimore: Johns Hopkins University Press.

[22] Petroleum Intelligence Weekly, 2008

# 3 NORWEGIAN ECONOMY

## 3.1 GENERAL OVERVIEW OF THE ECONOMIC HISTORY OF NORWAY IN THE 19TH - 20TH CENTURY

Before gaining independence, Norwegian economy was predicated upon industries, which were practically farming, fishing, hunting and forestry. There were also merchants who traded goods both locally and internationally. Any changes in the economy prior to independence were most certainly accredited to agricultural output, amounts of caught fish and wars.[23]

In 1814 after a firm union with Denmark that has lasted more than four centuries Norway was forced to accept the Swedish king in a royal union. The newly formed state lacked institutions and domestic capital. Thus, in 1816 The Central Bank of Norway was established as well as the national currency was created. Norway's economy enhanced rapidly after 1840s onwards. Thanks to huge amounts of natural resources such as oil and gas, a country's geographical position gave it solid growth opportunities and by the late 19th century Norway became a wealthy European state with its GDP value being even well ahead of Sweden. Moreover, Norwegian merchant fleet became third largest in the world after British and American. In 1884 Norwegians impeached the entire government, afterwards creating a parliamentary democracy in Norway. [24]

This section provides more information on Norway's economic history after the year 1905. For the reason that, as previously mentioned, before 1905 the country was not independent and participated in unions with its more powerful neighbors at the time – Denmark and Sweden. In the beginning of the 20th century Norsk Hydro was founded, which gave a push for the manufacturing industry development. In the beginning of the 20th century the country has faced recession periods which were met by strong and mostly pro-cyclical inflationary monetary policies. Although Norway was neutral during the World War I, the reason for those recessions was the country being a small open economy that is highly sensitive to the international recessions especially to recessions in the economies of its trading partners (UK and Sweden).

[23] The Economic History of Norway – https://eh.net/encyclopedia/the-economic-history-of-norway/

[24] The Economic History of Norway – https://eh.net/encyclopedia/the-economic-history-of-norway/

When in 1930s the Great Depression took over Europe – massive unemployment, bankruptcies and financial crisis were the dreadful results. Norway's GDP in 1931 fell by 8.4%. On that account, it may be said that Norway was one of the worst economic performers in the Western Europe during the time. There was a slight rise in manufacturing and exports, primary sector was still prevailing in Norway. However also during this period there was notable merchant fleet growth and exploration of a new developing niche of oil tankers.[25]

In the World War II Norway had surrendered to Germany and the control over Norwegian economy was divided between Germany and Norway's allies. After the war, there was a need for reconstructing the economy, thus in 1935 the Labour Party came to power and established a social democratic rule with centralized planned economy. In the post-war period to cope with the economy's downturn Norway joined IMF, World Bank, GATT and the Bretton Woods system. It also became a member of UN, NATO and EFTA. Although the economic policies implied by the Labour party in Norway had positive effects on the distribution of wealth in the economy, on the overall growth rate of Norway was still lower than most western nations at that time.[26]

Between 1950 and 1973 there was a great growth in Norwegian GDP and a decline of unemployment which is in many researches accounted to good economic planning. From the 1960s the first reliable data from World Bank appeared, which allowed the comparisons of GDP per capita between European countries. From this data, it can be seen that Norway's GDP was one of the highest and fastest growing at the time.

In the 1950s Geological survey in a letter to the Ministry of Foreign Affairs had stated that "The chances of finding coal, oil or Sulphur on the continental shelf off the Norwegian coast can be discounted". As we can see from further chapters of the country's history they could not be more wrong. In 1969 Phillips Petroleum, have located large oil deposits on the Norwegian continental shelf. Ekofist was discovered and in 1971 petroleum was produced by Norway for the first time. Next year the parliament voted to establish Statoil as an oil company owned by the state and

[25] The Economic History of Norway – https://eh.net/encyclopedia/the-economic-history-of-norway/

[26] Norway's Petroleum History. Norsk gass – https://www.norskoljeoggass.no/en/Facts/Petroleum-history/

Norwegian Petroleum Directorate (NDP), whose job is industry regulations. Increase in the oil production have assisted the rapid growth of Norwegian economy in the subsequent years. Nowadays Norway for almost five decades has been an oil and gas producing country, that directly and indirectly employs approximately 250 000 workers nationwide.[27]

## 3.2 CURRENT STATE OF THE NORWEGIAN ECONOMY

The world has plenty of examples of creating strong economies by exporting various natural resources – Canada, Australia and of course Norway. However, news from Norway rarely make it to the headlines in the worlds media, even more rarely astonish the world's community.

If we look at it from one view, there is not much that could attract the international news media attention in Norway. It is the Northernmost country in Europe, the word "Norway" literally means "the North way" if translated. One third of the country's territory is situated within the Arctic Circle. It is one of the least populated countries in Europe – only 5,166,493 people as of 1st January 2015, comparing to Germany, which population was the highest in the European Union at that time - 81,197,537 and Malta with the lowest indicators - 429,344. Two thirds of total area of Norway are mountains and water, which makes planes the most common type of transport and development of agriculture somewhat truly difficult. [28] More recently, in 1950 as mentioned in the previous chapter, Norway was a considerably poor country in Europe among other more prosperous ones and even I dare say might have been often called a "fishing province".

On the other hand, today Norway is recognized as one of the most prosperous and developed countries in the world and its population enjoys one of the highest living standards in the world. It can be seen from the Figure 5 that describes the OECD's better life index that in Norway in the year 2015 all of the stated indicators were higher than the OECD average, especially the indicator of subjective well-being, jobs and earning, environment, social connections and the work-life balance.

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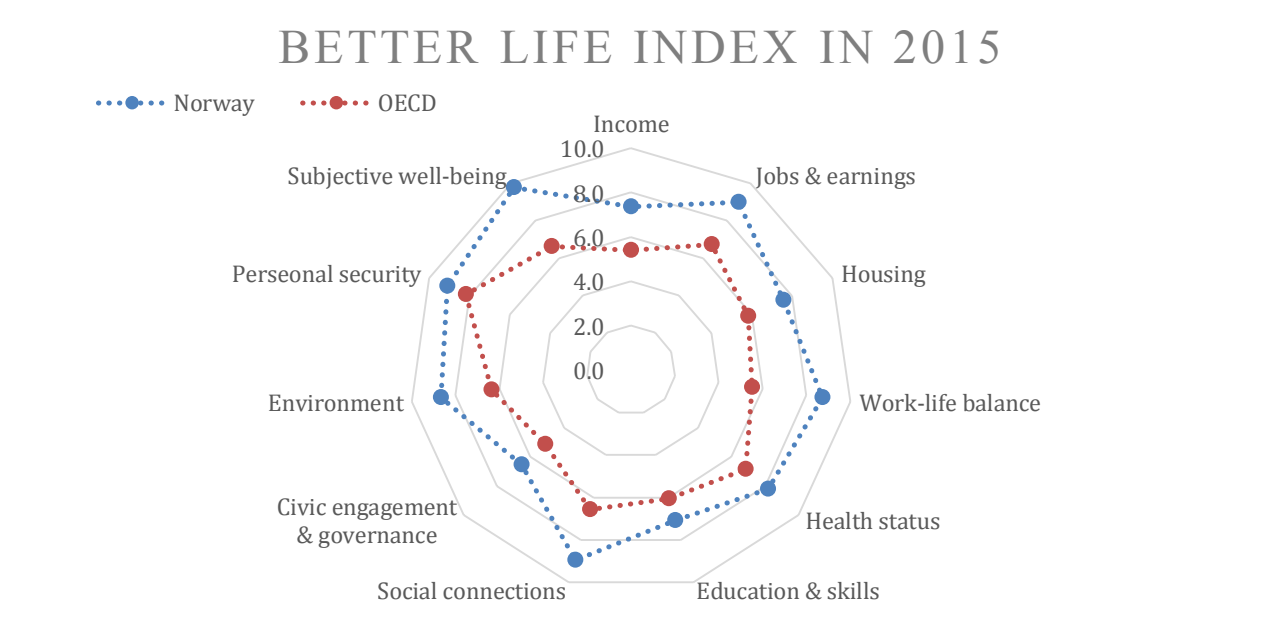
[27] A day in history: This rig gave birth to Norwegian oil industry – http://www.offshoreenergytoday.com/a-day-in-history-this-rig-gave-birth-to-norwegian-oil-industry/

[28] Norway. Gudmund Sandvik-Henrik Enander - https://www.britannica.com/place/Norway

Figure 5 Better life index in the year 2015. Indicators are normalized by re-scaling to be from 0 (worst) to 10 (best)




Source: OECD

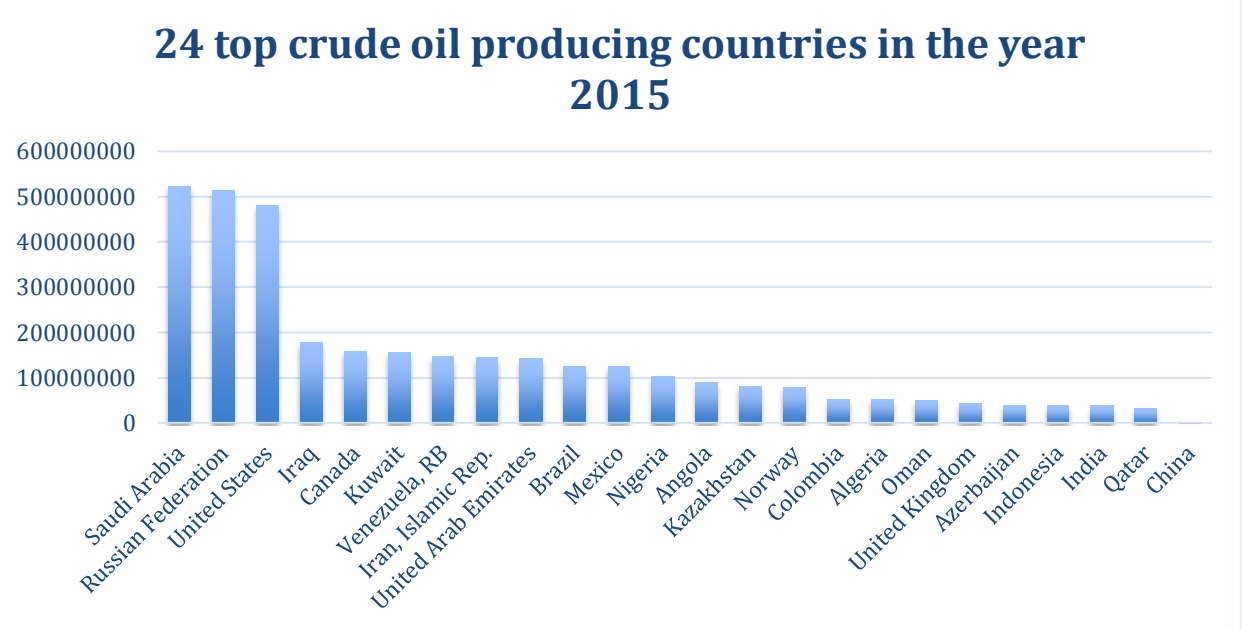
In 2015 according to the International Monetary fund, Norway's GDP per capita (PPP) was second highest in Europe after Luxembourg and sixth highest in the world.[29] Not to mention that in 2011 for instance the country was the world's fourteenth largest oil producer and seventh largest oil exporter[30].

As of the year 2015 as stated by OECD, the highest rates of oil production are in Saudi Arabia, Russian Federation and United States, while Norway is taking the 15th place.

[29] World Economic Outlook Database, October 2016, International Monetary Fund. Database updated on 4 October 2016. Accessed on 6 October 2016.

[30] Cullen, Ross, (2014), The good oil. State roles in Norwegian petroleum sector, No 165816, 2014 Conference (58th), February 4-7, 2014, Port Maquarie, Australia, Australian Agricultural and Resource Economics Society.

Figure 6. 24 Top oil producing countries measured in thousand tonnes of oil equivalent in 2015




Source: World bank

Norway was also ranked as the third largest producer in the world in gas exports[31] and a giant in industries concerning shipping. It was the one of not many countries in the world to preserve a budget surplus in difficult crisis year of 2009 (5.7%), primary due to high revenues from oil exports), only Hong Kong, UAE, Lebanon and Kuwait joined Norway on the ranks. For instance, Government budget of Switzerland, Sweden, UK and USA was 0 or less at the time. [32] Norway's economy during this crisis fell 1.8% but this was the smallest reduction taking into account comparisons with other developed countries.

Norway has a very high rate of capital accumulation (ratio of investment to the GDP) – 25-30%. For this indicator Norway, has shared first places with Japan and Finland since its post-war period. In 2001 and then continuously (except for 2 years) Norway is ranked top country by Human Development Index, which includes live expectance, income level and educations system assessment. Also, worth mentioning is that Norwegians still have not joined the European Union until. But the question remains of what factors help maintaining strengths and development of Norway's economy? I would like to mention some, which I find most crucial:

[31] Central Intelligence agency. The World Factbook https://www.cia.gov/library/publications/the-world-factbook/rankorder/2251rank.html

[32] Norway Government Budget 1995-2017 | Data | Chart | Calendar | Forecast – http://www.tradingeconomics.com/norway/government-budget

### 3.2.1 High endowment of natural resources and environmental taxation

On Norway's territory are placed largest deposits oil, gas, iron ore, copper, zinc, Nickel, uranium, silver, gold, fish, timber, hydropower – production of electricity based on water) – ranked first in the world electricity generation per capita. "We were able to start building the Norwegian society of today when we learnt to use rivers and waterfalls to produce electricity. Hydropower has provided the basis for Norwegian industry and the development of a welfare society ever since the late 18000s." – The Minister of Petroleum and Energy Tord Lien.[33]

Moreover, Norway is famous for its long history of environmentally related taxes that have been implemented in 1970s to lower the amounts of waste and toxic emissions. Starting from 1991 were introduced taxes on oil sector in Norway, which are still actual today.[34] According to Eurostat report (2003) the aim of Environmental taxes is to "internalize external environmental costs and thereby stimulate both producers and consumers towards limiting environmental pressure and towards responsible use of natural resources".[35] As reported by OECD Norway is on 19th place out of 39 countries on the scale of the highest environmentally related tax revenue. In 2014 those revenues accounted to 2,06 percent of GDP.

### 3.2.2 Sound economic policies

The main feature of the Norwegian economy is that it is a mixed economy, which combines both free market and large-scale government interventions. Every 3rd worker is placed in a state-owned enterprise. To compare with the UK, where the state sector employs every fifth person. So, for instance, in the largest oil company Statoil, the state owns nearly 67% of the shares as of the year 2009 [36], due to this it controls 60% of the oil and gas market in the country. The government also owns 44% stake in oil, gas and metals company Norsk Hydro, 90% in the licenses for development of gas in Norwegian sea belongs to state-owned companies StatoilHydro and Petoro, etc. Moreover, the state strictly controls its shares.

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[33] Norwegian Ministry of Petroleum and Energy: Facts 2015. Energy and water resources in Norway.

[34] The history of green taxes in Norway. Ministry Finance - https://www.regjeringen.no/en/topics/the-economy/taxes-and-duties/The-history-of-green-taxes-in-Norway/id418097/

[35] Eurostat (2003): Environmental Taxes in the European Union 1980 – 2001. First signs of a relative " green tax shift ". Statistics in focus, Environment and Energy, Theme 8 – 9/2003, Eurostat

[36] The Norwegian State – https://www.statoil.com/en/investors/our-dividend/the-norwegian-state.html

### 3.2.3 Redistribution of income

Well-developed industries: shipping, machinery (specialized in production of equipment for oil, gas and refining industries), electrometallurgical, electrochemical, paper, etc.). The foundation of Norway's economy still remains oil and gas industries, but the country is also one of the world leaders in the informational and communicational technologies: According to the World Economic forum in 2016 Networked Readiness Index in Norway is ranked at third place among other countries.[37] Also, Norway has an export-oriented economy. Given that Norway's domestic market is quite small its production is oriented mainly on the exports of resources and products (for instance, the country consumes only 5% of the gas produced by it). Norway exports 90% of paper produced and delivers fish in more than one-hundred-and-forty countries. Small and medium business is a significant part of the economy also. According to Eurostat number of small and medium-sized enterprises in Norway in 2012 was 99.8% of total enterprises.[38] That is not all though, there is big development in tourism, farming of salmon and trout, production of boats, sport equipment, etc.

### 3.2.4 Favorable business environment

It is a generally known fact that among all EU countries, there is a favorable business environment in Nordic countries Most of Norway's companies barely ever go bankrupt due to impact of state support and availability of credit, the world's lowest cost for licenses registration, relationships with tax are completely transparent, no extortions. Corruption in the country is at a low level - fifth place in the world in year 2015 according to Transparency international.[39] An economist at Royal Bank of Scotland – Par Magnusson has said "Because Norway is the best sovereign credit in the world, it's such a safe heaven". Norwegian government bonds show a yield of 6.197 which is high compared to German 4.747 and Swiss 2.931 yield on the similar bonds with maturities.[40]

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[37] World Economic Forum; The Global Information Technology Report 2016; Date of data collection or release: 6th July 2016; www.weforum.org/gitr

[38] Statistics on small and medium-sized enterprises – http://ec.europa.eu/eurostat/statistics-explained/index.php/Statistics_on_small_and_medium-sized_enterprises

[39] Transparency International – http://www.transparency.org/cpi2015

[40] Newsmax Finance. Norway Becomes Investor Haven on World's Lowest Default Risk – http://www.newsmax.com/Finance/StreetTalk/Norway-Investor-Haven-World/2010/11/18/id/377414/

### 3.2.5 Tourism

Someone might think what can be special about tourism in a North country located at the same latitude as Siberia and Alaska. Although thanks to the Gulf stream, the climate in Norway is way milder and if we consider the National Geographic Traveler report the Norwegian fjords appeared much higher on the list than Egyptian pyramids, Great wall of China or Grand Canyon. Add to this various ethnographic museum, famous ski resorts and the annual inflow of 5 million of tourists to the country won't astonish anyone.[41]

# 4 NORWAY'S OIL INDUSTRY

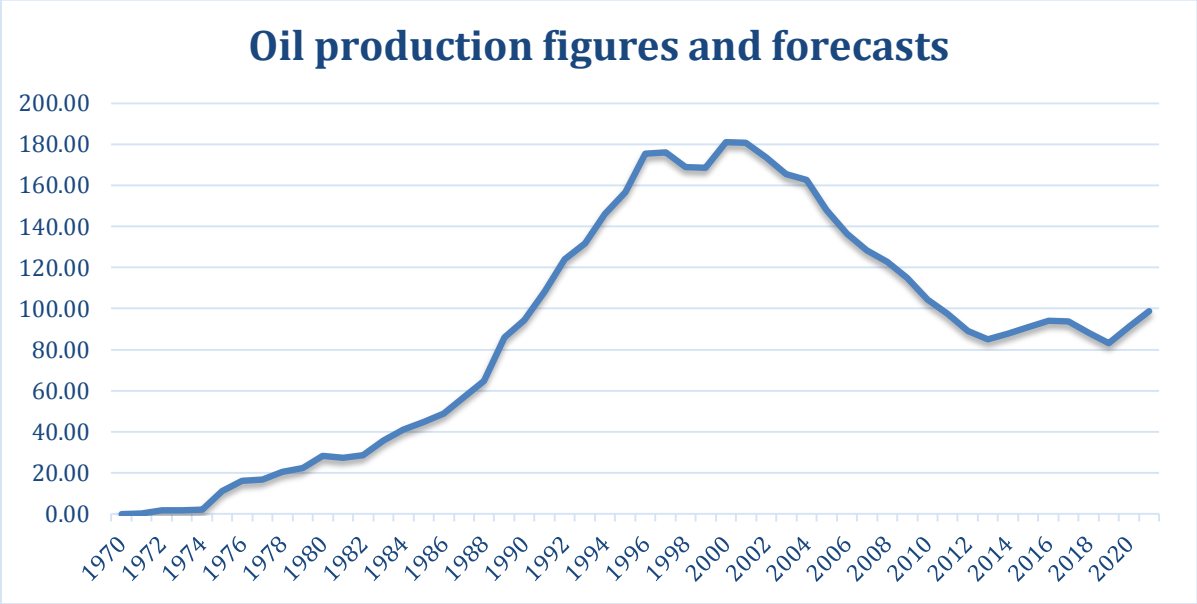
## 4.1 NOWADAYS STRUCTURE

As it was mentioned in the previous chapters, oil has been produced in Norway since the year 1971 and its production rates, employment, exploration rate, know-how level and export amounts have risen multiple times. Almost half a century ago when the licenses for oil extractions were introduced barely few people could imagine that it would become the first industry in the Norway's economy when considering the value creation, exports and state's income. Starting from the first oil production in Norway and until now it is estimated that 48% of the total resources on the continental shelf were extracted. So it can be seen that there are still some resources remaining for somewhat fifty years to come and the oil industry in Norway will continue to develop. [42] According to the Figure 7 presented below we can see the approximate prognosis on how much oil will be produced in the next couple of years and it states that from 2018 there is a sharp growth expected.

[41] Norway – International tourism, number of arrivals – http://www.tradingeconomics.com/norway/international-tourism-number-of-arrivals-wb-data.html

[42] Oil and gas production – http://www.norskpetroleum.no/en/production-and-exports/oil-and-gas-production/

Figure 7. Oil production figures and forecasts in Norway in years 1970- 2021 in million Sm³ o.e.




Source: Norwegian Petroleum Directorate

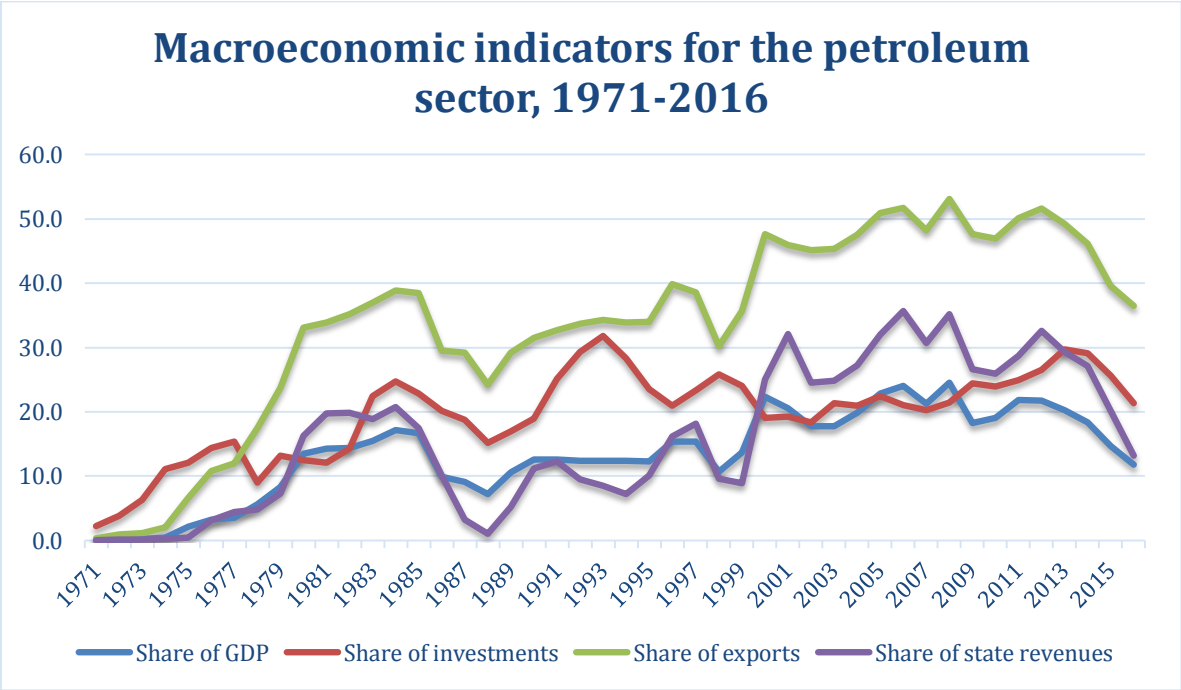
Also, from the next Figure 8, it could be seen very well how petroleum sector's share in GDP, investments, exports and state revenues have grown over time. Last year according to this graph the share of GDP made by petroleum industry was almost 12 %, the share of total exports was around 37%, share of total investment – 21% and share of state's revenue 13%. And during the selected period the peak for the share of oil industry was the highest for all four indicators during the year 2008 when it was at the peak.

Today there are more than fifty companies that take part in oil production and exploration on the Norwegian shelf. It comprises from a varied range of small and big companies, which is considerably good because it provides healthy competition and contributes to the efficiency. It has been calculated that in 2013 the largest share by the production of oil by companies was done by the biggest company extracting oil in Norway– Statoil, which has forty-two fields and platforms in Norway and employs nearly nineteen thousand people.[43] Statoil is closely followed by foreign companies such as ExxonMobil, Total, Shell, ConocoPhillips and ENI. [44]

Figure 8. Macroeconomic indicators for the petroleum sector, 1971-2016 measured in percents

[43] Statoil. Norway – https://www.statoil.com/en/where-we-are/norway.html

[44] Yngvild Tormodsgard, Ministry of the Petroleum and Energy. Facts 2014. The Norwegian Petroleum Sector. 2014




Source: Statistics Norway, Ministry of Finance (national budget 2017)

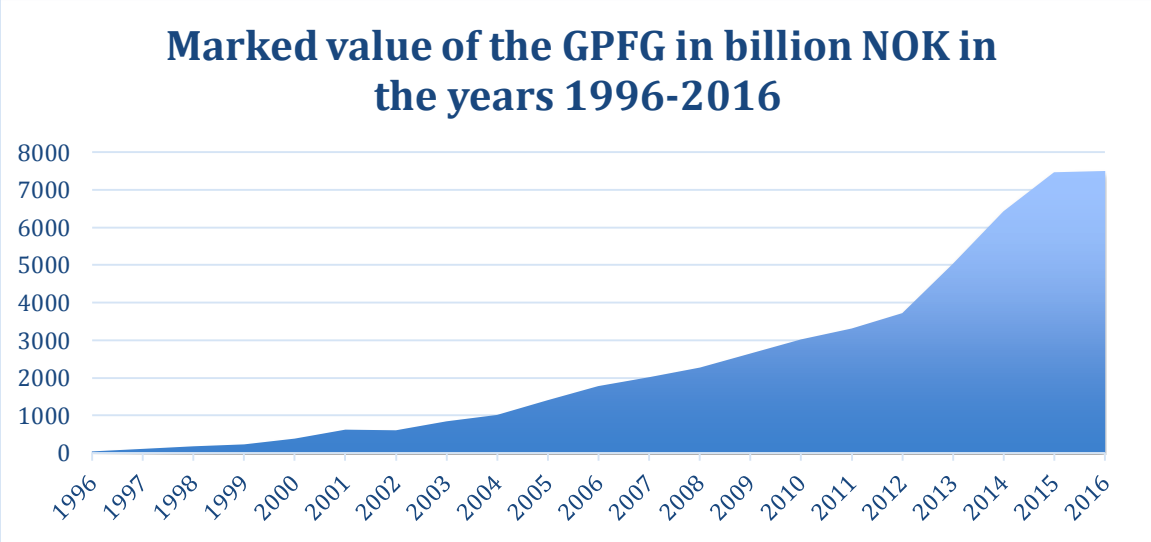
Because of the remarkable returns that Norwegian society can gain from oil production, starting from the origination of the industry and nowadays all of the principles of the management of petroleum revenues are aimed to bring value to the country as a whole as well as for the future generations (when the oil deposits will be depleted). The policies for the statutory and monetary framework are all made to aim these principles. Thus, Norwegian state secures the value from petroleum industry through various channels: taxes on extraction of oil, environmental taxes, area fees, dividends paid by Statoil to the government budget, apart from taxes and through the scheme known as State's Direct Financial Interest (SDFI). The SDFI was established in 1985 and currently is managed by the state-owned oil company Petoro. SDFI represents one third of the regular production of oil in the country. Government activities in the petroleum industry through equity are on the annual basis published and fully available for the general public to see.
"There are no payments from Petoro to the central government: income from the SDFI is a "cash-flow instrument" whose revenues are channeled directly to the fiscal budget."[45].

All of the collected gains from oil production then go to the Government Pension Fund Global (GPFG), originally called Government Petroleum Fund. This fund was

[45] International Monetary Fund. Sanjeev Gupta, M.B. . Norway: Report on Observance of Standards and Codes - Fiscal Transparency Module.

established in the year 1990 and the first money transfer to the fund was made in 1996.Today it is the largest pension fund in Europe. It is managed by the Norges bank (Norwegian Central Bank) on behalf of the Ministry of Finance. There is no one who has a direct claim for the money in the fund, part of the profits from the fund is sent to the government budget and already from there it speeds in the country's economy. The amount which is transferred is determined yearly during budget planning and is governed by a fiscal rule. In term, that fiscal rule is a plan for leveled and steady growth in spending of oil earnings, so the percentage of the revenues which is transferred to the government budget could vary according to the state of the Norwegian economy at that time. The capital from the fund is placed entirely in the foreign securities. 60 % of the money from the sovereign wealth fund are invested in equities, 35 % in fixed income and 5 % in the real estate. This benchmark was determined by the Ministry of Finance.[46] According to the Statistics Norway what we can see from the Figure 9, at the end of 2016 the value of the fund was established to be 7510 billion NOK, which comparably equals to 1.4 million per registered person in Norway. In sync with the fiscal rule, the GPFG are used to expedite the revenues from the oil industry from the mainland economy's budget during the sharp changes in oil prices.[47]

Figure 9. Marked value of the GPFG in billion NOK in the years 1996-2016



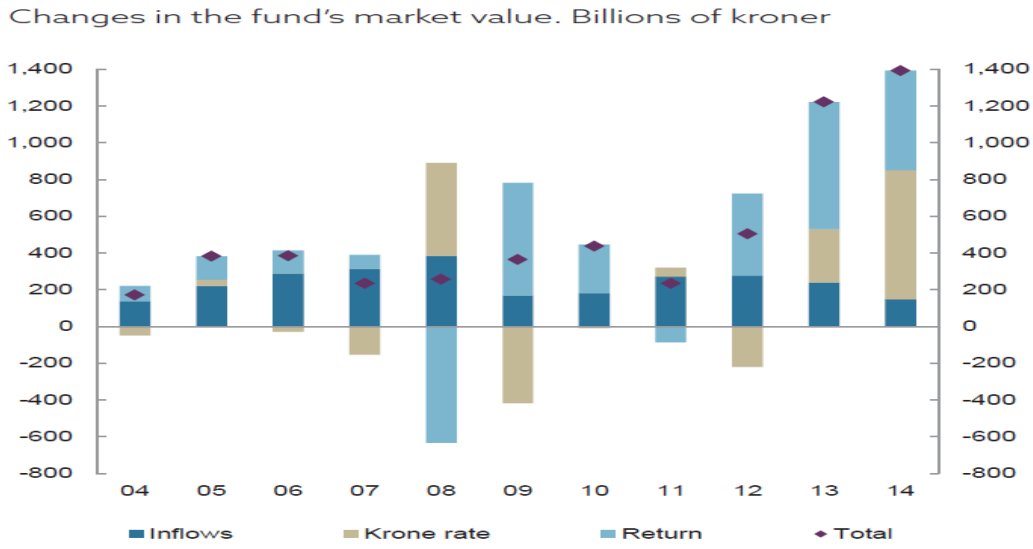

[46] Norwegian Ministry of Finance. GPFG responsible investment. Government Pension Fund Global.

[47] National Budget, 2016

Source: Statistics Norway, NBIM

From the Figure 10 we can see that the inflow of oil production revenues to the GPFG had fallen strongly in the year 2009 after a relatively stable growth in the period from 2004 – 2008. A most probable assumption would be that the inflow to the GPFG fell due to the financial crisis that happened in 2009 and also due to the significant drop in oil prices during this year to nearly 60$ per barrel (Figure 14). Then there was a steady growth of oil prices until the year 2011 which also reflected positively on the inflows to the GPFG.

Figure 10. Changes in the fund's market market value in the period 2004-2014 measured in the NOK billions




Source: Norges bank

### 4.1.1 Oil prices and the exchange rate in Norway

According to the economic theories countries that have large exports of commodities are under pressure of having various exchange rate fluctuations. For instance, when the commodities price as oil is high it causes the appreciation of the domestic currency for the oil-exporting country, while low oil prices in turn will cause depreciation. According to the empirical research in some studies there is a non-linear relationship of oil price and the exchange rate, the power of correlation is much dependent on the trend in oil prices, precisely if they are notably low or high.[48] Moreover, this relationship is highly influenced by the dependence of the Norway's

[48] Akram, Q.F. 2002 "Oil process and exchange rates: Norwegian evidence". Research Department, Norges Bank

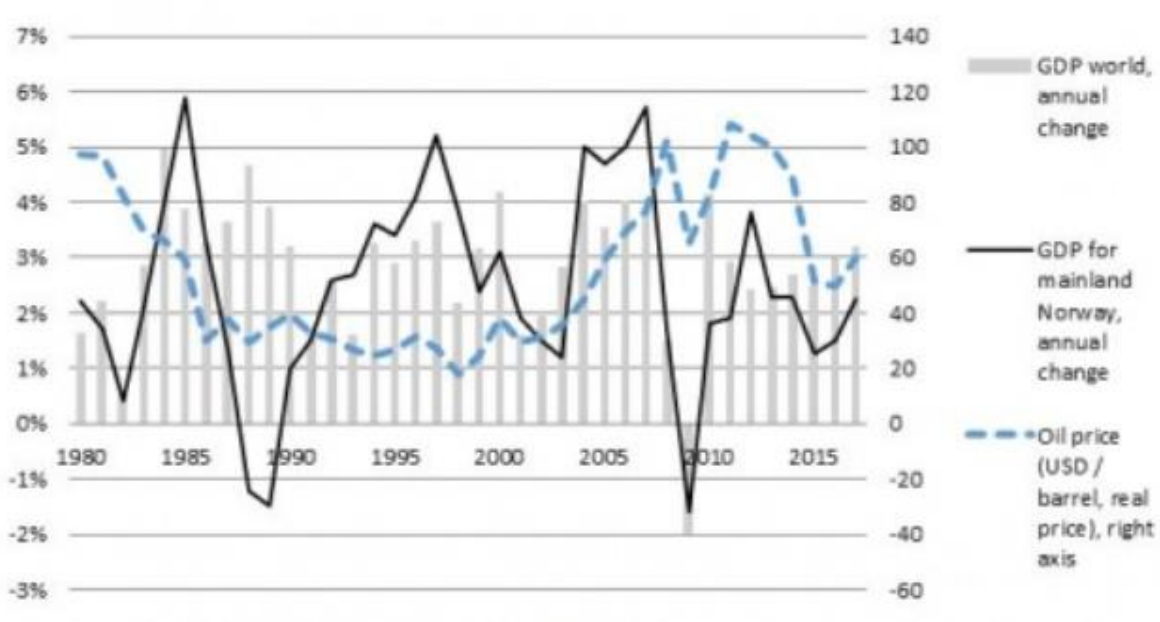
economy on the oil sector at the time. If the mainland economy is mostly independent from the offshore revenues then, the relationship between the exchange rate and the oil prices would probably be very anemic. Also, the GPFG can help stabilize the exchange rate during oil price sharp fluctuations. Norway's policies have implemented the floating exchange rate, which is very helpful during the unstable periods and oil price shocks.[49] During the year 2015 when the oil prices fell almost by half (Figure 12) the GDP for mainland Norway fell, but not as dramatically as it did in other countries with the oil-dependent economies as Russia or Venezuela.[50] Returning back to the Figure 1, the Norwegian GDP in total fell also but not as drastically, by approximately 23 percent.

It can be seen from the Figure 11, that the average annual GDP in the world or the international trends of economic development are much more influential on the Norwegian mainland GDP than the world's oil prices at the time. In the period from 1990 to 2000, when the oil prices were relatively low, Norway, as a small open economy, was following the trends of the development in the world nonetheless.

[49] Bernhardsen T. & Roisland O., Factors that influence the krone exchange rate. Economic Bulletin, Norges Bank

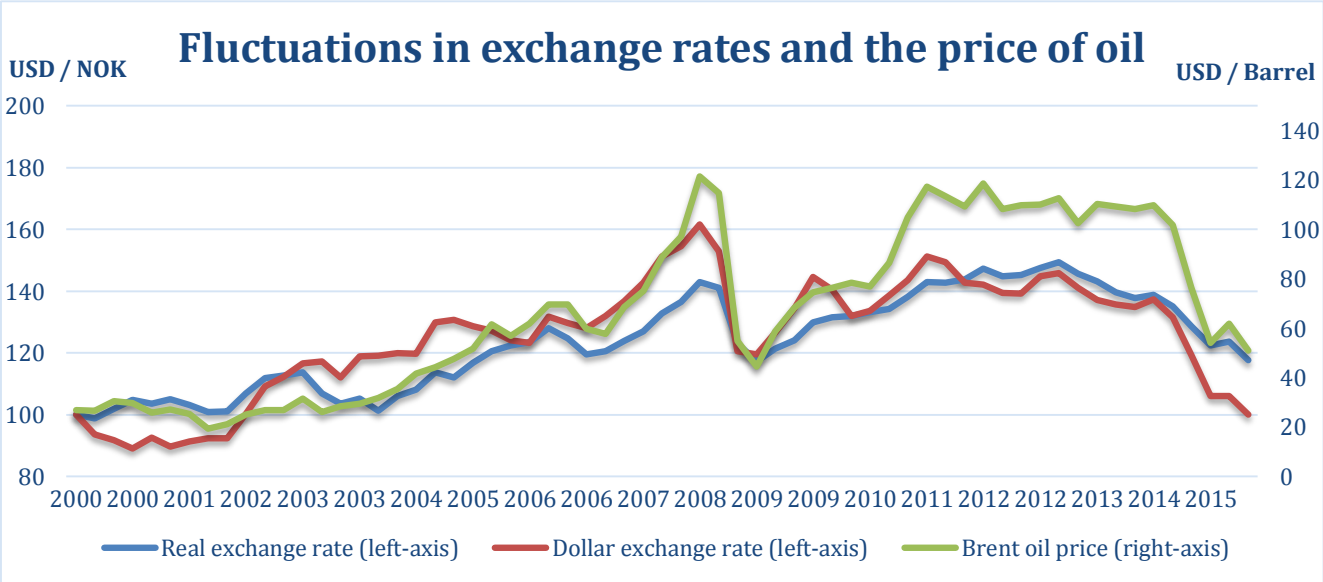
[50] Oil price: How does it affect Norway and the rest of the region - http://www.nib.int/news_publications/interviews_and_opinions/1800/oil_price_how_does_it_affect_norway_and_the_rest_of_the_region

Figure 11 GDP world, Norway's GDP for mainland (annual change measured in percents) and the oil price (USD/barrel) in the period 1980-2015




Source: IMF, EIA, SSB and SpareBank 1 SR-Bank

Figure 12 Fluctuations in the exchange rates and the price of oil measured in USD/ Barrel and USD/NOK for the period 2000 – 2015




Source: OECD, Analytical Database; Norwegian Ministry of Finance

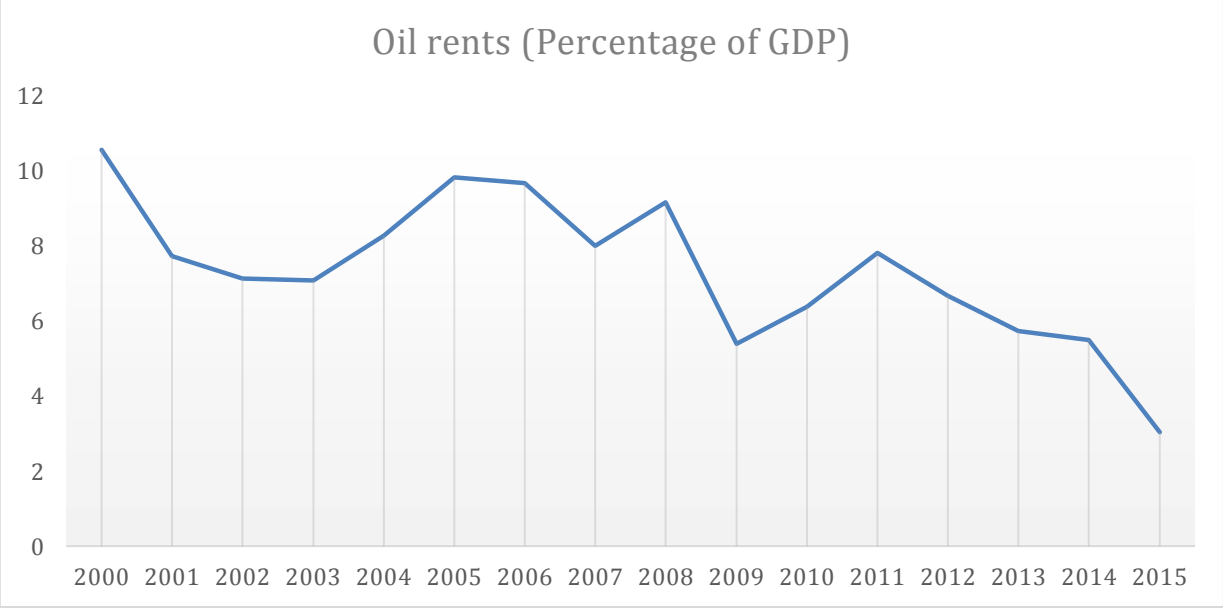
### 4.1.2 Oil prices and the oil rents

Oil rents represent the amounts of oil production in the country minus the costs of that production. This variable is useful for figuring out the relationship between the revenues from petroleum production and oil prices volatility. We can see from the Table 1 that in 2015 when prices of oil fell sharply almost by half: from 98,94 to 52,37, the oil rents in Norway also dropped by approximately 45 %. Analyzing those numbers, we can see that oil rents in Norway are highly related to the Brent crude oil prices worldwide.

Table 1 Crude oil prices and oil rents in Norway in the period 2013 - 2015

| | 2013 | 2014 | 2015 |
|---|---|---|---|
| Crude oil, Brent ($/bbl) | 108,86 | 98,94 | 52,37 |
| Oil rents (% of GDP) | 5,73 | 5,50 | 3,04 |

Figure 11. Oil rents in Norway measured as a percentage of GDP




Source: World bank

# 5 CHANNELS THROUGH WHICH OIL REVENUES AFFECT GOVERNMENT BUDGET OF NORWAY

This chapter of the thesis describes in more detail the channels through which oil prices and revenues can affect the Government budget of Norway. Some of the channels were already mentioned in the previous parts. Various papers usually take into account different approaches. With respect of Norway's oil-production in developed economy one of the Monetary Fund reports prepared by Dorsey, Ho and Shirono (2015) on the contribution of oil and gas on the economy, as well as the links between these production sectors and the GDP. In this research the Norway economy was divided in two parts: 1) Mainland economy, which comprises from the non-oil related tradable, non-tradable, government budget and oil and gas related supply and services. 2) Offshore economy, which is mainly GPFG and oil and gas production on the continental shelf.[51] The channels from abroad affected by foreign suppliers and non-oil capital were also analyzed, however because the scope of this paper is focused on the domestic relationship between oil production and real economy, the foreign channels will be excluded from further analysis.

In relation to the above mentioned theoretical division of the economy, could be defined following three major channels that are important for understanding the connections between money flows from oil industry to the mainland economy:

1) State net cash flow from the petroleum industry
2) Households channel, which mainly consists of labor taxes paid to the government budget and subsidies paid from the government budget.
3) Corporations channel

The scope and focus of this paper will be made on the government budget channel only, but other areas of oil prices volatility and influence will also be mentioned. The following chapters will define in greater detail the channel of government budget or state net cash flow from the petroleum industry, as well as identify major variables to assess the oil-production impact. Section 6.3. will evaluate impact of oil-production through each of the channels. Final chapter

[51] International Monetary Fund. Dorsey T., Ho G., Shirono K.; July 30, 2015

will discuss the overall impact and causal effect of oil prices on the Norwegian economy and the sensitivity of the each of the channels.

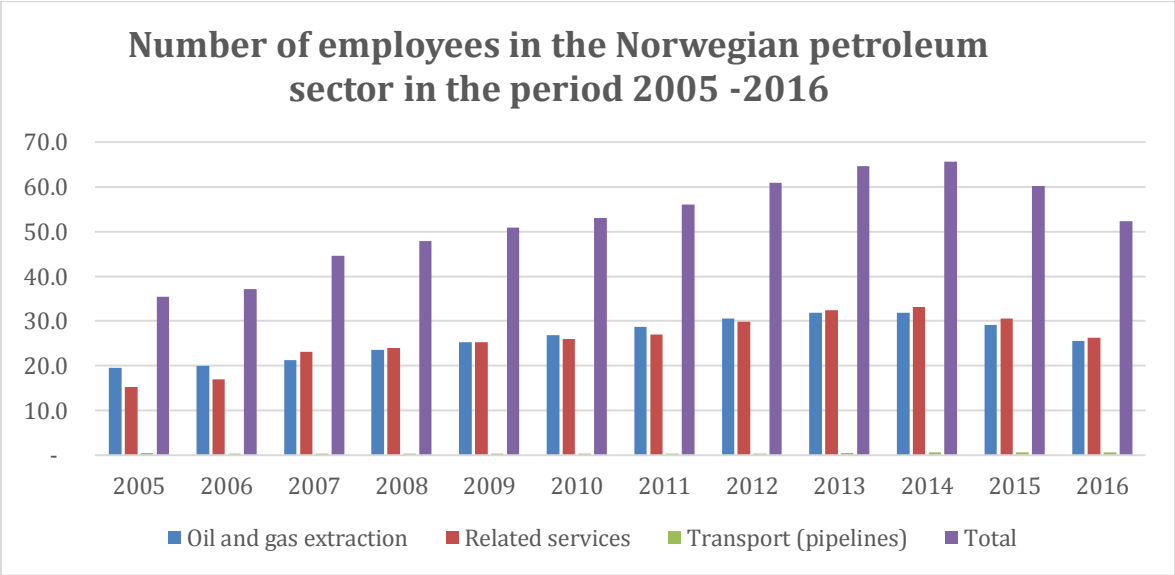
The households channel however is also crucial for the economy and it mainly comprises from labor, capital and taxes paid by workers directly and indirectly employed in the oil industry. Increase in the petroleum production in Norway has given a considerable push for the supply trade, thus a consequential growth in the total employment rates in the country has been seen. This growth is attached to the petroleum production. [52] It is quite difficult to assess the number of people employed in the oil sector, because it is problematic to separate the consignments of the goods and services related to the oil industry. Moreover, it is even more troublesome to estimate the indirect employment in other economic sectors, which is caused by the petroleum production, those could include IT industry, renting of equipment and tools, hotel business, law and accounting firms and so on.

Figure 9 presents the numbers of workers in the oil and gas extraction, related services, transport (pipelines) and the total employees in the petroleum sector. It is visible from this graph that during the years from 2005 to 2014 there has been a steady growth in the total number of employees, however the numbers fell significantly in the years 2015 and 2016. For the sake of comparison: in the year 2016 the number of directly employed workers in the oil sector was approximately 52 000. At the same time, according to the Economic survey of Economic developments in Norway in 2016 the estimated total of directly and indirectly employed in the petroleum sector was 185 300.[53]

[52] Norway's National Budget, 2016

[53] Statistics Norway. Economic Survey. Economic developments in Norway. 2017/1

Figure 13 Number of employees in the Norwegian petroleum sector in the period 2005 -2016, employed persons in thousands




Source: Statistics Norway

The corporations channel is quite similar to the household's channel. The activities in oil sector influence the supply of goods and services of the other sectors of the economy. Prestmo and others (2015) studied the topic, where they have again separated the direct deliveries and indirect deliveries. By using the input-output model they have imitated the production chains and established the indirect deliveries to the oil and gas sectors. The analysis also shows the size of the share of oil industry in the total demand. This in turn, in more detail shows the spill over-effects from the offshore to the mainland economy. The results of this research show that offshore production is channeled through relatively large portion of industries (division by the share of industries can be seen in the Table 1).[54] Therefore, confirming once again that the links from oil sector to the Norway's economy are substantial and could be affected by the increase or decrease in oil production because of the oil prices fluctuations.

[54] Prestmo, J.B., Strom, and H.K.Midsem, 2015, "Spillover Effects from the Offshore Petroleum to the Mainland Economy," Statistics Norway Report 2015/8

Table 2 Direct and Indirect deliveries to Norway's petroleum industry measured in percents

| Industry | Share of industry output (%) |
|---|---|
| Services related to oil and gas | 53,7 |
| Ship-building and engineering | 24,8 |
| Research and development | 15,6 |
| Manufacturing | 13,5 |
| Transport | 7,8 |
| Electricity | 6,9 |
| Banking and insurance | 6,9 |
| Real estate | 6,7 |
| ICT services | 6,0 |
| Retail | 5,6 |

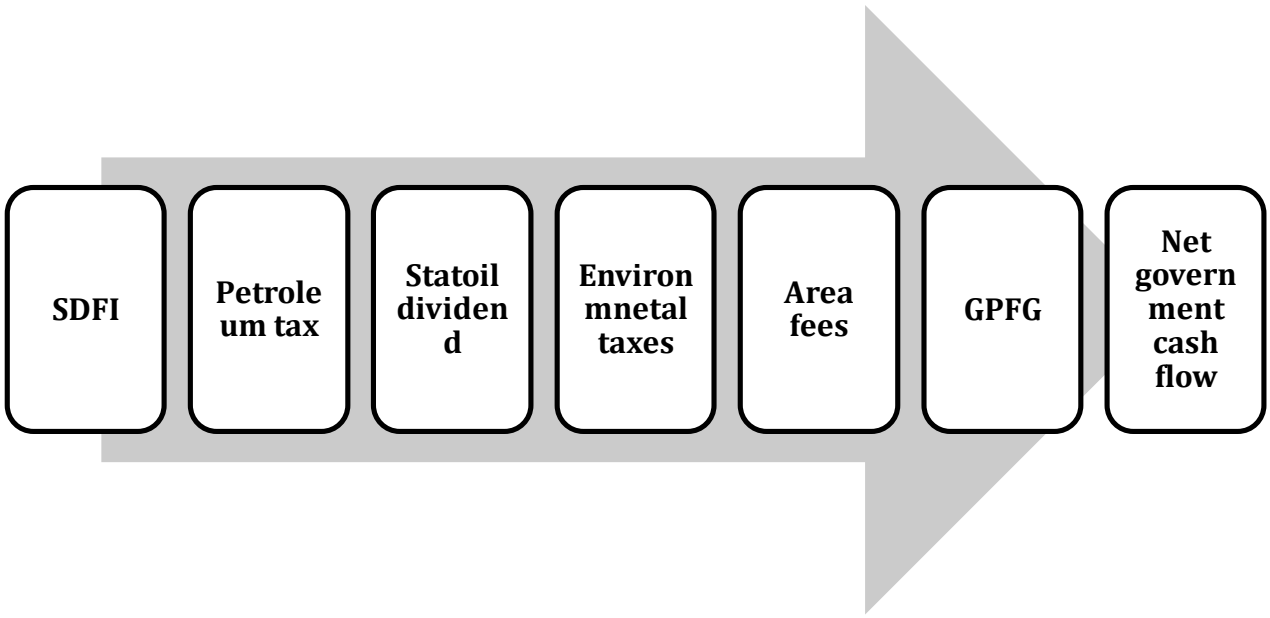
Source: Prestmo and others (2015)

## 5.1 DEFINING THE INDIVIDUAL CHANNELS OF EFFECT OF OIL PRICES ON GOVERNMENT FINANCE

In the research conducted by Aamodt for the Norges Bank in 2012 she states that the government of Norway uses the profits from the oil industry to cover the so called non-oil budget deficit, which is the difference between government's revenues (excluding oil revenues) and expenditures. In this paper she describes it as follows: „…national budget is initially set up with a deficit with oil revenues excluded, and all of the government's revenues from the petroleum sector are transferred to the GPFG. Fiscal policy is subject to a fiscal rule: Over time, the structural non-oil budget deficit shall approximately equal the expected real return on the GPFG, estimated to be 4 percent. The aim of the fiscal rule is for Norway over time not to spend the actual capital in the GPFG but only the return generated by the GPFG's investments." [55]

[55] Aamodt E., Department of Market Operations and Analysis, Norges Bank Monetary Policy. Economic commentaries. The petroleum fund mechanism and Norges Bank's foreign exchange purchases for the GPFG. 2012

Figure 14 Net government cash flow from petroleum activities




Source: Statistics Norway, Ministry of Finance

The Figure 14 shows the individual channels from which Norway's net government cash flow from oil industry or so called government revenues from petroleum production comprises. Those are:

a. Petroleum tax. All of the companies in the oil industry in Norway except Petoro (which is owned by the state) are paying taxes to the government. The size of those taxes is related to the amounts of oil produced and sold as well as oil prices on the global market. This in turn puts pressure on the exchange rate and fiscal policy in Norway because all of the taxes are paid in Norwegian crones and profits from oil companies are mostly in foreign currencies.

b. SDFI (mentioned prior in the chapter 5.1), which includes revenues from oil production by companies, whose shares are owned by the state.

c. Statoil dividend. As mentioned previously the Norwegian government owns 67% of interest in the Statoil, thus making it the largest shareholder. So almost two thirds of the revenues from Statoil's production also goes directly to the net government cash flow from petroleum activities.

d. Environmental taxes

e. Area fee, they are implemented in order to ensure that awarded acreage is explored efficiently.

f. All of the remaining profits from petroleum activities (after covering the non-oil budget deficit) are in turn transferred to the Government Pension Fund Global. The returns on the GPFG mainly determine the degree of the government revenues from petroleum.

## 5.2 DEFINING THE VARIABLES THAT WILL BE USED TO PROXY THE IMPACT ON EACH OF THE CHANNELS TO THE GOVERNMENT REVENUE

A range of nine variables will be used in the time series to study the impact of the channels mentioned in the previous chapter on the government revenue from oil prices, those would be:

1) Net cash flow from the SDFI, which represents the portfolio of government exploration rights and licenses.
2) Petroleum taxes, which shows amount of taxes paid by all the non- government-owned petroleum production companies on the Norwegian continental shelf.
3) Statoil dividend serves as a variable for the profits from oil production from the government owned interests in a company Statoil.
4) Environmental taxes and area fees speak for the quantity of money paid on green taxes (as Carbon and Nitrogen oxides taxes) and efficient exploration of the territorial reserves taxes.

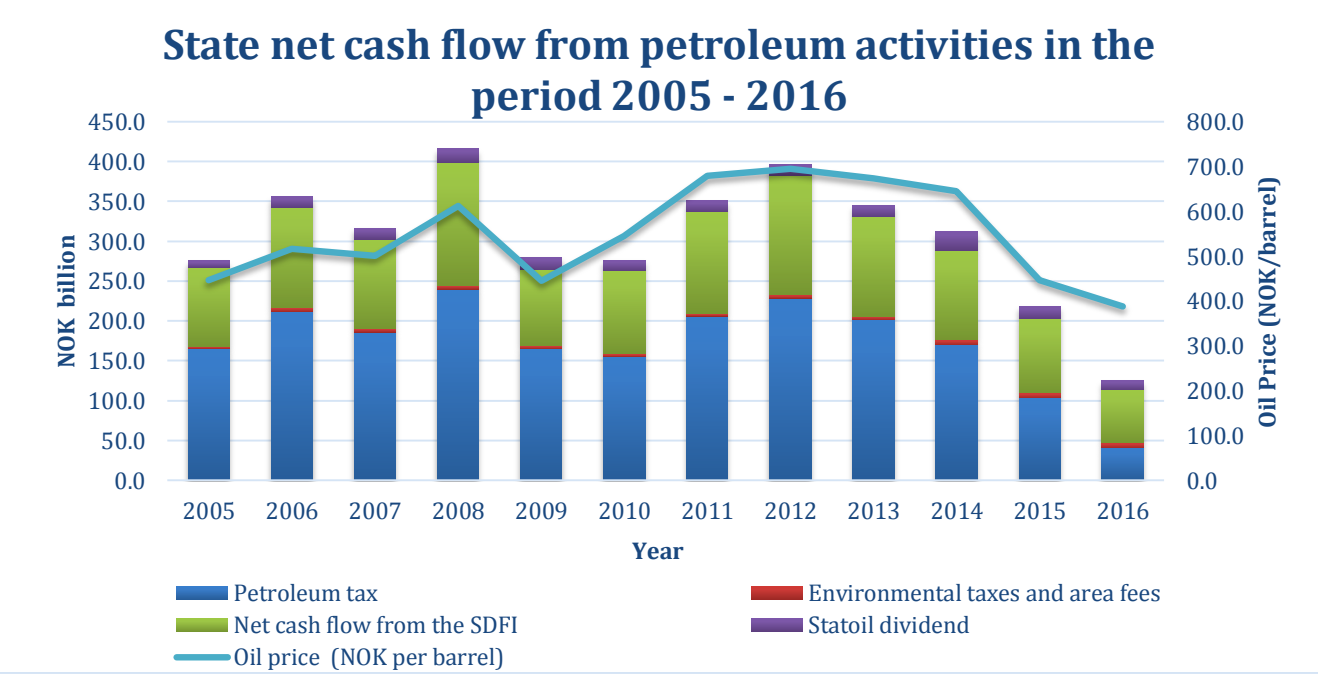
5) State net cash flow from petroleum activities, which equals to the sum of points 1 – 4
6) GPFG revenue from interest and dividends speaks for the amount of returns on interests and dividends of GPFG from the transferred amount from the government budget.
7) Annual return on the fund (in percentage), which is a total of the GPFG annual returns on the equity, fixed income and real estate investments abroad.

8) Fiscal Budget and the Pension Fund – consolidated surplus, which represents the total of Fiscal budget surplus (after subtracting all the expenditures of Norwegian economy) and the surplus in the GPFG, which basically is equal to the sum of net transfer amount to the Pension Fund, interests and dividends obtained on it during the year.
9) Oil price (NOK per barrel) shows what was the oil price in the particular year.

## 5.3 ANALYSIS OF THE VARIABLES TOGETHER WITH THE OIL PRICES

This study uses data from the report *Perspektivmeldingen 2017* that discusses the key challenges for the Norwegian economy and the continuation of the Norwegian welfare system in the long term. This report is provided on the web portal of the government of Norway[56] and is available only in Norwegian language. The data source is considered reliable and its data is from the year 2017, hence, it includes the most recent observations, which are best suited for this study.

Figure 15. State net cash flow from petroleum activities in NOK billion in the period 2005 - 2016




Source: Ministry of Finance, Statistics Norway [57]

[56] Government Norway - www.government.no

[57] 2016 are preliminary numbers from Perspektivmeldingen 2017

To calculate for the state net cash flow from petroleum activities I have made a sum of the following variables: Petroleum tax, net cash flow from the SDFI, environmental taxes and area fees and Statoil dividend. Respectively, the much more crucial analysis of data for the project would be provided by the comparison of the total for net cash flow with the consolidated surplus from Fiscal budget and the Pension Fund as provided below in Figure 16 and Table 4, where mentioned also variables such as GPFG revenue from interests, dividends and annual return on the fund; stated in percentages.

Figure 15 shows the channels A through E mentioned in section 5.1 and respectively the variables 1 through 4 mentioned in section 5.2 in the relationship with oil prices in NOK per barrel in the years from 2005 until 2016. There has clearly been a pattern of sharp spikes in petroleum tax, net cash flow from SDFI and Statoil dividend in relation with the oil price change that can be seen in Table 3.

Table 3 State net cash flow from petroleum activities in NOK billion in the period 2005 - 2016

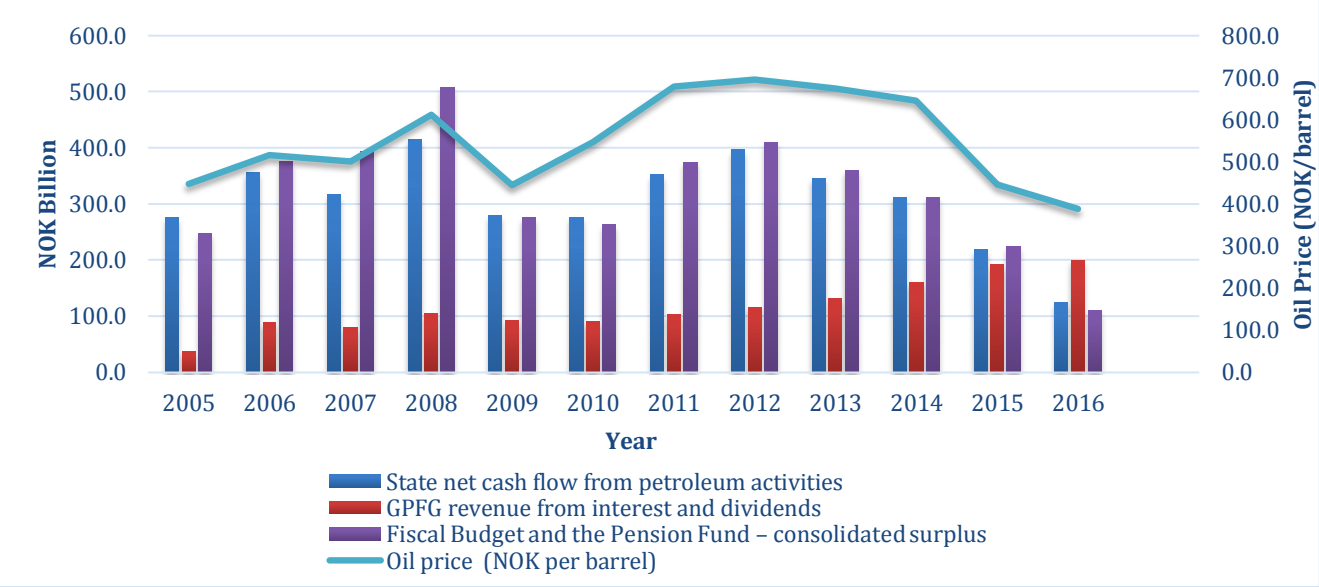
| Year | Petroleum tax | Environmental taxes and area fees | Net cash flow from the SDFI | Statoil dividend | Oil price (NOK per barrel) |
|---|---|---|---|---|---|
| 2005 | 164,9 | 3,9 | 98,6 | 8,1 | 446,7 |
| 2006 | 211,5 | 5,8 | 125,5 | 12,6 | 515,7 |
| 2007 | 186,5 | 4,6 | 111,2 | 14,0 | 500,2 |
| 2008 | 239,6 | 5,5 | 153,8 | 16,9 | 611,8 |
| 2009 | 165,2 | 3,7 | 95,3 | 15,5 | 444,5 |
| 2010 | 155,6 | 3,6 | 104,1 | 12,8 | 545,5 |
| 2011 | 205,9 | 3,7 | 127,8 | 13,4 | 678,5 |
| 2012 | 228,7 | 4,0 | 148,9 | 13,9 | 694,7 |
| 2013 | 201,5 | 4,9 | 124,3 | 14,4 | 674,1 |
| 2014 | 170,1 | 6,1 | 112,9 | 22,7 | 644,8 |
| 2015 | 103,7 | 6,5 | 92,7 | 15,4 | 446,0 |
| 2016 | 41,1 | 6,5 | 66,5 | 10,7 | 387,8 |

Source: Ministry of Finance, Statistics Norway

From this analysis of variables that combine the total of state net cash flow from petroleum activities we can see that there is a strong relationship between oil prices and the channels of

petroleum tax as well as net cash flow from the SDFI. In the period from 2005 to 2016 those two channels respond sensitively to the oil price decline. There is a weaker link between the environmental taxes and Statoil dividend. For instance, this could be seen from the year 2010, when the price of oil has risen to 545,5 NOK billion compared to the 444,5 NOK billion in the year 2009, the revenues from environmental tax and Statoil government dividend had dropped. Or in 2013 when the price of oil had fallen, the revenues from those two channels had actually increased. Also, we can see that in the recent years 2014-2016 environmental taxes were on the highest level in spite of the decline in values for other variables. One potential explanation for that could be related to the introduction of new environmental taxes for the petroleum industry, which are not in any way related to the profits from the oil sold but are related to the amounts of pollution and emissions. Overall over a long-time horizon the results from the Figure 15 and Table 3 suggest that all of the mentioned channels in the model are sensitive to the oil prices.

Figure 16 Government channel variables




Source: Ministry of Finance, Statistics Norway and Norges Bank

Commenting on the second approach in Figure 16 and Table 4 we can clearly see that GPFG interests and dividends as well as the variable – annual return on fund are not sensitive to oil prices. To the contrary, since the years 2009-2016 there can be seen a steady growth in this variable from 91,3 to 200,1 NOK billion. Regarding the Fiscal budget and Pension Fund consolidated surplus, it could be said that it is more dependent on the state net cash flow from petroleum activities.

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Table 4 Analysis of the government channel variables together with the oil prices in the period 2005-2016 in NOK billion

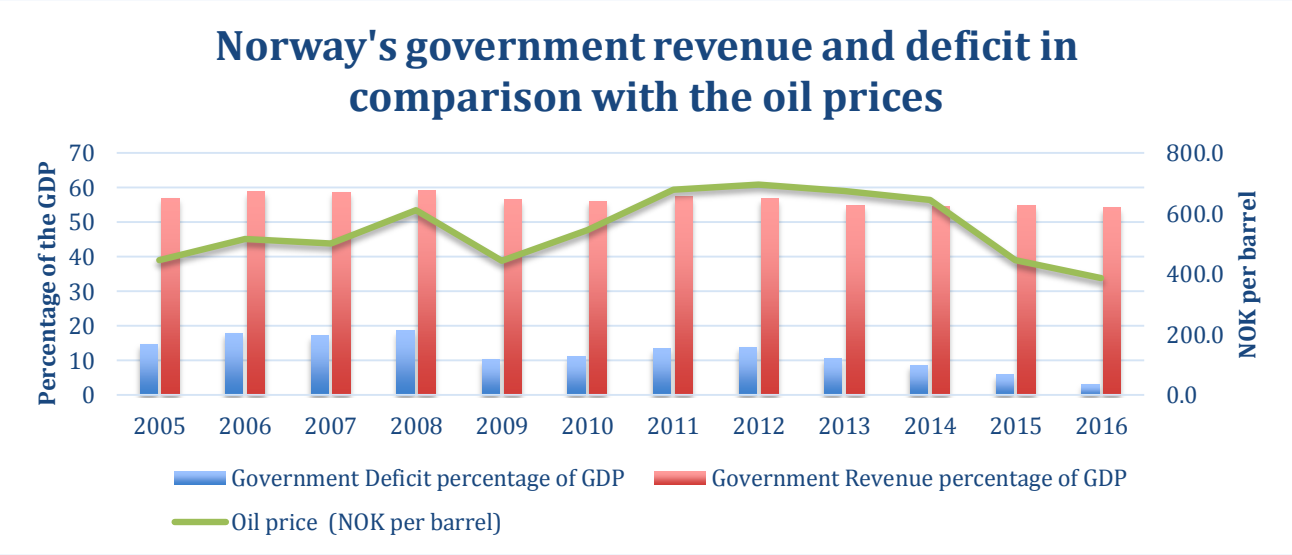
| Year | State net cash flow from petroleum activities | GPFG revenue from interest and dividends | Annual return on the fund (in percentage) | Fiscal Budget and the Pension Fund – consolidated surplus | Oil price (NOK per barrel) |
|---|---|---|---|---|---|
| 2005 | 275,5 | 36,9 | 11,09 | 247,6 | 446,7 |
| 2006 | 355,4 | 87,7 | 7,92 | 375,5 | 515,7 |
| 2007 | 316,3 | 78,7 | 4,26 | 393,5 | 500,2 |
| 2008 | 415,8 | 104,2 | -23,31 | 507,2 | 611,8 |
| 2009 | 279,7 | 91,3 | 25,62 | 274,5 | 444,5 |
| 2010 | 276,1 | 90,5 | 9,62 | 262,4 | 545,5 |
| 2011 | 350,8 | 103,0 | -2,54 | 374,4 | 678,5 |
| 2012 | 395,5 | 115,3 | 13,42 | 409,9 | 694,7 |
| 2013 | 345,1 | 131,1 | 15,95 | 359,8 | 674,1 |
| 2014 | 311,8 | 160,1 | 7,58 | 311,7 | 644,8 |
| 2015 | 218,3 | 192,0 | 2,74 | 225,0 | 446,0 |
| 2016 | 124,8 | 200,1 | 6,9 | 109,3 | 387,8 |

Source: Ministry of Finance, Statistics Norway and Norges Bank

I have also added a Figure 17 to this study to compare the impact of oil prices on the government deficit and government revenue. And while government revenue mainly remains stable from 54-

60 percent of the GDP, the government deficit parameters have changed significantly over the years and we can see that in spite of the fall in oil prices between 2014 and 2016 the budget deficit has been decreasing from 9 to 3 percent of the GDP.

Figure 17 Norway's government revenue and deficit measured as a percentage of GDP in comparison with the oil prices (NOK/barrel) in the period 2005 - 2016




Source: OECD (Assessed on 12 May 2017)

# 6 DISCUSSION

**Net state cash flow**

From the three main channels to government side of the economy, the analysis indicated that state net cash flow and government budget are relatively largely affected by the volatility in oil prices. During 2014 and 2016 both follow the fall in oil prices.

Considering the state net cash flow variable, the petroleum tax was identified as the most influential factor. Petroleum tax is applied to revenues of the oil-producing companies, hence the amount of oil sold by the company and oil prices play the biggest role in this channel. The fall in the profitability of the sector and low taxes directly relates to the low profits.

Net cash flow from SDFI and Statoil divided are less affected by the volatility of oil prices. They have stayed on the similar levels during the years 2014 - 2016, and are mainly influenced by the long-term trends in the industry and global economic conditions.

The only variable that has increased since the fall of oil prices in 2014 is the channel of environmental taxes, mainly because the so called green tax is applied not to the revenue of the oil-producing companies, but on the amount of pollution generated.

**Fiscal budget and Pension fund**

The variable of the consolidated surplus from the Fiscal budget and Pension Fund has proven to be highly sensitive to the oil price volatility. In the years 2014 - 2015 when the oil prices fell approximately by 200 NOK per barrel the Fiscal budget and Pension fund reserves has dropped by nearly 90 NOK billion. The similar pattern could be seen in the year 2009 when the price of oil has decreased.

**GPFG**

As we can see from the analysis the least sensitive channel to the fluctuation in oil prices according to the models in the period 2005-2015 appears to be the Government Pension Fund Global. Indeed, the main goal of the fund is to redistribute the savings that are used to finance the pension expenses and promote rational long-term spending of the revenues coming from oil extraction activities. As all the capital from the fund is invested solely in the foreign assets it helps balance out the risks of shocks in the economy. There was a slight drop in the revenues of the GPFG in the years 2007 - 2009, which was most probably due to the global financial crisis of the years 2007-2008.

In spite of the significant fall of oil prices in 2014 – 2016 this variable has developed independently and has been growing rapidly over the years 2010 – 2016.

Although as was mentioned prior in the study, there are two more important channels that exist between the offshore revenues and government budget and I would like to also comment on the sensitivity of those channels.

First one would be the households' channel, which is mainly influenced by employment in the oil sector as well as employment in the industries that are highly dependent on the offshore production. In 2016 as stated in report by the Royal Ministry of Finance (11 May 2015) the decrease in demand from the oil sector has slowed down the growth and enlarged the amounts of unemployed people in the country. To mediate that the government has suggested the new policies directed on decreasing the unemployment. Those would be – tax reductions for individuals., which will make it more attractive to work. Changes in the government's tax receipts and cyclical government expenditures such as unemployment benefits influence the budget deficit as well as the transfers to the GPFG in the long-term. Considering this we can see that the channel itself may be sensitive. When it comes to reducing taxes while oil prices are low it can lead to decrease in the government revenue and thus increase in the fiscal deficit.

Second channel would be the corporations' channel, which is influenced by the taxation from the companies that are dependent on the demand from the oil sector. According to the report of International Monetary Fund (2016) after the year 2000 during the oil boom increase in oil prices has given a push for the extension of the oil dependent industries at the expense of the other industries in the mainland. The bottom line is that the same effect applies in the case of drop in oil prices as in the years 2014 till 2016, the companies that are dependent on the oil sector demand will suffer more thus proving the sensitivity of this channel as well. Same as in the previous mentioned channel in 2016 Norway's government has proposed tax reduction for corporations too in order to boost investments. The goal of this is to strengthen the mainland economy from being susceptible to oil prices.

# CONCLUSIONS

As discussed previously in the theoretical part, Norway has one of the richest economies in Europe and very high standards of living as a result of natural resources abundance and effective economic policies. Nevertheless, after the substantial decline in oil prices in the years 2014 and 2015 it has showed that Norway's economy; as any small-open economy; is exposed to the external shocks, thus, bringing up the important concern that the mainland economy has to develop and grow to become less dependent on the offshore revenues in the future years.

In the scenario where the oil prices would continue to drop it could inevitably lead to the fall in the petroleum activities, decrease in revenues for the country's economy, fall in investments and job losses. In this case, the fiscal-policy could play a crucial role. The aim of this study has been to investigate the sensitivity of the change in oil prices on the government budget of Norway; in order to do that the model of nine chosen channels was established. This approach aimed to compare the dependence of those channels on state net cash flow from petroleum activities and the Government Pension Fund Global revenues on the price volatility. In addition, the impact of the two other important channels of households and corporations was mentioned.

Overall, the findings suggest that the decline in the oil prices influences the sensitive channels of government net cash flow in Norway in the period from 2005 until 2016. Net state cash flow from petroleum activities and fiscal budget are highly affected by the oil prices volatility. The least sensitive channel appears to be the Government Pension Fund Global. The GPFG has proven to be one of the most independent channels when it comes to the sensitivity of the oil prices, it successfully shields the fiscal budget from the changes in the prices of oil. And although this channel is in turn dependent on the transfers from the state net cash flow from petroleum activities they do not have an immediate impact on the revenues from the fund, because after the non-oil fiscal budget is covered, the fund invests its money solely in the assets abroad. As was proposed by the fiscal policy in 2001 aimed to preserve the revenues from the oil drilling in Norway for future generations and to keep the amount of capital sent from the fund to the government budget below 4 percent. Given now the depreciation of the NOK that began in the years 2014 the spending of the revenues from the petroleum activities are on the low level and there is no threat that the oil production reserves will be reduced. The hypothesis of high sensitivity of government budget was partial refuted. Even though the oil prices have an immediate impact on the Norwegian economy, the strategy and deployment of the GFPG serves

as a stabilizer and redistributes the income from oil-production continually. However, it is crucial to add, that although the government finance has been shielded by the GFPG, the households and private corporations sector are not, hence the impact on the economy as the whole remains considerable.

# List of figures



# List of tables

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