DUTCH DISEASE
An Empirical Analysis of Norway's success and Venezuela's stagnation

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Abstract

The purpose of this paper is to provide insight into the Norwegian and Venezuelan oil sector and investigate the effects that natural resource can have regarding Dutch Disease. The current situation in Venezuela is grim, and one can't help but contemplate about where it all went wrong. Both Venezuela and Norway have some of the world's largest oil reserves, however Norway has managed to utilize the oil reserves much better than Venezuela. Ever since the 1960s Norway has experienced a steady increase in their GDP whereas Venezuela's development has been highly volatile and has not increased sufficiently despite their access to oil. The reasoning for this can be traced and related to the effects of Dutch Disease. Initially, when starting the research behind this thesis, we were expecting to find that Venezuela would be highly affected by Dutch Disease, whereas Norway has managed to avoid it. By looking at the problem and comparing the two situations through a theoretical point of view, as well as an empirical point of view by conducting OLS regression and using the Durbin-Watson model, we found just that, that Norway had avoided the Dutch Disease and Venezuela was heavily affected by it. The reasons for the results can be difficult to compare, as the two countries are so different in their development and the management of the resources available to them. However, due to their similar situation with natural resource supplies, it was interesting to dig deeper and explore if there were any other similarities regarding the "resource curse", which in this case was the Dutch Disease.

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Glossary

PPF: Production Possibilities Frontier
GE: Government Expenditure
RER: Real Exchange Rate
W_{OIL}: Wage in the Domestic Oil Industry
$IDPC_{MANUF}$: International Difference in Production Costs
DD_{AG}: Dutch Disease dependent variable Agricultural Sector
DD_{MANUF}: Dutch Disease dependent variable Manufacturing Sector
IPC: Income per Capita
RGDP: Real Gross Domestic Product
MS: Money Supply
VZ: Venezuela
NOR: Norway
DW: Durbin- Watson test for autocorrelation
NOKK: Norwegian Kroner (Norway's currency)
Bs.: Bolivares (Venezuela's currency)
FONDEN: Fondo Nacional para el Desarrollo Nacional, National Development Fund.
PDVSA: Petróleos de Venezuela, Venezuela's Oil company.
E&P: Exploration and Production
1L: 1 liter
TRD: Taxes, royalties, and dividends
DICOM: Divisa Complementaria. Complementary floating foreign exchange rate, i.e.: the rate for private-sector operations.
DIPRO: Tipo de Cambio Protegido, Protected currency exchange rate, i.e.: the prevailing rate for imports of essentials goods and the raw materials for their production.
NBIM – Norges Bank Investment Management
NCS – Norwegian Continental shelf

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Chapter 1

1. Introduction

1.1 Motivation

It is a well-known fact that Norway is a sovereign welfare state, where their wealth is largely based on their oil production. Over time they have gone from being an average country to becoming one of the richest countries in the world; very much thanks to their calculated and transparent way of distributing their oil revenues. However, several countries have access to vast oil reserves, Venezuela being one of them. Venezuela, on the contrary has not experienced the same level of growth and prosperity that the oil fund has brought to Norway. As recent developments in Venezuela have shown, there is a lot of anger and frustration aimed towards the government for numerous reasons. Taking this into account, we wanted to see how Norway managed to avoid Dutch Disease whilst Venezuela is still stuck on it, and see if there are any possible ways it could be avoided. We wanted to gain insight and analyse the different paths and initiatives taken by the two countries with regards to their oil funds and more specifically the effect that it has had on the topic. As we have roots in Norway and Venezuela it is a theme that we both were curious to know more about, and to see if our thoughts of the countries are correct, if Norway has managed to avoid Dutch Disease completely and if Venezuela is as affected as we believe they are.

There have been many analyses made on Norway, given the successful nature of its oil funded economy, but the information on Venezuela is scarce and lacking due to the very non-transparent nature of the country's government. This is the main reason why we believe that this will be an interesting comparative analysis, and adventure into understanding the fundamentals behind a well-functioning oil backed economy.

1.2 Problem Statement

When it comes to the natural resources, both countries rely heavily on them, as oil is a large resource in both countries. Venezuela found oil already in the 1920s and was the largest oil exporter in the world for many years. So, when the first oil exploration started in Norway in 1971, the two were having the same starting point and the GDP per capita at this point were almost identical, despite Venezuela having access to vast oil resources for almost 50 years. Yet, from there the two countries could not have followed more different paths. In 1972, the parliament of Norway created the oil directive and subsequently created the 10 oil commandments to ensure Norwegian control on the Norwegian Continental Shelf. These commandments are still used to this day and have been highly influential and directly shaped Norway's oil policy over the years. In the late 1990's Norway then created The Government Pension Fund to make sure the revenues from the oil would be invested over a long-term perspective, with the purpose of supporting present and future generations. On the contrary, we find Venezuela, where 95 per cent of their export revenue is from the oil, as they have not managed to create the same wealth from their resources as Norway. The revenue from the oil has been used to pay government debts and generally not strengthened the economy sufficiently. Due to the lack of transparency in the country, there is no way of knowing for sure where the oil revenue has gone over the years.

Based on that, we will in this thesis analyze how Venezuela's economy is based solely on oil and compare it to Norway's situation by developing an econometric model that shows that Venezuela is still stuck on the Dutch Disease while Norway has been able to diversify its economy and therefore not being solely dependent on its oil sector.

Upon completion of the comparison, the background, reasons and implications will be described and explored in order to gain a better understanding of Dutch Disease in general and, more importantly, the effect of Dutch Disease in both countries.
Consequently, the context presented above leads to the central problem this master thesis will try to resolve:

"What has the different implications connected with having a large oil resource been on Norway's and Venezuela's economy?"

This problem will be supported and expanded upon through the following research questions:

- What is Dutch Disease?
- Are there patterns of Dutch Disease in any of both countries?
- If patterns can be identified, are they supported theoretically and/or empirically?
- Is there a difference in the performance of Dutch Disease between both countries?
- How Dutch Disease can be fought?

The questions will guide the development of this thesis throughout. They will set the foundation for the areas to be looked into, as well as the formulation of hypotheses.

In order to answer these questions our thesis is organized in the following four parts:

- Chapter 2 introduces the Dutch Disease Econometric Model and how it performs for Norway and Venezuela, establishing the existence or inexistence of Dutch Disease, as well as the possible policy implications to beat it.
- Chapter 3 studies the Norwegian oil economic situation, how it deals with oil revenues and expenses as well as with the oil prices and how the effect of Dutch Disease in the country was.
- Chapter 4 evaluates Venezuela's oil economic situation, how it deals with oil revenues and expenses as well as with the oil prices and how it is a current model of Dutch Disease.

- Chapter 5 will compare both countries oil situation and Dutch Disease performance.

Ideally the goal is to ultimately be able to provide reliable answers through empirical and theoretical research methods.

1.3 Methodology

This thesis answers the question of how a natural resource boom adversely affects a nation's economy by developing a theoretical framework of the intricate Dutch Disease mechanisms and how they function. We use Venezuela as the running example throughout the study, offering an insight into a classic case of Dutch Disease. In addition, we develop an econometric model that accounts for the several effects of the Dutch Disease phenomena. Also, a series of control variables are employed so as to separate the effects of Dutch Disease from several unrelated macroeconomic events occurring concurrently in the economy. Then, data from another oil-exporting country, Norway, are employed to demonstrate the applicability of the model into a country that effectively managed the Dutch Disease. Finally, our thesis outlines a series of policy implications which Venezuela that primarily rely on one resource for export earnings should consider in comparison to Norway.

From a philosophical point of view, this thesis will take a realistic approach, which entails looking at the phenomenon at hand from an objective viewpoint. Ultimately, the goal is to be able to analyze the subject matter from a perspective where the authors do not take a stance or position with regards to the information, but merely takes the role of an unbiased observer.

Furthermore, this study will take an iterative deductive approach. While theory testing will lie at the core of the study’s approach, the theories and their corresponding hypotheses will be subject to constant modifications. This same approach will be applied

to the rest of the thesis; data collection, empirical testing, analysis and interpretation, as well as concluding arguments, will be subject to alterations throughout the process.

The intuition behind this approach is that the question at hand is subject to multiple dimensions of possible analysis, which entails that different approaches are available to tackle the problem statement. Regardless, this empirical analysis will be highly dependent on the quality and availability of data. Therefore, the possible implications of an initially formulated theory and its hypotheses will be a constant appraisal of their relevance. Empirical data and analysis will dictate the overall evolution of this master's thesis.

Moreover, this thesis will focus on a descriptive and explanatory level of knowledge. Parting from the approach lined out above, this study will be initiated by formulating a general problem statement which, in turn, will be lead into the formulation of single hypotheses. These will be tested through interpretation & analysis of empirical data. The purpose of our study is to demonstrate the existence of Dutch Disease in Venezuela and previous existence in Norway by developing the model of Neary and Van Wijnbergen (1986) with some inclusions in the theory from Corden and Neary (1982) where non oil variables are taken into account. For that we will exclude two variables- the mechanism of resource-movement effect and the international in production costs ratio- that although in theory appears as necessary in practice they do not have any relevance in the diagnosis of Dutch Disease.

The last stage of this thesis will be concluding arguments based on the results of all analyses and interpretations and, parting from them.

1.4 Data Collection

Data collection will be performed with two perspectives in mind. On one hand the focus will lie on gathering all relevant quantitative data. More specifically, this entails gathering all relevant data to develop an ordinary least squares (OLS) regression using

time-series data from 1970-2016 for Norway and 1973-2013 for Venezuela. On the other hand, quantitative data needs to be supplemented by qualitative data in the form of literature. Qualitative data is vital for hypothesis formulation and testing, as well as in order to apply a coherent and accurate analysis on the quantitative data. Both primary and secondary sources will be used.

The nature of the data to be collected, in particular the quantitative part, can only be approached through databases compiling information straight from the source. Quantitative data will mainly be gathered through financial databases. The authors of this study have access to several main sources which will be used throughout to gather all relevant information. IMF Tables, OECD Tables, The World Bank Tables and other international data sources. The dependent variables are expressed as percentages; the data for government expenditures are expressed in local currency units as are the data for the money supply. Per capita income and real GDP are expressed in constant dollars. The real exchange rate variables are expressed as direct quotes, ie. the price of the foreign currency in terms of the domestic currency.

Two ordinary least squares (OLS) regression methods are employed, one for Venezuela and the other for Norway.

In terms of qualitative data, literature in the form of academic articles, research and books will be used. Basing our econometric model from the study of Neary and Van Wijnbergen (1986) in "Natural resources and the macroeconomy: a theoretical Framework" which was founded from the pillars of Corden and Neary (1982) in "Booming Sector and De-Industrialisation in a Small Open Economy" and also explaining the theory from both.

It is vital to evaluate the quality of data in order to accomplish a reliable academic study. Failing to maintain a set of reliable data entails including unnecessary biases in the study, as well as being subject to faulty analyses and interpretations. Therefore, all

sources of information to be used throughout this thesis will be subject to analysis of the "value" of the source, i.e. an examination of the originator of the sources, the reasons behind the creation/recreation of the sources, tendency and the situation of origin of the source. The goal of this examination is to utilize sources of undoubted quality, and thereby assuring that all information used paint a trustworthy picture of real empirical developments.

Chapter 2

2. The Econometric Model

In this chapter we develop the Dutch Disease Econometric Model based on the study of Neary and Van Wijnbergen of 1986 and show how it performs for Norway and Venezuela evaluating the existence of Dutch Disease in any of both countries.

In order to test the Dutch Disease in these countries we have used different dependable variables for both countries, as well as the so-called "Dutch Disease" variables. For Norway as dependable variable we have used the manufacturing sector, due to the fact that before Norway exploited oil, its main source of revenue was the trading good sector, while for Venezuela it was the agricultural sector. When it comes to the "Dutch Disease" variables government expenditure is used for Norway and real exchange rate for Venezuela. Finally other control variables are used like the money supply and real GDP for Norway and money supply and gross national income per capita for Venezuela[1].

We will analyse how these variables behave within both economies to find out if there is Dutch Disease and if there exists, the possible policy implications to beat it.

2.1 Theoretical Framework

Dutch Disease refers to the adverse effects of a natural resource boom on the manufacturing or agriculture sector. Massive increases in revenue from the booming sector result in a temporary appreciation of the real exchange rate. The immediate impact of this is to reduce worldwide demand for other exports of this country. In addition, assuming that the country does not devalue the nominal exchange rate to

[1] For further reasoning on the use of the different variables please see section 2.2.2. Dutch Disease Variables.

maintain the old level, the booming energy sector causes domestic inflation greater than the world inflation rate; consequently, profits for exporters will decline as wages and other input prices rise more quickly than the world price of exports. Since their profits fall, producers of exports will produce less and incomes and employment will decrease (Ezeala-Harrison, Structural Re-Adjustment in Nigeria: Diagnosis ofa Severe Dutch, 1993).

This explained differently means that the boom and subsequent surge in resource exports cause an appreciation of the real exchange rate (through the appreciation of the nominal exchange rate and/or a rise in the domestic price level) which decreases the competitiveness of the country's other, non-resource tradable goods. This tradable goods sector experiences a decrease in production since fewer international buyers are purchasing these goods due to their higher relative prices. In addition, since the boom causes the domestic price level to increase, producers of tradable goods face a higher production cost, which causes them to reduce their output. Consequently, the tradable goods sector contracts, and deindustrialization or de-agriculturalization sets in. It is relevant to establish here the fact that Dutch Disease begins in one of the following two ways:

1. The discovery of a large, easy-to-exploit source of oil can induce a rapid exploitation of the resource, triggering the onset of Dutch Disease. This is typical of many developing oil-exporting economies such as Venezuela. The mere discovery and the ensuing massive exportation of the oil cause the appreciation of the currency which leads to a contraction of the country's traditional export sector.

2. A sudden increase in the price of oil. This is what happened with developed oil-exporting economies, such as Norway, who now found it profitable to exploit their North Sea oil and natural gas reserves. Before 1973, as well as Nowadays when the price of oil has decreased, it was relatively unprofitable for these nations to pump oil, but the large price increase at that time induced Norway to begin a

massive exportation of these resources, consequently, leading to the onset of Dutch Disease symptoms at that time.

Some theoretical explanations for a resource boom can be found in Corden and Neary (1982) where they study the deindustrialization aspect of Dutch Disease.

They assume a small open economy is composed by three sectors:

1. a traded goods sector whose output is not consumed within the country (the energy sector);
2. an import-competing sector (manufacturing sector); and
3. a non-traded goods sector (services, local products, etc.).

In their study they explore what are the consequences of a resource boom upon the manufacturing sector; therefore, they treat the increase in revenue brought by the resource boom as a *transfer* of income which refers to how the inflow of revenues of the resource boom act as like a transfer of income from abroad into the domestic economy of one country. The results of their theoretical study are presented graphically on the below graph, making use of the framework later developed by Neary and Van Wijnbergen (1986).

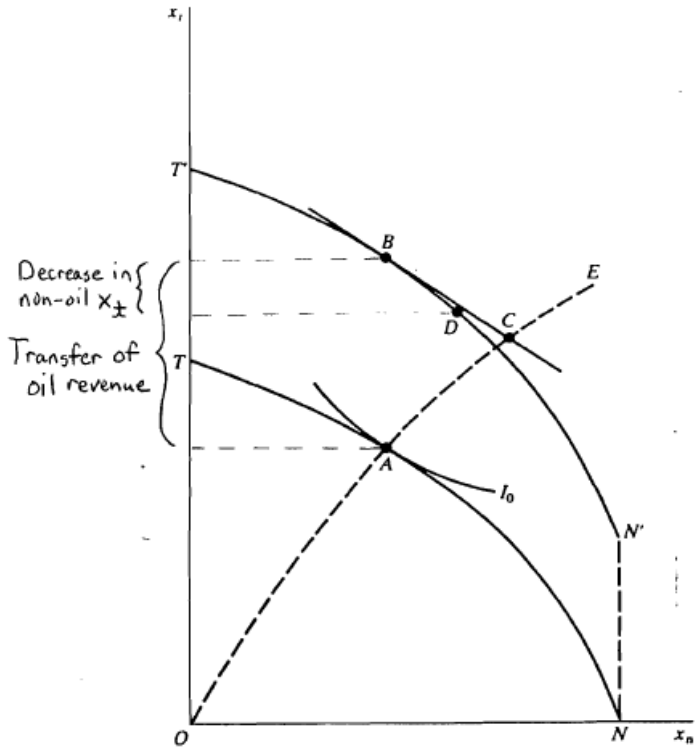

Figure 1: The spending effect of a resource boom. Neary and Van Wijnbergen (1986)

In order to present the results graphically, Neary and Van Wijnbergen combine the energy sector and the manufacturing traded goods to form a general traded goods category, X_t on the y-axis. N on the x-axis represents the non-traded goods sector.

Before the boom, equilibrium is at point A at the intersection of the highest attainable community indifference curve IO with TN, the production possibilities frontier (PPF). The slope of the line tangent to point A is the real exchange rate or relative price line. The "transfer" of income caused by the boom produces a parallel upward shift of the PPF; this is represented by the new production possibilities frontier, T'N'. Therefore, assuming initially that the slope of the relative price line remains unchanged after the boom, we move to point B (where there is no increase in N, only an increase in the traded goods by the amount of the transfer of income). With production and domestic real income determined at point B, desired consumption must lie along a price line tangential to point B. Since relative prices are unchanged, it must take place at point C, where the price line intersects the income-consumption curve (OAE).

As a result, there is an excess demand for non-tradables represented by the horizontal difference between points B and C. This drives up the relative price of non-tradables (represented by an increase in the slope of the price line) until the new equilibrium is reached at point at D (Bruno & Sachs, 1982).

Since the price of non-tradables has risen, it has become more profitable to produce these non-tradables, which consequently will lead to an outflow of labour, capital, and other factors of production from now, relatively less-profitable manufacturing sector. Manufacturers of traded goods now have less incentive to produce these goods since they are relatively less profitable to produce. So, at the new equilibrium point D, domestic welfare has risen (society is on a higher indifference curve), but at the expense of a production reallocation. The output of the non-traded good has risen, whereas that of manufacturing has fallen.

Theoretical studies on Dutch Disease suggest two essential mechanisms by which it breaks through the economy. These mechanisms are the spending effect and resource-movement effect.

2.1.1. The Spending Effect

First the economy suffers from what is called the *spending effect*. It is caused by higher domestic incomes from the windfall revenue gain; therefore, people spend more money on both traded and non-traded goods. For non-tradable goods whose price is determined in the domestic economy, an excess demand results causing these goods' prices to increase. As a result, it becomes more profitable to produce these types of goods. On the other hand, producers of tradable goods, whose prices are determined in international markets, will witness no increase profitability since an increase in demand in one small country cannot affect the prices. Consequently, the tradable goods sector will contract since it is now relatively less profitable to produce these goods.

Using the supply and demand analysis, the demand curve for non-traded goods shifts outward to the right, causing the price of those goods to increase. The higher relative prices of non-traded goods increase the relative profitability of the non-traded goods sector and resultantly, contract the traded goods sector (van Wijnbergen & Neary, 1986).

Since the increase in energy revenues usually accrues to the country's government, it is often the government that initiates the spending effect.

2.1.2. Resource-Movement Effect

Second, the other effect that helps to account for the contraction of the tradable goods sector it is the so-called *resource movement effect* which occurs if the booming sector shares domestic factors of production with the other sectors of the economy. Upon the discovery of a natural resource, those factors initially employed in this booming sector will see an immediate increase in productivity. Since factors of production are paid according to their productivity, the booming sector factors' prices will be bid up. Consequently, there is a decline in the traded goods sector whose producers would be unable to pay the higher prices for factors of production. These producers are unable to compete for the inputs, thereby preventing the manufacturers from purchasing all of the supplies needed to maintain production levels. This, in turn, draws mobile resources away from the traditional sectors to the booming sector. As a result, these producers decrease their output, contracting the traded goods sector (Nyatepe-Coo, 1994).

However, if the booming sector does not participate in the competition for factors of production, then the resource-movement effect is nonexistent. For many oil-exporting countries this might be the case (Farmadesh, 1991).

Productivity in the oil sector has influenced aggregate indicators of labour productivity used in centralized wage negotiations. Therefore, the greater productivity in the oil sector would tend to have an upward, though indirect, push on wages in the

economy, as shown in the graph below. Perhaps then, the resource-movement effect is still existent, though not in the same form as theory would suggest.

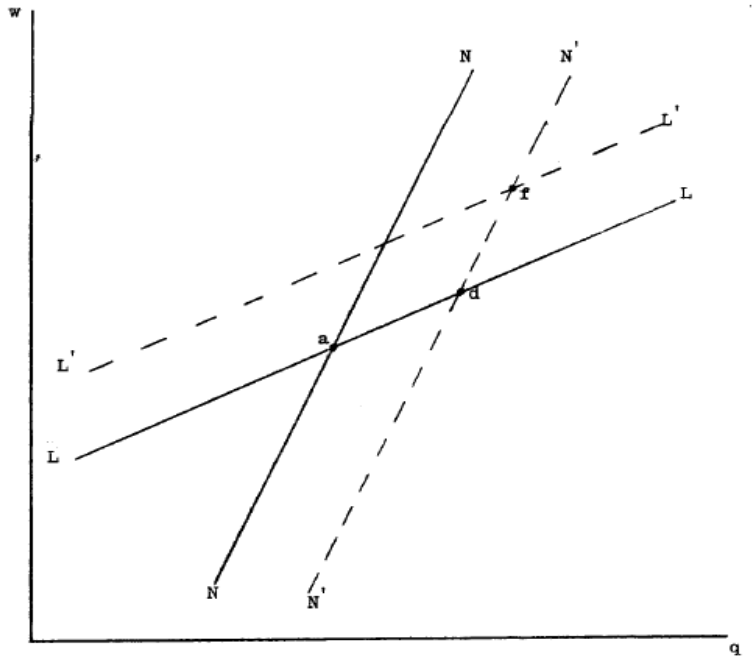

Figure 2: Spending and Resource Movement Effects of a boom. Neary and Van Wijnbergen (1986)

It is also theoretically possible that the resource-movement effect results from the government's increasing use of physical capital resources in the oil industry. Rather than wages being bid up, perhaps the price of capital would rise making it prohibitively expensive for producers of non-booming goods to compete for it. This would cause these sectors contraction. However, many researchers would point out that much of the physical capital used in the oil industry is imported from Western nations, and consequently, the oil industry does not directly compete with the other sectors of the economy for capital. Therefore, the oil sector is basically an enclave industry which means that it is isolated from the rest of the economy, not sharing any factors of production (Rudd, 1996).

In addition, if unemployed resources exist in the economy, then it is possible that the booming sector could base on these unutilized factors of production to facilitate its expansion. Rather than getting back resources from the manufacturing or agriculture

sector, the oil industry could get to work the unemployed resources. This would minimize or perhaps entirely eliminate the resource-movement effect.

2.2 Formulation of the model

An econometric model is formulated using the two components of Dutch Disease. The model includes a measure of Dutch Disease as the dependent variable and presents explanatory variables that attempt to capture the impact of the two essential theoretical elements detailed below. The decline in the manufacturing or agriculture sector is hypothesized to be a function of the spending effect and the resource-movement effect, previously explained.

Decline in Manufacturing or Agriculture =
f(Spending effect, Resource Movement effect).

For Norway the dependent variable would deal with the decline in the manufacturing sector, due to the fact that it was the main source of economy for the country before the exploitation of oil, whereas with Venezuela, the dependent variable is the contraction of the agricultural sector for the same reason. Other than this difference, the general model is equally applicable for both developed and developing economies (Rudd, 1996).

2.2.1 Dependent Variable

The dependent variable of the model shows the contraction of either the manufacturing or agricultural sector, depending upon whether the country is developed for the former or developing for the latter. It is important to model this variable using agriculture or manufacturing's percentage contribution to non-oil GDP. The reason why it must be non-oil GDP is that if even one of these sectors grew normally, its contribution to GDP would fall due to the increase in GDP figures due to the oil boom. Therefore, by subtracting oil's contribution from GDP, it is possible to isolate the manufacturing sector or agricultural sector's true decline (Nyatepe-Coo, 1994).

Since the dependent variable is the core of the model, it is called the ***Dutch Disease dependent variable*** and given the notation of **%DD$_{AG}$** for Venezuela's declining agricultural sector, or **%DD$_{MANUF}$** for Norway's manufacturing sector decline.

2.2.2. Dutch Disease Variables

Spending Effect

The spending effect is caused by an increase in expenditures in the domestic economy as the oil windfall flows into the country. Most of the increased spending arises from the government as it is the substantial recipient of the oil revenues (through direct ownership or levying taxes on domestic oil producers). Therefore, a variable of government expenditure would capture most of the aspects of the spending effect (Corden & Neary, 1982).

However, it is important to remember that as the domestic incomes rise, there is an excess demand for products which is mitigated only by an increase in the price level. The increase in the domestic price level affects the real exchange rate, causing the country's agriculture or manufacturing products to become less competitive. Production of those goods should decrease then as the real exchange rate appreciates. If this is so, then perhaps the real exchange is a suitable proxy for the spending effect (Rudd, 1996).

It is expected from the Dutch Disease theory that the government expenditure variable and the real exchange rate variable should be highly correlated. The correlation coefficients of both countries are presented below[2]:

Norway from 1960-2016: almost no correlation

	GE	*RER*
GE	1	
RER	0,00458245	1

[2] Government expenditure figures are logged in order to get a better representative value.

Table 1: Norway´s correlation between GE and RER 1960-2016

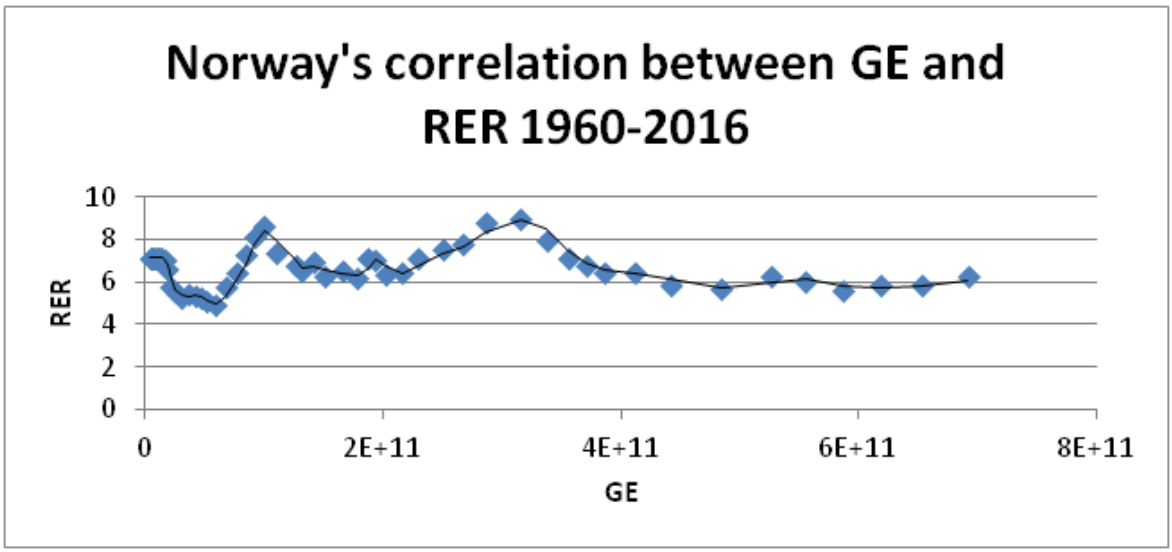

Figure 3: Norway´s Correlation between GE and RER 1960-2016

Venezuela 1960-2013: high positive correlation

	GE	*RER*
GE	1	
RER	0,72722557	1

Table 2: Venezuela´s correlation between GE and RER 1960-2013

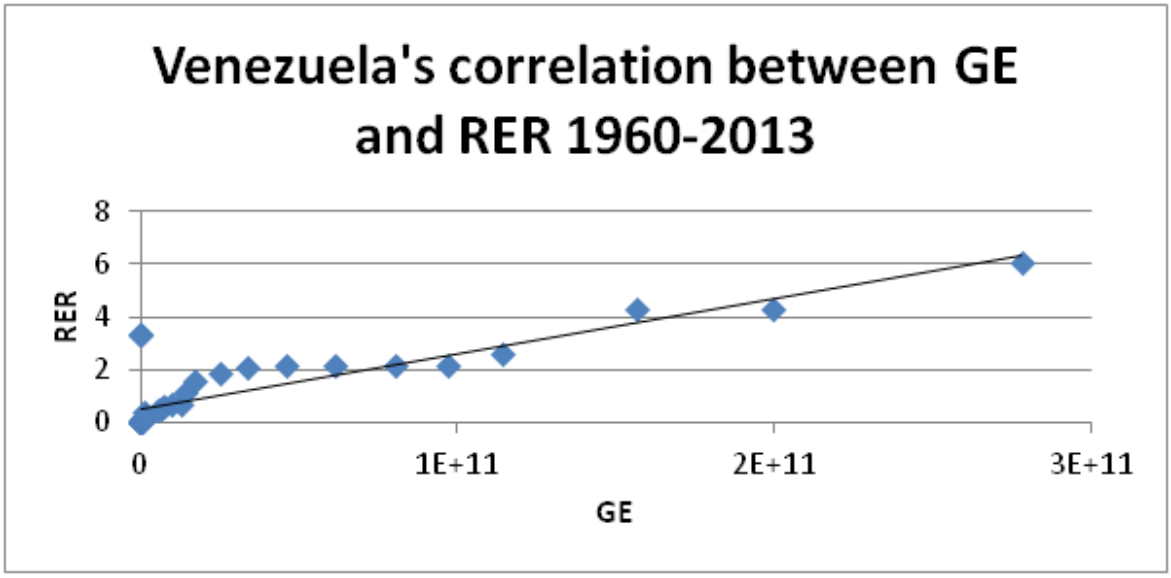

Figure 4: Venezuela's Correlation between GE and RER

The results show that there is no correlation in Norway between the government expenditure and the real exchange rate, but for Venezuela if we take the official currency

exchange rate[3] there is a high positive correlation. Theoretically speaking, both variables can be included in the regressions without having to worry about multicollinearity between them. However, later on once the model is developed; it will show that from an econometric point of view it is confusing to include both in the model. This confusion results from a fundamental principle of regression analysis (that all other variables are held constant when examining the effects of anyone variable). For example, when examining the effects of the government expenditure variable, it is necessary to hold constant the real exchange rate if it is included in the model. However, in theory the government expenditure variable works along with the fluctuations of the real exchange rate. But if both are included in the regression, then this econometrics principle prevents them from functioning according to theory. Hence, it is necessary to decide which one to include depending on the country that is being analysed.

The government expenditure variable is chosen as the proxy for the spending effect in Norway. The variable **GE** represents the general government final consumption expenditure in current local currency. As the government expenditure increase, it is expected that the spending effect will be evident, leading to a decline in manufacturing or agriculture. Moreover, because there is no correlation between GE and RER in Norway, the regression will be carried out as well as for the real exchange rate separately to compare results and see if there are any alterations.

However, for Venezuela the real exchange rate is used. The reason for using **RER** is that since many developing countries finance government spending through the printing of money, the government expenditure varies; therefore, it is more taken into consideration than just the increase in oil revenue. In fact, the increase in revenue from oil might be totally lost, or at least distorted, if the government prints a large amount of money to finance its expenditures. It is predicted that as the real exchange rate increases (representing a depreciation of the country's currency), the country's agriculture sector

[3] Venezuela currently has 4 types of currency exchange rate. Therefore it is complex to elaborate a proper correlation only using the official exchange rate. https://mises.org/library/venezuelas-bizarre-system-exchange-rates

should expand. According to the Dutch Disease theory, the country's currency should appreciate as the government spends more, which will eventually cause its traditional manufacturing or agriculture sector to contract (Rudd, 1996). Nevertheless, because Venezuela's current exchange rate situation is pretty delicate we will use the GE variable as well to evaluate which variable if it is more convenient. Also, considering that both variables are medium correlated we can expect that the government expenditure moves more or less in the same direction as the real exchange rate.

Resource-Movement Effect

The proxy for the resource-movement effect could be a wage variable in the oil industry. As workers in the oil industry become more productive, their wages increase resulting in other workers migrating to the oil industry and in a fall of the number of workers in the agricultural or manufacturing sector. Farmers or manufactures face a situation with fewer workers and/or having to pay higher wages to keep their employees; therefore they will have to decrease production and consequently the traded goods sector will contract. Therefore, it is hypothesized that as wages in the oil industry rise, agriculture's percentage share of non-oil GDP for Venezuela and manufacturing's percentage share of non-oil GDP for Norway should fall.

Therefore, we will use the wage in the domestic oil industry as variable for the resource-movement effect. It is represented by $\mathbf{W_{OIL}}$. Ideally, it would be best to find wage data on each of the countries' oil sectors, but unfortunately, consistent and reliable wage data for one particular sector could not be found in any of both countries.

Consequently, due to data constraints, the resource-movement effect cannot be modeled in this thesis because of lack of data from both countries. As stated before, most researchers conclude that this effect is minimal since the domestic oil industry is usually an enclave. Hence, the model should perform almost as well as if a resource-movement variable were included. However, since the variable is such an important aspect of the theory (van Wijnbergen & Neary, 1986), it is included in the summary chart of the

expected signs of the variables. Nevertheless, the data constraints prevent the inclusion of the variable in the actual regression analysis.

Control Variables

It is necessary to consider possible alternative explanations for the contraction of the manufacturing or agricultural sector. It is possible that some other factors, other than Dutch Disease, have led to these contractions. Therefore, it is important to account for these other explanations by using several control variables.

International Difference in Production Costs

It is very important to take into consideration the international difference in production costs, also called *world-price effect*. Some authors employ this effect as a fundamental explanatory variable of Dutch Disease, just as the resource-movement effect and spending effect (Farmadesh, 1991).

The world price effect affects differently to developed and developing countries. Due to an exogenous increase in oil prices and the fact that oil is often an intermediate input in manufactured goods, the world price of manufactured goods relative to agriculture goods will increase. Specifically, the increase in the world price of oil increases the oil imports cost of developed countries. Since oil is used as an intermediate input, the production costs of manufacturing in the developed economy will increase.

However, the increase in the world price of oil does not equivalently affect the domestic manufacturing production cost in developing oil-exporting economies for two reasons. Principally, the price of oil does not rise as much in these types of economies as it does internationally. Many governments of these countries purposely keep the price of oil low in order to encourage economic expansion. Secondly, the oil-intensity of manufacturing is less in developing countries than in developed ones. This is logical since oil and capital are complementary factors of production, and it is generally accepted that developing economies employ less capital-intensive methods of production. As such, production costs of manufacturing do not rise as much in these countries, leaving these

producers with a cost advantage in manufactured goods (Farmadesh, 1991) (Corden & Neary, 1982).

There is an incentive to produce manufactured goods in these developing oil-exporting economies as the result of the positive change in profitability. As the manufacturing sector in these countries expands, the agricultural sector becomes relatively less profitable. Assuming that there are no unemployed resources in the economy, the agriculture sector should contract as labor migrates toward the "booming" manufacturing sector. In a sense, a country neglects agriculture as it diverts more resources into manufacturing to take advantage of the increased profitability (Farmadesh, 1991).

However, in developing countries, there are unemployed resources where the manufacturing sector can draw upon these resources without negatively affecting the agricultural sector (Ricardo, 1817). Hence, it is difficult to predict how the international difference in production costs impacts the agriculture sector of developing economies.

Therefore, the international difference in production costs theory outlines that a developing oil-exporting country will witness an expansion of the manufacturing sector while the agriculture sector may contract or expand.

On the one hand, because several factors influence the impact on the agriculture sector, it cannot be predicted a priori whether agriculture will expand or contract in Venezuela. On the other hand, Norway's manufacturing sector should decline as a result of the international difference in production costs since production costs increase as the price of oil rises. In most developed economies the domestic price of oil is regularly at or above the world price of oil and they generally do not promote economic expansion by subsidizing the private sector with cheap oil; in short, these countries have different energy policies than developing ones.

	Manufacturing sector	Agriculture sector
Developed oil-exporter (Norway)	Contracts	?
Developing oil-exporter (Venezuela)	Expands	?

Table 3: International difference in production costs effect on manufacturing and agriculture sector

However, this thesis takes a different view of the world-price effect. Rather than a fundamental explanatory Dutch Disease variable, we treat it as a control variable. The international difference in production costs theory is relevant to all countries, not just Dutch Disease candidates. As such, it cannot be included as a Dutch Disease-type variable for developing countries. In fact, Dutch Disease can occur without the presence of this effect, or quite possibly, the world-price effect can be present without the appearance of any Dutch Disease symptoms.

A reliable proxy for it is the index of the world relative price of manufactured goods to agricultural products. However, an even better proxy for the world price effect is the ratio of the price of manufacturing in more developed nations to the price of manufacturing in less developed countries (Farmadesh, 1991).

The proxy needs to capture the difference between the two manufacturing prices. This variable is represented by the notation $\mathbf{IDPC_{MANUF}}$, the international difference of production costs in manufacturing. Furthermore, it is defined as the price of manufactured goods of Norway divided by the price of manufactured goods of Venezuela.

Due data constrains by not finding very relevant data for this variable we have chosen not to include it in the model, as the Dutch Disease effect remains the same by including or excluding it.

Natural Development Process

This thesis has hypothesized that Venezuela's agriculture sector has declined due to the presence of Dutch Disease. However, it is possible that much of these declines are due, in part, to the natural tendency for the agriculture sector to contract as developing countries begin to develop.

For Venezuela, the gross national income per capita should be an appropriate control variable for explaining the contraction of the agriculture sector as it develops economically. Income per capita is used by economists as the most common measure of a country's level of development. The income per capita increases, as the country develops and devotes more attention to manufactures. As such, **IPC** is used as a control variable to account for this industrialization process which does not mean that the changes in income per capita cause agriculture to expand or contract.

For Norway, a country that has already undergone the development process, a different variable needs to be included. It is interesting to point out that the manufacturing sectors of most European countries have declined since the late 1960s, but with no single evident factor causing the deindustrialization, the best possible proxy is one that somehow captures this trend. In our thesis we use the real GDP, **RGDP**, as the most appropriate variable. As happens with IPC this variable does not attribute the deindustrialization trend to Dutch Disease.

Other Control Variables

Some other control variables are needed to explain the decline in the agricultural or manufacturing sector. As such, it is quite possible that tight monetary policy may lead to the neglect of certain tradable goods sectors, leading to contractions and sectoral shifts. This could easily be accounted for in the model by a money supply variable.

Other possible explanations include contractionary fiscal policy that similarly neglects certain sectors like cutting agricultural subsidies or the substantial removal of tariffs and quotas that leave the tradable goods sector exposed to foreign competition.

Since reliable information concerning subsidies and tariffs is difficult to quantify, the best control variable accounting for the neglect of the tradable goods sector, therefore, is a money supply variable. Consequently, the gross money supply will be used as the control variable. This is represented by the variable **MS**. A positive relationship is expected to exist between MS and the growth of the manufacturing sector.

Norway's and Venezuela's variables and expected signs

The following two tables list all the variables and each of their expected signs:

NORWAY

Type	Variable	Explanation	Expected Sign
Dependent	$\%DD_{MANUF}$	% share of manuf. GDP	
DD: Spending Effect	**GE**	Government expenditure	-
DD: Resource-Movement Effect	W_{OIL}	Wage in the domestic oil industry	-
Control: Money Supply	**MS**	Annual rate of growth in money	+
Control: Real GDP	**RGDP**	Real GDP in constant NKK	-
Control: Int. Dif. In production costs	$IDPC_{MANUF}$	Ratio of price of manuf. of NOR to VZ	-

VENEZUELA

Type	Variable	Explanation	Expected Sign
Dependent	$\%DD_{AG}$	% share of agriculture GDP	
DD: Spending Effect	**RER**	Government expenditures	+
DD: Resource-Movement Effect	W_{OIL}	Wage in the domestic oil industry	-
Control: Money Supply	**MS**	Annual money supply in home currency	+
Control: Per Capita Income	**IPC**	Income per capita in Bs.	-
Control: Int. Dif. In production costs	$IDPC_{MANUF}$	Ratio of price of manuf. of NOR and VZ	?

Table 4: Norway's and Venezuela's variables and their expected signs

The Basic Model

The preceding model says that the Dutch Disease for either manufacturing or agriculture is a function of two Dutch Disease variables (GE and RER) and several control variables (MS, $IDPC_{MANUF,}$ RGDP and IPC). The empirical model is given below:

For Norway:

$$\%\boldsymbol{DD_{MANUF}} = \boldsymbol{a_0} + \boldsymbol{a_1 GE} + + \boldsymbol{a_2 MS} + \boldsymbol{a_3 RGDP} + \boldsymbol{\epsilon_1}$$

For Venezuela:

$$\%\boldsymbol{DD_{AG}} = \boldsymbol{b_0} + \boldsymbol{b_1 RER} + \boldsymbol{b_2 MS} + \boldsymbol{b_3 IPC} + \boldsymbol{\epsilon_2}$$

From the theory it is hypothesized that the two Dutch Disease variables will account for a substantial part of the tradable (non-energy) goods sector contraction. It is important to remember that the resource-movement effect variable, $\mathbf{W_{OIL}}$ cannot be included in the formal regression analysis due to data constraints. Consequently, it is not shown in the above empirical model. $\in_1$ and $\in_2$ are random error terms for their respective regressions, which will be proved running the Durbin-Watson test of autocorrelation.

Furthermore, the $\mathbf{IDPC_{MANUF}}$ variable cannot be included in the model, due to the fact that we only found the data for Norway's manufacturing producer price index but not from Venezuela. Also, we found the world-price effect ratio from 1983 onwards but it is not truly reliable if it is compared to other sources, therefore we have decided not to include it in the model. Moreover, when the model is compared with and without this variable it does not have any effect on the model and consequently on a country having Dutch Disease. Hence, this is reinforcing what was stated in the theory previously.

2.3 Results

In general the model has performed properly for both countries. In each country the Dutch Disease explanatory variable was more or less significant, indicating that Dutch Disease played a role in the decline of the countries' traditional tradable goods sector. Nevertheless, we have tried both models interchangeably to evaluate its behaviour. The following sections discuss the results individually for each country. A significance level of 5% alpha level is used in the model[4], as well as the Durbin-Watson test to explain the autocorrelation in both countries.

Variables	Norway		Venezuela	
Dependent variable	**manufacturing share**		**agriculture share**	
	coefficient	**P-Value t-statistic**	**coefficient**	**P-Value t-statistic**
Constant	0,400992823	0,788435686 0,270021179	1,511949683	0,04293754 2,096455492
Government Expenditure	-0,038433391	0,787347231 -0,271445696		
Real Exchange Rate			-0,161516224	0,000736485 -3,681046552
Money Supply	-0,427383863	0,003838523 -3,056674261	0,113550222	0,002332327 3,269615109
Income Per Capita			-0,49506128	0,017756231 -2,481378539
Real GDP	0,531127305	0,010916802 2,660711054		
R squared	0,965820016		0,326418645	
Adjusted R squared	0,982761424		0,27180394	
Durbin-Watson	0,801204138		0,551143078	

Table 5: Econometric model results

2.3.1. Norway

By examining the results from Norway's regression, we can see that it has problems with *multicollinearity*, an econometric disease where two or more of the

[4] Only a significance level of 5% is used througout the model regressions because the results for the 1% and 10% alpha significance levels were pretty close to each other.

independent variables are correlated. In the table below, we find that GE and MS are highly correlated, as well as RGDP with MS.

	GE	*MS*
GE	1	
MS	0,99831694	1
	MS	*RGDP*
MS	1	
RGDP	0,99324637	1

Table 6: Correlation between GE and MS and MS and GDP.

The issue with multicollinearity is that it can distort the results, making certain variables insignificant when they are in reality significant. However, all the variables for Norway's regression are significant if we take into account either the P-values or the t-statistic, therefore, no action needs to be taken to correct for multicollinearity. In general, the regression performs very well, explaining over 98% of the variation in the dependent variable.

Because, as we show in table 1, there is no correlation between Norway's **GE** and **RER** both can be used separately in the model. Moreover, results are almost the same[5]. Being more significant the use of GE instead of RER according to its p-value. When we use GE the coefficient is negative, therefore it coincides with what is explained on the theory[6]. We will stick to the theory in order to analyse the data.

GE is negative which means that as the government spends its oil revenues, holding all of the other variables constant, the manufacturing sector will contract. In order to determine whether or not the spending effect is important, it is helpful to examine the government expenditures data. In 1970, the Norwegian government spent just over 15 billion Norwegian Kroner, but by 2016 this number had increased to over 760 billion Norwegian Kroner. This means that almost every year, Norway witnessed a 16

[5] See appendix 2
[6] See appendix 1

billion Norwegian Kroner increase in government spending. Therefore, since a 16 billion Norwegian Kroner increase is not that large and produces a near 2% change in the manufacturing sector, it is evident that, according to the results of the model, the spending effect is quite important. As such, the spending effect is an attributable cause of Norway's deindustrialization.

Other non-Dutch Disease factors seem to have played an important role in Norway's manufacturing sector contraction. For example, the coefficient for the **MS** variable, a control variable, is highly significant if we take into account the t-statistic, but it has not the correct sign. This could be due to the fact that is it almost positive perfectly correlated with the Dutch Disease variable GE[7]. From a theoretical perspective, it is logical that the MS and GE variables are correlated, but this is a situation which occurs in developing countries. Therefore, here we need to take into account the Norway from the 70's for this correlation to make sense. At that time Norway financed its government spending by monetising its debt, thus increasing the money supply. This is a logical action in that the increase in GE exceeded the increased oil revenues and was partially financed by the country's monetisation of its debt, as it happens nowadays in Venezuela.

Another important control variable is the real GDP, **RGDP**, which is highly significant when we take into consideration the t-statistic but has the incorrect hypothesised sign as well. It is also almost positively perfectly correlated with MS[8] which means that as the country grows the broad money also increases, provoking a contraction on the manufacturing sector. Specifically, a 7 billion Norwegian Kroner increase in real GDP leads to a 2% decrease in manufacturing's contribution to non-oil GDP.

From this analysis, in the case of Norway, Dutch Disease is not the sole factor contributing to the country's manufacturing decline. It seems that also the control variables played a role in Norway's economy deindustrialisation.

[7] See table 6
[8] See table 6

Overall, the regression for Norway performed very well, explaining a good portion of the dependent variable's variation. In addition, all three of the variables' coefficients are significant, with two having the wrong sign. Although the Durbin-Watson (DW) statistic used to test the *autocorrelation,* which is if the error terms of the regression are correlated to each other, is low[9], normally this is an ordinary situation when it comes to the analysis in time series data.

However, since autocorrelation is often caused by an omitted variable, it is possible that the exclusion, due to data constraints, of the resource-movement effect variable as well as the international difference in production costs have caused the DW statistic to be low. If such data could be found, it is expected that the DW statistic would increase, indicating a reduction of autocorrelation.

To conclude in Norway's analysis, we also have run the regression for Norway using the developing country variables[10] and also combining the dependable variable of manufacturing and agriculture[11]. The results from using the agriculture share in Norway can be found in appendix 7. It is very important to highlight that this model performs better than the one corresponding to developed countries but only explains 88% of the variation in the dependent variable (agriculture share) in comparison to the 98% of the manufacturing share. The expected signs for the three variables correspond, as well as the variables are significant it we take the t-statistic. The reasoning behind this does not coincide with the theory in the fact that Norway is a developed country, and that if we separate the energy sector, it bases its economy on manufacturing. Therefore, it will only make sense if we consider Norway as a developing country basing its economy on agriculture before oil was exploited.

When it comes to the regression combining manufacturing and agriculture, the results are quite similar to the core model but less significant.

[9] See appendix 5
[10] Appendix 3
[11] Appendix 4

2.3.2. Venezuela

As happens in Norway, the results for Venezuela have problems with *multicollinearity*. The inclusion of all of the variables in Venezuela's regression created problems. This could be as consequence of two factors:

1. Official data which in reality is not factual (or biased) due to the constraints of the country itself.
2. Lack of data from 2013 onwards.

It is important to point out that the agriculture share for Venezuela is pretty significant if we consider its coefficient and t-statistic meaning that the Dutch Disease is truly declining this sector[12].

The developing countries model uses the **RER**[13] as the Dutch Disease variable. For Venezuela's case it does not really mind which one to use, either GE or RER, because both of them are highly positive correlated[14]. Also the results are very similar[15], both having negative expected signs which do not correspond to the theory. Although according to its t-statistic is highly relevant. GE and RER move in the same direction. If there is an increase in the government spending there would be an appreciation of the domestic currency, contracting the agriculture sector.

Another example of this multicollinearity is the money supply control variable. The situation is almost the same as in Norway; the difference is that the positive expected sign for **MS** corresponds. In the table below, it can be seen that MS is almost perfectly positive correlated with the GE and RER and highly positive correlated with RGDP.

	GE	*MS*

[12] Please see table 5
[13] See appendix 7
[14] Please see table 2
[15] See appendix 8

GE	1	
MS	0,99549596	1

	MS	*RER*
MS	1	
RER	0,98119694	1

	MS	*RGDP*
MS	1	
RGDP	0,96151345	1

Table 5: Venezuela Correlation RER and MS, GE and MS and RGDP.

Theoretically speaking, it makes sense that the MS and GE variables would be correlated. Often, developing countries finance government spending by monetising their debt, thus increasing the money supply. As the country decreases the money supply, while holding all other variables constant, the agriculture's share of non-oil GDP decreases. This neglect of the agriculture sector, through tight monetary policy, helps explain the overall decline in Venezuela's agriculture sector.

Another important control variable that is used for the developing countries is the gross national income per capita **IPC**, which is highly significant according to its t- statistic and its sign corresponds to the expected one. So it can be reasoned that as income per capita increased in Venezuela from 1973 to 2013, it played a statistically significant role in explaining the decline in the agriculture sector.

Although in practice the real GDP, **RGDP** is only a control relevant variable for developed countries, in theory it has an effect in Venezuela. It is highly significant when we take into consideration the t-statistic but as well has the incorrect hypothesised sign. It is also almost perfectly positive correlated with MS[16], therefore, as the country develops the money supply also increases, provoking a contraction on the agricultural

[16] See table 7

sector. Furthermore, this variable is not included because the results of using this variable throughout the whole model are insignificant[17].

It is clear that for Venezuela, the Dutch Disease is not the only contributor to the country's agriculture contraction. The control variables in the model played an important part in Venezuela's de-agriculturalisation.

Overall, the three of the variables' coefficients are significant, with one having the wrong sign. Although the Durbin-Watson (DW) statistic to measure autocorrelation is low[18] it has not being an impediment to run the model. This is very normal when it comes to time series data and also because we are missing two variables in the regression (the resource-movement effect variable and the international difference in production costs). If such data could be found, it is expected that the DW statistic would increase, indicating a reduction of autocorrelation.

To sum up Venezuela's analysis, we also tried the regression using the developed country variables[19] and also combining the dependable variable of manufacturing and agriculture[20]. The results from using the manufacturing share in Venezuela can be found in appendix 10 and indeed they are not really significant. The same happens with the results from the regression combining manufacturing and agriculture.

2.4. Econometric model conclusion and policy implications

From analysing econometrically both countries several conclusions can be drawn, and from these, some policy implications can be recommended. We will analyse this more in depth on chapter 5.

The results show that the spending effect plays a statistically significant, though not exclusive role in declining both countries' tradable goods sector. Moreover, the

[17] See appendix 9
[18] See appendix 12
[19] See appendix 10
[20] See appendix 11

results are not robust as the signs of the variables vary across both countries. Therefore, both countries have experienced differentiated forms of Dutch Disease, taking Venezuela's and Norway's governments' different courses of action to combat their problems.

In conclusion, the results indicate that the applicability of the Dutch Disease model varies across countries. For instance, in Norway it is not as strong as in Venezuela, verifying the previous presence of Dutch Disease where the spending effect variable is highly significant and exhibits the negative relationship with the dependent variable as theory suggests.

This analysis confirms that Norway's basic economic problems in the past and Venezuela's current economic issues of stagnating growth, unemployment, and major shifts in its sectors structure are due at least in part to Dutch Disease. However, it is important to highlight that although Norway in the past did experience a moderate case of Dutch Disease, the reasons for the manufacturing sector's contraction are more complex than what is explained by the model. The same happens with Venezuela where its agricultural sector contraction is influenced by other control variables apart from the Dutch Disease ones.

Some of the policy implications that could be drawn from this analysis, it is that the government could subsidise the traditionally exposed sector by helping farmers or manufacturers to be productive (Herberg & Enders, 1984). In Venezuela, most of the government's spending goes to the non-traded sectors instead of the agriculture. Partly because of this, Venezuela suffers a severe case of Dutch Disease. Therefore, it is evident that governments can at least mitigate the effects of Dutch Disease by actively subsidising their traditional export sectors upon the discovery of oil.

Another possible policy is that the government can prevent the Dutch Disease by using its oil revenue to reduce taxes. If consumers' marginal propensity to import is

greater than the government's marginal propensity to import, then the increase in imports can offset the appreciation of the currency. If so, then the country's traditional exports do not become less competitive in world markets, and therefore, these sectors would not need to contract.

After exposing some measures that Venezuela could consider in order to beat the contraction of its tradable sector (non energy) we arrive at the conclusion that Venezuela faces an uncertain future. However, like in the case of Norway by taking proper action at the correct time the Dutch Disease effects can be mitigated and the country could ensure a productive post-boom era.

Chapter 3

3. Norway's Oil Economic Situation

This chapter studies how Norway deals with its oil revenues and expenses as well as with the oil prices and also how Dutch Disease has affected Norway

3.1. Norway's Oil Financial situation.

In 1960 Norway realized that they should create an oil fund, as international companies had shown an interest in searching for oil at the Norwegian Continental Shelf (NCS). The prime minister at this time, Einar Gerhardsen, and his government claimed sovereignty over the NCS, and even though international companies with both resources and more experience received license to search for oil, the Norwegian state remained in control. It was not until years later that oil was discovered, and in 1971 the first oil production from the oil field Ekofisk started. To make sure the state of Norway had control of the oil production they created what is called "Statens Oljedirektorat" – Norwegian Petroleum Directorate. One of the first things that the Petroleum Directorate did was to create the ten oil commandments. As Norway's politicians appreciated the importance of a national oil policy, a unanimous Parliament adopted the following 10 basic principles in June 1972, called the 10 oil commandments:

"1. National supervision and control must be ensured for all operations on the NCS (Norwegian Continental Shelf).

2. Petroleum discoveries must be exploited in a way which makes Norway as independent as possible of others for its supplies of crude oil.

3. New industry will be developed on the basis of petroleum.

4. The development of an oil industry must take necessary account of existing industrial activities and the protection of nature and the environment.

5. Flaring of exploitable gas on the NCS must not be accepted except during brief periods of testing.

6. Petroleum from the NCS must as a general rule be landed in Norway, except in those cases where socio-political considerations dictate a different solution.

7. The state must become involved at all appropriate levels and contribute to a coordination of Norwegian interests in Norway's petroleum industry as well as the creation of an integrated oil community which sets its sights both nationally and internationally.

8. A state oil company will be established which can look after the government's commercial interests and pursue appropriate collaboration with domestic and foreign oil interests.

9. A pattern of activities must be selected north of the 62nd parallel which reflects the special socio-political conditions prevailing in that part of the country.

10. Large Norwegian petroleum discoveries could present new tasks for Norway's foreign policy." (Norsk Olje og Gass, 2010).

As the oil production grew, the ministry of finance realized the need for a way to deal with the country's increasing oil wealth and how it should be used. This was previously discussed in 1974 but no rules or laws were concluded. In 1983, a report was submitted by the Tempo Committee in which they were proposing a creation of an oil fund where the government would be able to store the rush of oil revenue and spend only the real return. And in 1990 Norway established the Government petroleum fund, later known as the Government Pension Fund.

The whole idea by creating the government petroleum fund, was so that the state of Norway would have a fund were they could transfer capital that came from the petroleum revenue. Its sole purpose is to support the government's long-term management of petroleum revenue. It was not until 1996 that the first capital was transferred from the Ministry of Finance to the fund. The way this capital was invested

was in the same way as the Norwegian Central Banks foreign exchange reserves, meaning that all the assets were invested outside of Norway.

In 1998, the ministry of finance created Norges Bank Investment Management, often referred to as NBIM, and with this the government pension act was also created. The government pension fund act is to ensure that the revenue of the oil is used in Norway´s best interest. (Norsk Olje og Gass, 2010).

The Government pension fund act goes as follows:

"§1. The government Pension Fund shall support government saving to finance the National Insurance Scheme's expenditure on pensions and support long-term considerations in the use of petroleum revenues.

§2. The government Pension Fund is managed by the Ministry of Finance. The Fund comprises the Government Pension Fund Global and the Government Pension Fund Norway

The government Pension Fund Global is deposited in an account at Norges Bank. The counter value is managed under rules laid down by the Ministry, see §7.

The Government Pension Fund Norway is deposited with Folketrygdfondet. The counter value is managed under rules laid down by the Ministry, see §7.

§3. Income to the Government Pension Fund Global consists of the net cash flow from petroleum activities, which is transferred from the central government budget, the net results of financial transactions associated with petroleum activities and the return on the Fund's capital.

The net cash flow from petroleum activities consists of the gross revenues in the third paragraph minus the expenses in the fourth paragraph.

The following gross revenues are part of the cash flow from petroleum activities.
Total tax revenues and royalties deriving from petroleum activities collected pursuant to the Petroleum Taxation Act (no. 35 of 13 June 1975) and the Petroleum Activities Act (no. 72 of 29 November 1996)
Revenues deriving from tax on CO" emissions due to petroleum activities on the continental shelf pursuant to Act relating to CO" tax in the petroleum activity on the continental shelf (no. 72 of 21 December 1990)
Revenues deriving from tax on NOx emissions due to petroleum activities on the continental shelf
Operating income and other revenues deriving from the State´s direct financial interest in petroleum activities.
State revenues from net surplus agreements associated with certain production licenses,
Dividends from Statoil ASA
Government revenues deriving from the removal or alternative use of installations on the continental shelf,
Any government sale or stakes representing the State's direct financial interest petroleum activities.

The following expenses shall be deducted from the gross revenues in the third paragraph:
Government's direct investment in commercial petroleum activities (the State's direct financial interest),
Operating costs and other costs directly related to the State's direct financial interest.
Government expenses in connection with the removal or alternative use of installations on the continental shelf
Any government purchase of stakes as part of the State's direct financial interest in petroleum activities.

Net results of financial transactions associated with petroleum activities are gross revenues from government sale of shares in Statoil ASA less government purchase of shares in Statoil ASA, defined as the market price paid by the government for the shares, and less government capital contributions to Statoil ASA and companies attending to government interests in petroleum activities, as well as financial transactions connected to companies in the petroleum sector in which the Government has ownership.

§4. Income to the Government Pension Fund Norway consists of the return on the capital under management.
§5. The capital of the Government Pension Fund may only be used for transfers to the central government budget pursuant to a resolution by the Storting (the Norwegian Parliament)
§6. The Government Pension Fund itself has no rights or obligations vis-á-vis private-sector entities or public authorities and may not institute legal proceedings or be subjected to legal proceedings.
§7. The Ministry may issue supplementary provisions to implement this Act.
§8. The Act enters into force at such time as the King decides. [1]The King may bring the individual decisions into force at different times. The Ministry may make transitional rules.
§9. The following amendments to other Acts become effective as from the entry into force of this Act.

[1]Repeal of the government Petroleum Fund Act (no. 36 of 22 June 1990)"
(NBIM, 2015)

The figure below shows a quick overview over who controls what:

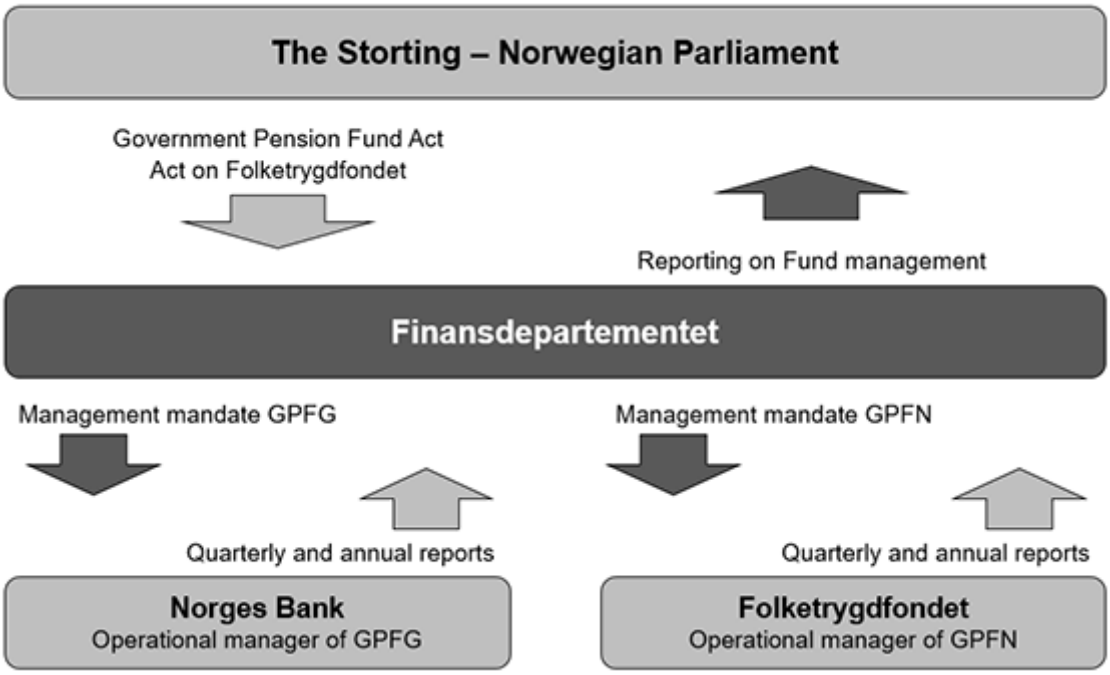

Figure 5: Governance model Norway (Regjeringen, 2017)

The figure above explained.

Finansdepartementet – The ministry of Finance holds the overall responsibility for the management of the funds. Within the government pension fund, we find the Government Pension Fund Global (GPFG) and the Government Pension Fund Norway (GPFN), which is managed by Norges Bank and Folketrygdfondet, respectively, under mandates laid down by the ministry.

The purpose of the Government Pension Fund is to support long-term considerations in the spending of government petroleum revenues and to facilitate savings to finance pension expenditure through the national insurance scheme and in this way, allow both current and future generations to benefit from the petroleum revenues. This is made possible by facilitating government savings to finance rising public pension expenditures, and support long-term considerations in the spending of government petroleum revenues. Also, a sound and reasonable long-term management of the fund contributes to intergenerational equity.

The way that the funds risk is managed, is to achieve the highest possible return over time, subject to a moderate level of risk. (Regjeringen, n.d)

As mentioned the fund is divided up into Government Pension Fund Norway and Government pension fund global, where Government Pension Fund Norway invests in both equities and bonds in the Norwegian market, whilst the Government Pension Fund Global invests in equities, bonds and real estate across a broad range of countries, sectors and companies. It is important that the Government pension fund is managed in a responsible way, where good long-term financial returns are assumed to depend on sustainable development and well-functioning markets. (Statsbudsjettet, 2015)

When NBIM was created, about 40 per cent of the funds bond portfolio was put into equities. Over the years, the investment strategies have developed. In 2000, emerging markets were added to the funds benchmark fixed income index, and in 2002 corporate and securitized bonds were added. By 2004 they established ethical guidelines for the fund, as it is important for them that the investments they do follow certain ethical standards. These are also regulated over the years to make sure of ethical investments as time progresses. In 2008, the ministry of Finance decided to include real estate in the fund´s investment portfolio, with a maximum limit of 5 per cent of the total assets, but it is only in 2011 the fund made its first investment within the real estate market. (NBIM, n.d. b)

Since NBIM was created, the fund's annual average return has been at 5.7 per cent. (NBIM, n.d. a) The table below shows annual return over the years and the accumulated annualised return from the fund.

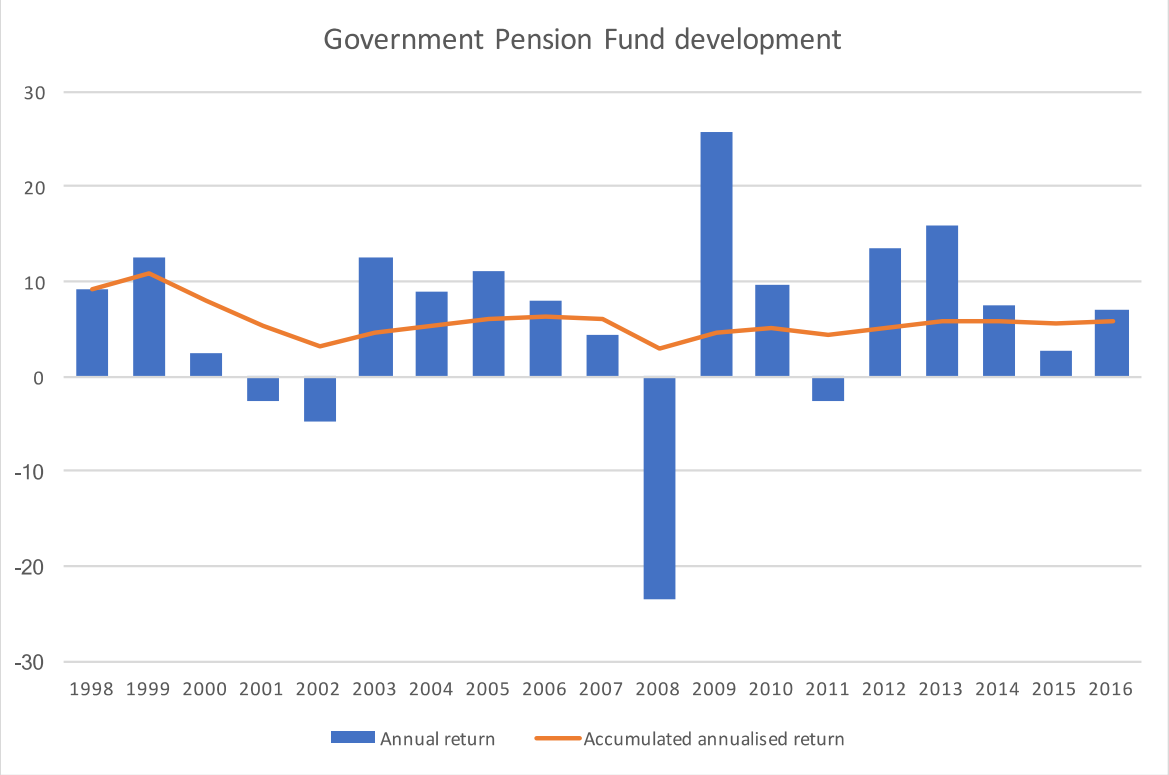

Figure 6: The annual return of the Government pension fund (NBIM, n.d, c)

As mentioned one of the main purposes of the Government Pension Fund is to finance pension savings by investing and facilitating savings. In the table below, we show the development of the market value of the fund since the beginning in 1998 until 2016. The market value of the fund changes every day, depending on investments and currencies as they are investing internationally, and per the date of chart creation, 8th of May 2017, the total market value is at 8 123 billion NOK. (NBIM, n.d. a)

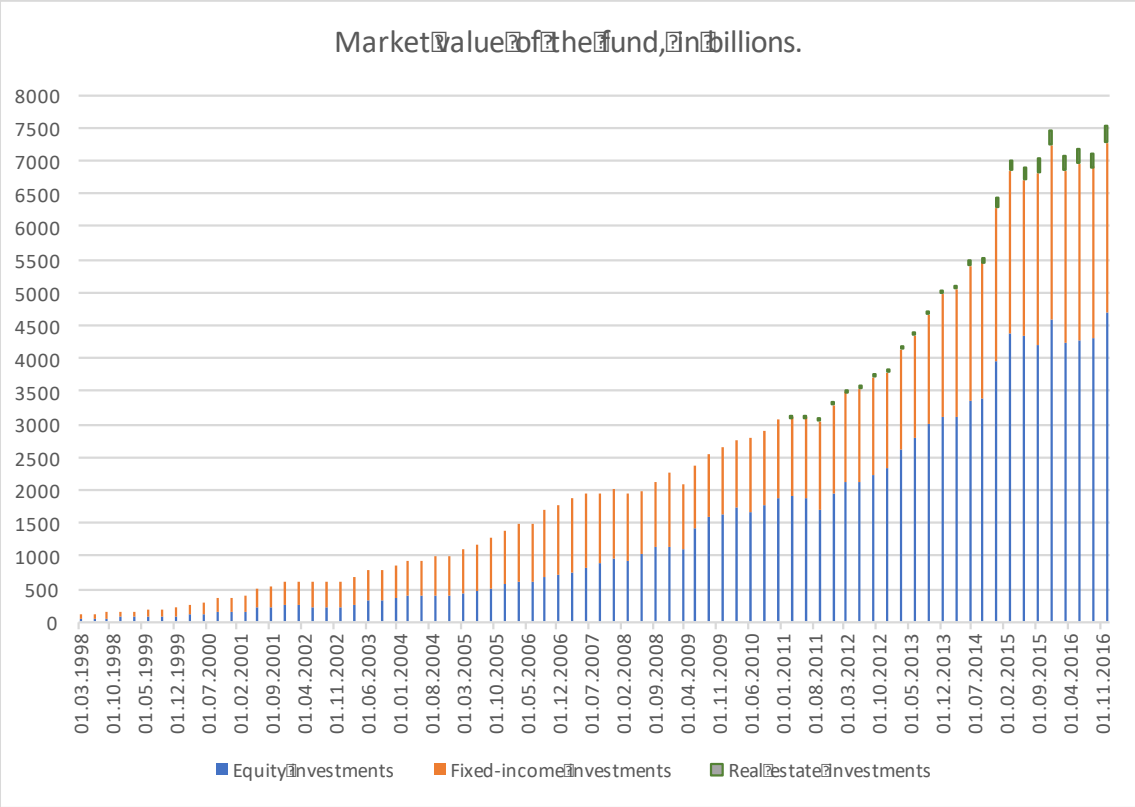

Figure 7: Market value development from the Government Pension fund through the years (NBIM, 2017)

The way Norway is financed every year is through the state budget, with an income not just from petroleum, but also from different taxes. The largest income comes from the petroleum, employer and social security contribution, taxes on income and fortune and VAT (value added tax). In 2016, these incomes amounted to 85 per cent of the state budget. Other large income is excise duties connected to vehicles, tobacco, alcohol, interest and dividends. The gathered income from petroleum was estimated to about 233 billion NOK in 2016, and the expenses on petroleum estimated to about 29 billion NOK leaving a total cash flow of about 204 billion NOK, which in its whole was transferred to the Government Pension Fund for investment. Not including loan transactions and the petroleum, the state budget has a total deficit of 208 billion NOK, and this deficit is being covered with an equivalent transaction from the Government Pension Fund.

Oil price, oil production and the income from the petroleum contribute to deciding how much money the government can use, and how large the profit is and how

much that can be transferred to the government pension fund. The bigger the fund, the more money can be used in the yearly budget. (Haugen, 2016)

The fiscal rule tells us how large of a share of the fund value can be used in the national budget, fuelling the Norwegian economy. The use of petroleum revenues is linked to the expected real return on the Government Pension Fund Global. In previous years it has been 4 per cent, but after a long-term perspective of the Norwegian Economy the withdrawal from the fund from 2017 should be equivalent to 3 per cent, down 1 per cent from the previous years. In 2016 220.2 billion NOK were transferred to the national budget. The reasoning behind the fiscal rule is to gradually phase oil revenue into the economy, by only spending the return of the fund rather than eating into its capital. By doing this, the fund will also be able to benefit future generations. (NBIM, n.d. a)

3.2 Norway and Dutch Disease

In many countries, large reserves of natural resources have proven to be detrimental to their economic development, and countries that are exporters of large quantities of natural resources have a lower economic growth rate than those lacking it. But where others have failed, Norway appears to be the perfect example of how to successfully manage these resources. This is the case as they have avoided symptoms of the resource curse known as Dutch Disease. (Ramirez-Cendrero & Wirth, 2016) One of the key features of how Norway has avoided Dutch Disease is how Norway manage their additional cash flow from their natural resources. They have done this by creating the oil fund and the rules they follow regarding investing their money.

Looking at this from a theoretical point of view, the way Norway has handled their oil and managed to keep the country growing, shows us that it has not been affected by Dutch Disease. One could look at one of the symptoms of Dutch Disease, which is that the country is highly dependent on the resource and its price development, given that the country relies heavily on export. In the figure underneath you can see the price development of crude oil from the 1970s to today. As Norway first found oil and became

a rich resource country in the 1970s, we do not believe it is necessary to look at the oil prices before this stage, as it wouldn't have had an effect on the country's economy.

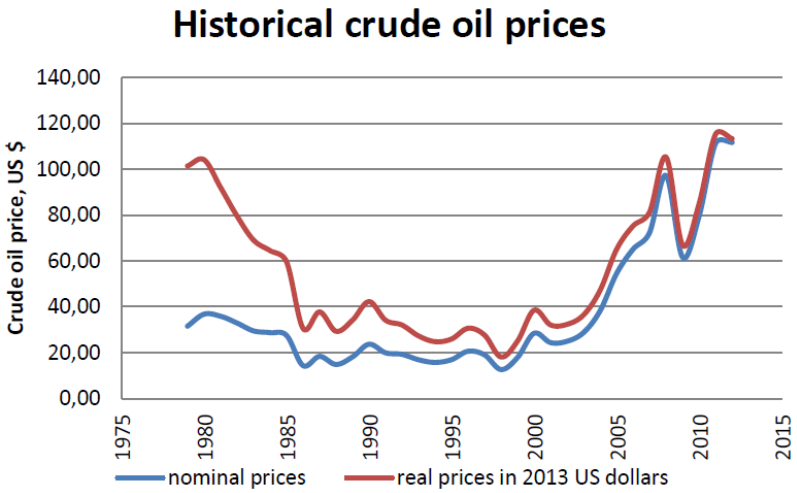

Figure 8: Nominal and real crude oil price. (Statistical review of world energy, 2016)

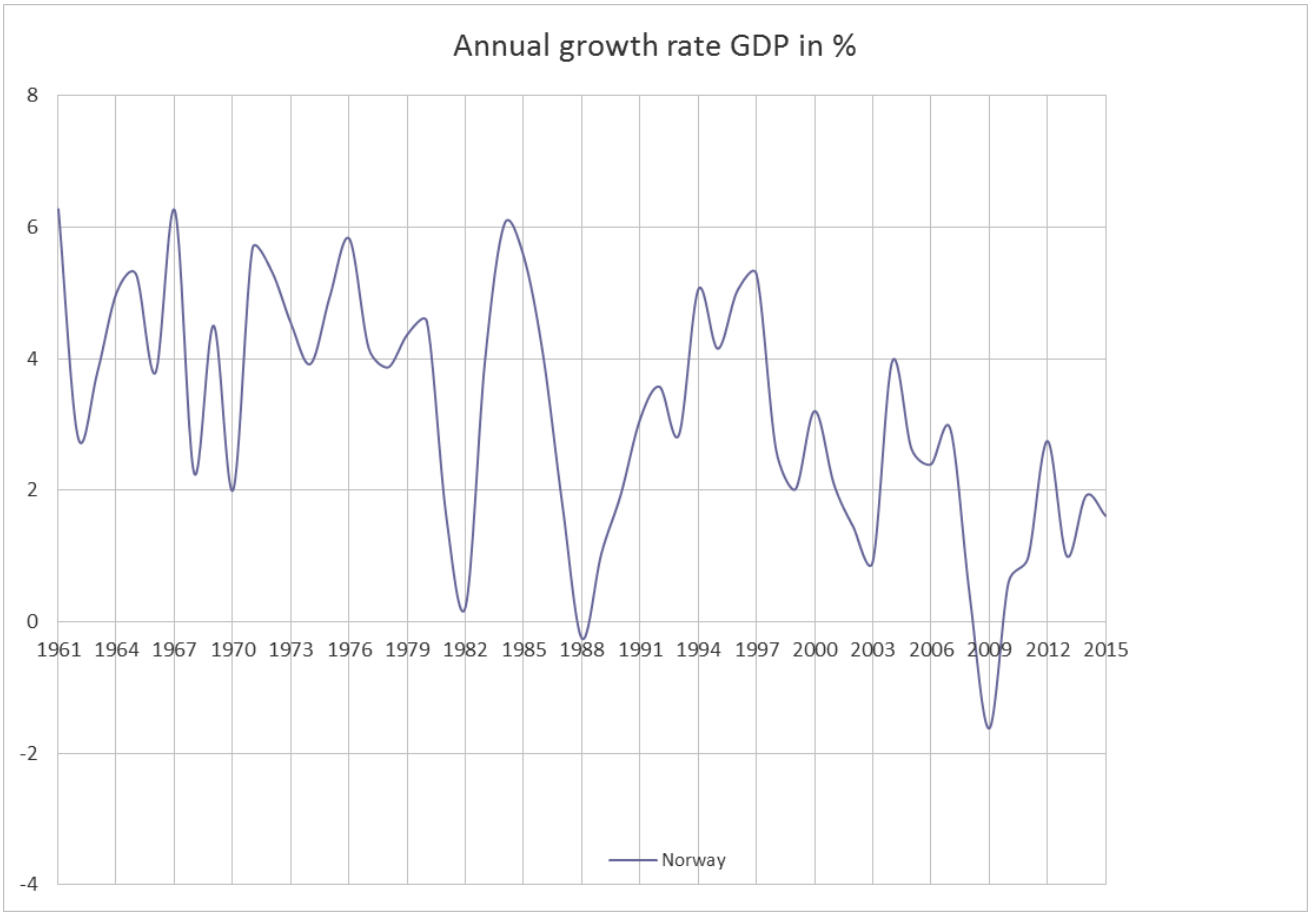

Figure 9: Annual growth rate GDP in % Norway

As you can see from the figure above, the volatility of GDP in Norway has been mostly positive since the 1970s, only interrupted by global recession periods. In other words, it is not very volatile. Certainly the oil price does affect the country's GDP to a certain extent, where we can see increase in oil price equals increase in GDP and vice versa, but as Norway is not completely reliant on oil for their exports, and they also invest the money they make through the pension funds, Norway is able to maintain a growth throughout the years, with only a very few exceptions. Due to the low volatility of the Norwegian GDP growth in general, the minor impact that fluctuations in the oil price has on the GDP, as well as the relatively steady positive growth in GDP, Norway is not suffering from Dutch Disease.

Another important factor to take into consideration when evaluating whether a country is affected by Dutch Disease or not, is differentiating between the country being resource abundant or if it is resource dependent. If a country is highly dependent on raw materials such as oil and gas, this correlates to the country's economic structure having limited diversification and therefore being much more vulnerable to fluctuations in the natural resources price and demand. (Ramirez-Cendrero & Wirth, 2016)

Even though Norway has benefitted substantially from their natural resources, the country's growth has not been completely dependent on their vast oil supply, as their economy started growing steadily before the entire oil adventure became reality. Amongst other exports from Norway, fish, timber as well as a very profitable shipping sector can be mentioned. However, the greatest contributor to the strong economic growth is of course the massive boost their economy received from the discovery and export of oil. One could argue that, more importantly, the manner in which Norway has handled the influx of capital received from their oil revenues is the reason why they have avoided Dutch Disease. By investing the funds domestically as well as internationally while following strict rules as well as being transparent and open for everyone to oversee has led to the creation and continued success of the world's largest sovereign wealth

fund. (SWFI, 2017) This fact alone almost entirely dismisses the notion that Norway might be affected by Dutch Disease.

The figure below portrays how GDP per capita has increased in Norway over the years, starting in the 1960s; prior to when the oil exports began. As shown in the figure, it is very apparent when NBIM started to properly manage, invest and increase the wealth generated from the oil revenues. The figure also further emphasises the previous fact that despite fluctuations in the oil price, the GDP per capital has not experienced the same fluctuations. Meaning that it is not dependent and in correlation with the oil prices and revenue generated from this resource. The countries wealth continues to grow because of the way the revenues are being handled by the fund.

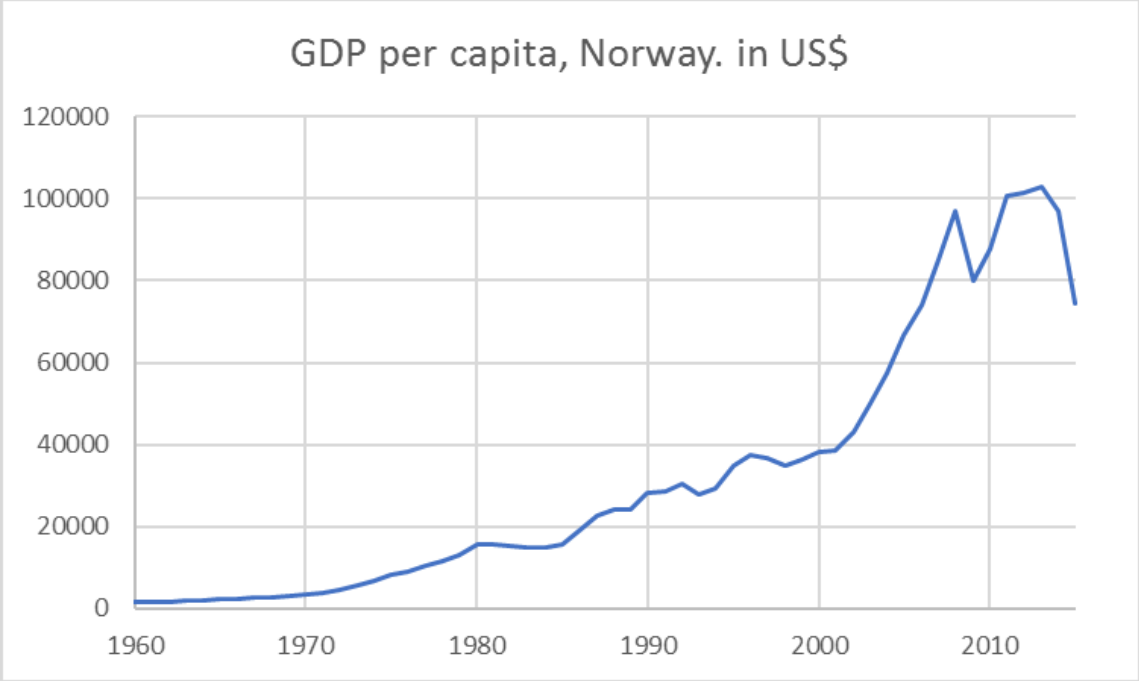

Figure 10: GDP per capita, Norway (WorldBank, 2017)

3.3 Part conclusion

When taking Norway's oil history into consideration, as well as the way in which the country took control over the Norwegian continental shelf by creating oil commandments and later the global pension fund to invest the revenues, it is apparent

that a country that that has a plan, clear guidelines, and takes the necessary steps to follow through is able to avoid resource curses or the Dutch Disease in particular.

By managing the oil revenues and building up their wealth by investing the surplus, they have managed to create a wealth that will cover Norway's future generations. This we also can see by looking at the development of the GDP per capita and the volatility of the GDP, which makes us conclude by just looking at some theoretical points that Norway is not affected by Dutch Disease.

Chapter 4

4. Venezuela's Oil Economic Situation

In this part we evaluate how Venezuela deals with oil revenues and expenses and how oil prices affect the current economic situation converting the country into a proper model of Dutch Disease.

4.1. Venezuela's Oil Financial Situation

It can be said that the country's poverty situation today is due in some extent to what made Venezuela rich just a few years ago: **oil**.

Venezuela, a charter member of the OPEC cartel[21], has the world's largest oil reserves and is a major oil exporter (Sullivan, 2014) being the U.S. is its biggest customer. Most of Venezuela's oil is of a thick variety that is expensive to refine and transport. But it was not a problem when oil prices in the late 2000's where at $100/barrel.

Because most of Venezuela's oil is produced by the state-owned oil company PDVSA, those profits are controlled by the government. The former president Hugo Chavez used that money to spend heavily on social programmes, and spent even more by borrowing billions of dollars overseas. Many of his efforts worked, in the short-term: Venezuela expanded access to education and health care, boosted employment and reduced poverty by more than half (Weisbrot, Ray, & Sandoval, 2009).

But all that spending and borrowing left Venezuela dependent on ever-rising oil prices. Instead, prices plunged, dropping from over $100 a barrel in mid-2014 to under $30 a barrel earlier in 2015. (It has rebounded to about $50 in recent weeks).

[21] The Organization of Petroleum Exporting Countries (OPEC) was founded in 1960 by Iran, Iraq, Kuwait, Saudi Arabia, and Venezuela, and has since then expanded to consist of 12 members.OPEC regulates the international output of oil on the world market in order to control oil prices through quotas.

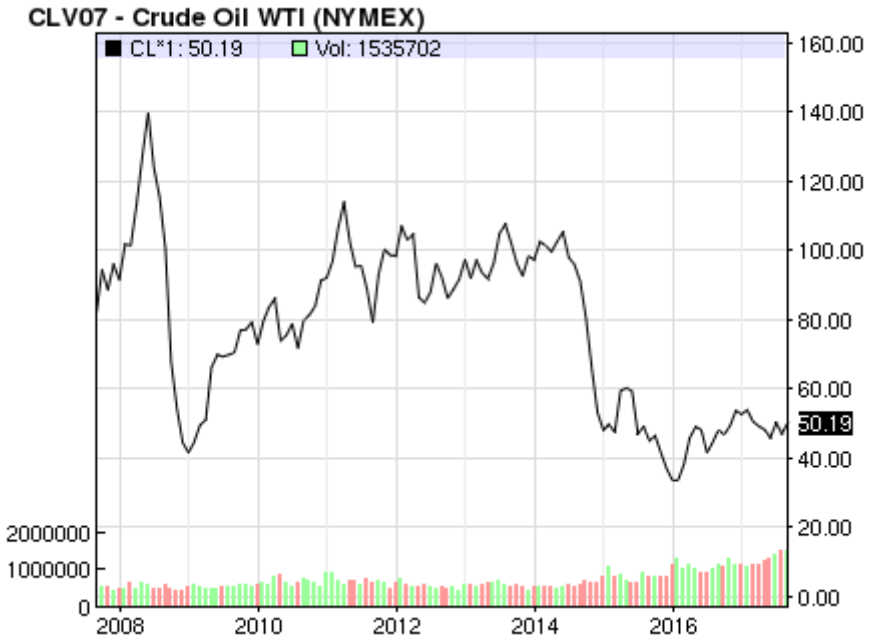

Figure 11: Price of crude oil (NASDAQ, 2017)

The unexpected price slump was bad news for oil-based economies from Riyadh, Saudi Arabia, to Williston, North Dakota. But nowhere was hit as hard as Venezuela, which was left with huge debts and no other meaningful exports to help repay them (Casselman, 2016).

Making matters worse, Chavez's spending on social programmes and international projects[22] left little remaining to invest in PDVSA. (Monaldi, 2015) Old fields were allowed to decline, while new drilling opportunities were not adequately explored. As a result, Venezuelan oil production is not rising and exports are falling due to rising domestic consumption. Meanwhile, production is falling in Venezuela's most profitable fields, those that produce a lighter type of oil. That leaves the country more reliant than ever on

[22] Ecuador and Argentina received economic aid from 2005 and onward (Riggirozzi, 2011) (Baribeau, 2005). Chávez also aimed at other regional projects such as the creation of a joint energy policy in Latin América through Petro-América as a regional OPEC, but also through the Caribbean integration project PetroCaribe from 2004 to assist 17 Caribbean countries (Kozloff, 2015) (Maingot, 2009). Chávez kept strong ties with Cuba by trading subsidised oil for doctors and teachers through the "Oil for Doctors" programme. Venezuela is a strategic economic partner for Cuba, providing 80,000 barrels of oil every day (Højen, 2015).

overseas sales of its heavy crude. Venezuela has been forced to import lighter oil from other countries to mix with its oil so it can sell the blend.

Far worse has been the effect on the Venezuelan people; reductions in poverty have now been reversed, inflation is accelerating faster than it can be calculated, and shops now lack even the most basic products. The IMF estimated inflation could hit 1,660 per cent at the end of 2017, potentially reaching 2,880 per cent in 2018. Currently, the level of inflation is around 700 per cent (Meza, 2016).

In order to carry out a proper analysis of the oil contributions it is important to define PDVSA which is the company in charge of the Venezuela's oil exploitation and what it has brought to the country in the next point.

4.2. Venezuela's state-owned oil producer - Petróleos de Venezuela (PDVSA)

Petróleos de Venezuela (PDVSA), the country's state-owned oil producer and exporter, is a key figure in the Venezuelan economic crisis. In the 1980s and 1990s, PDVSA was one of the world's premier oil businesses, capable of operating on the world stage (Glennen, 2017).

As stated before in the previous point, despite the current situation, Venezuela's government has continued to make payments on its debts, particularly those of PDVSA. After issuing bonds and taking loans to fund the company, PDVSA has a debt far beyond what it can afford (Glennen, 2017).

Venezuela owes roughly $7.2 billion in debt payments. The government had previously been paying this from its cash reserves, but according to the Central Bank of Venezuela, it currently holds only $10.5bn in cash (Gillespie, Venezuela is down to its last $10 billion, 2017).

In 2011, Venezuela had roughly $30 billion in reserves. In 2015, it had $20 billion. The trend cannot persist much longer, but it is hard to know exactly when Venezuela will run completely out of cash.

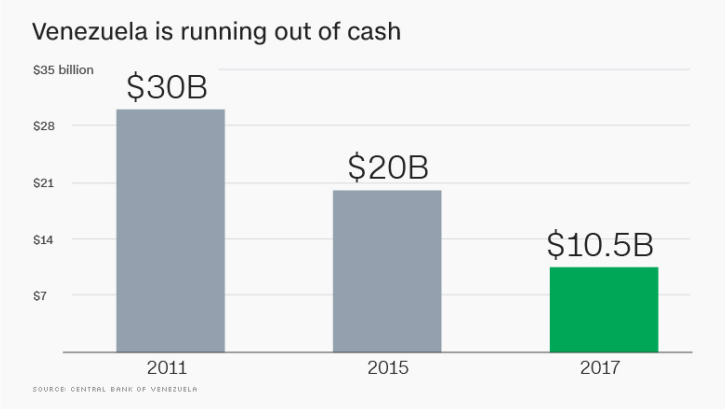

Figure 12: Venezuelas cash reserves, (BCV, 2017)

Like previously mentioned, the government has been very keen, as well as when Chavez was in power, to actually repaying the debt and trying to find other mechanisms to either pay or leverage the debt (Monaldi, 2015). Such payments allow continued relationships with several trading partners, including China, India and Russia, but it is a threat for Venezuela's Economy that could lead, at some point, to go bankrupt and be ruled by others (Rapoza, 2017).

Some of the solutions for not getting the country into bankruptcy will include repaying its debt by subtracting the revenue from international reserves ($11b) and reducing domestic social spending, as well as decreasing the transferring of revenue between PDVSA and the government. Unfortunately Venezuela's is in a very delicate situation which will take time to recover itself (Gillespie, CNNMoney, 2017).

It is very important than when evaluating Venezuela's oil financial situation we study PDVSA's Revenues and Expenses.

4.2.1. Revenues

Oil prices

Oil prices have experienced a dramatic decline over the last two years trying to recovering a bit nowadays. This situation provoked the contraction of the energy sector in Venezuela, because the the oil prices are the main factor behind the shift in production targets for PDVSA[23].

As shown in Figure 12, after an increase of almost 500% in real terms between 1998 and 2014, the price of the Venezuelan oil basket has seen a decrease of more than 60% between 2014 and 2016. Furthermore, nowadays the situation of Venezuela's oil basket is uncertain due to the economic situation of the country (Denning, 2017).

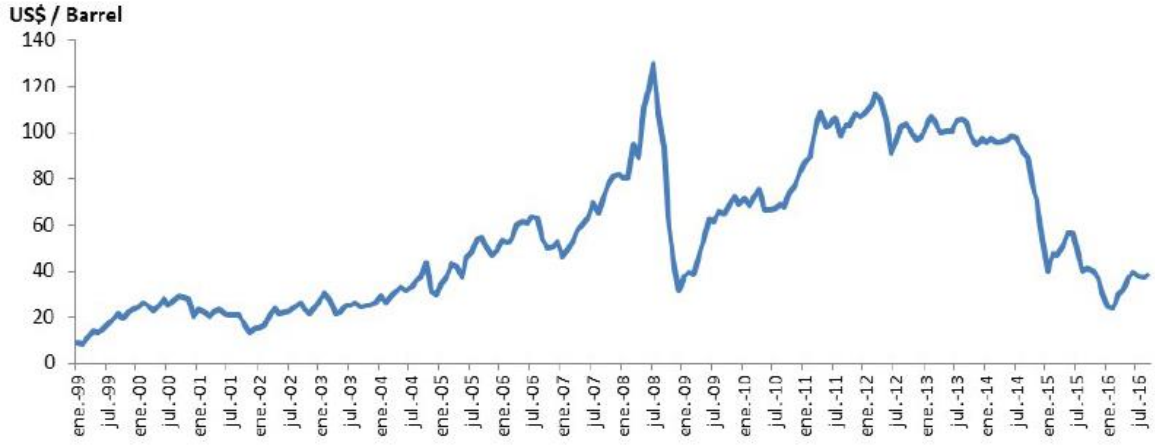

Figure 13: Evolution of the Venezuelan basket price. (Ministry of oil and mining, 2015)

Decline of production

According to PDVSA's annual management report between 2010 and 2015, oil production in Venezuela registered a cumulative decline of 253 thousand barrels per day (kbd), reaching 2.86 million barrels per day (mbd) by the end of 2015.

The figure below shows that oil production has been decreasing during 2016. Just from December 2015 to September 2016, cumulative decline has been approximately 235 kbd.

[23] See figure 10

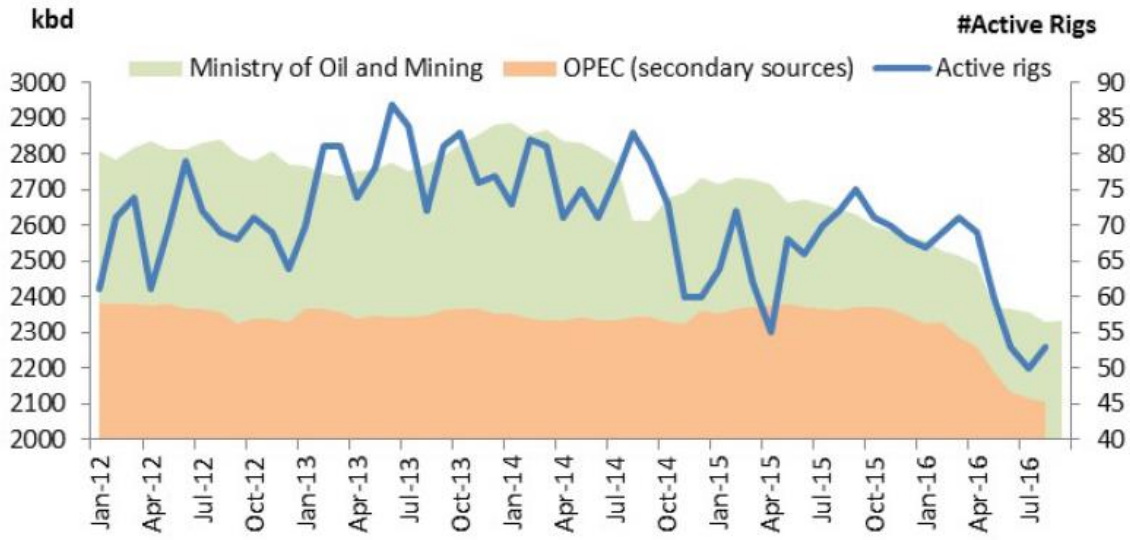

Figure 14: Monthly oil production and active rigs. (OPEC oil Monthly report and Baker Hughes, 2015)

Figure 14 takes into account the investments in Exploration and Production (E&P). These were increasing until 2012 but the output still showed a consistent decline. The reason for this could be that in previous years the efficiency in the E&P investment diminished or that there were limited investments.

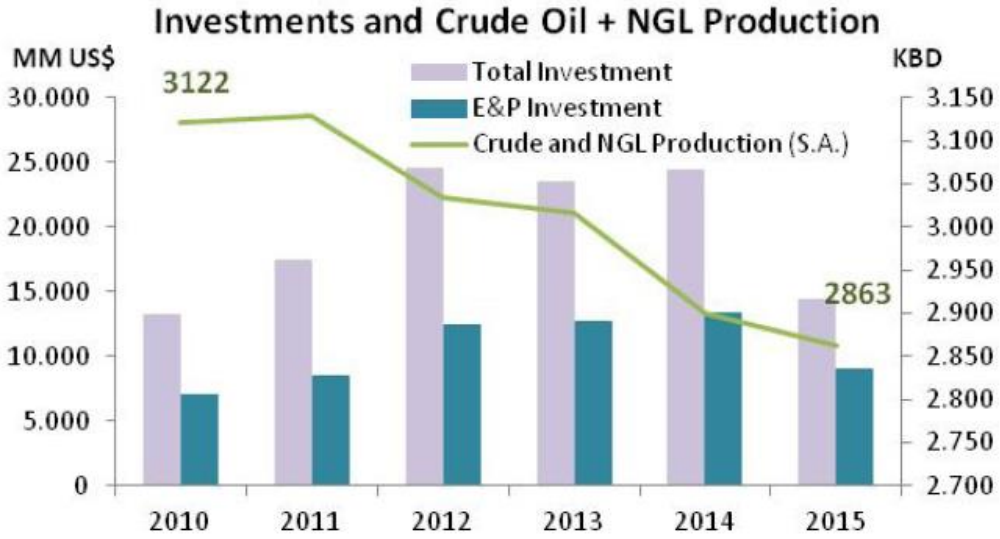

Figure 15: Evolution of oil production and investment in Venezuela (PDVSA Annual Management,2015)

Also, it is important to consider the evolution of oil production by region[24]. Table 6 shows that the only region with a production increase was the Orinoco Oil Belt, with a cumulative increase of 12.0%, whereas the East and West regions showed cumulative declines of 24.3% and 15.8% respectively.

Crude and NGL Production (kbd)							Change
Region	2010	2011	2012	2013	2014	2015	2015/2010
West	843	810	799	777	750	707	-16.1%
East	1,101	1,106	1,061	964	903	837	-24.0%
Orinoco Oil Belt	1,178	1,213	1,174	1,274	1,246	1,319	12.0%
Total	**3,122**	**3,129**	**3,034**	**3,015**	**2,899**	**2,863**	-8.3%

Table 6: Evolution of oil production by region in Venezuela. (PDVSA Financial statements, 2015)

Moreover, in table 7 we can see that the decline in production comes from areas that are entirely operated by PDVSA, which register a cumulative decline of 586 kbd (27.5%) between the years 2010 and 2015. In areas operated by Joint Ventures, there has been an increase of 357 kbd (42.3%). But the situation of the joint-ventures might change due to the reform of the new constitution on the 30th July 2017, where the government wants to nationalize the entire oil production (Gillesple, 2017).

Crude Production by type of contract (kbd)							Change
Region	2010	2011	2012	2013	2014	2015	2015/2010
Fields solely operated by PDVSA	2,130	2,080	1,835	1,775	1,639	1,544	-27.5%
Joint Ventures	845	911	1,075	1,124	1,146	1,202	42.3%
Total Crude Production	**2,975**	**2,991**	**2,910**	**2,899**	**2,785**	**2,746**	-7.7%
NGL	147	138	124	116	114	117	-20.4%
Crude + NGL Production	**3,122**	**3,129**	**3,034**	**3,015**	**2,899**	**2,863**	-8.3%

Table 7: Evolution of oil production by type of contract in Venezuela. (PDVSA and CIEA calculations)

Domestic consumption

As we have concluded in our econometric model with different policy implications, it is clear that the government with PDSVA's it is not using the most

[24] It should be noted that the Orinoco Oil Belt is a region where the reserves are largely comprised of heavy and extra-heavy grades, while the latter are mostly comprised of light and medium grades.

appropriate one, because its cash balances are impacted by highly subsidised domestic consumption which is equivalent to 21% of total production. Moreover, PDVSA does not charge market prices for some of its exports.

An example could be the extremely low price of gasoline. Nowadays, you can acquire 1L of gasoline for US$0.01 in Venezuela which is the lowest price in the world. The average price of gasoline is US$1.08 per 1L[25]. Because of this, the implicit subsidies for local consumption are very large. For the period 2010–2015, gasoline and diesel subsidies, which accounted for 92% of domestic consumption, represented a yearly average of US$ 14.7 billion. In addition, since 2012, given the technical problems and accidents in the local refinery system, an increasing volume of products has been imported, mostly from the US, to sustain the high levels of consumption. Oil product imports from the US were on average 62 kbd between 2010 and 2015, which represented an explicit subsidy of US$ 2.2 billion per year, on average.

The export composition has also been influenced by the developments in the domestic market. In table 8 we can see there have been an increasing share of crude exports and a decline in product exports.

KBD	2008	2009	2010	2011	2012	2013	2014	2015
Crude Oil and Products	**2,876**	**2,682**	**2,465**	**2,469**	**2,568**	**2,425**	**2,357**	**2,425**
Crude Oil	**2,213**	**2,019**	**1,911**	**1,917**	**2,060**	**1,935**	**1,897**	**1,950**
Light	548	551	388	400	358	287	228	114
Medium	320	198	151	138	202	110	85	119
Heavy, Extra-Heavy and Upgraded	1345	1270	1372	1379	1500	1538	1584	1717
Products	**663**	**663**	**554**	**552**	**508**	**490**	**460**	**475**
Residual Fuel Oil	230	301	217	271	262	284	254	279
Distillates	104	108	63	64	43	6	13	15
Gasoline and Naphta	69	48	49	46	30	36	44	48
Coke and Sulphur	54	50	31	32	37	35	37	37
NGL and Natural Gasoline	52	50	33	30	25	22	15	6
Others	154	106	161	109	111	107	97	90

Table 8: Evolution of crude and oil product exports from Venezuela. (PDVSA, 2015)

[25] http://www.globalpetrolprices.com/Venezuela/gasoline_prices/

It is necessary to highlight that the requirements of oil imports have been fostered by the problems in the refinery system, the increase in the production and export of heavy and extra-heavy crudes, and the decline in the production of light crudes.

Receivables

When we study Venezuela's receivables, the first question that arises is: *where do Venezuela's oil exports go?*

The table below shows the destinations of Venezuela's oil exports and their quantities. Its main recipients are the U.S., India, and China. Some of these exports do not generate cash-flow for PDVSA like the case of China, where they are largely used for the amortization of different financing agreements made by Joint Venezuelan-Chinese Fund and Great Volume Fund. Furthermore, a portion of the exports is heavily subsidised, because of regional cooperation agreements with countries in Central America and the Caribbean (e.g. Petrocaribe), as well as bilateral agreements, the most important one with Cuba.

KDB	2010	2011	2012	2013	2014	2015	Change 2015/2010
North America (includes St. Lacroix)	1,262	1,166	1,002	845	837	804	-36.3%
Central America & Caribbean	319	414	379	369	358	296	-7.2%
Asia	541	644	924	1,015	954	1084	100.4%
Europe	200	140	156	107	131	183	-8.5%
South America	82	83	73	67	60	37	-54.9%
Africa	3	10	21	10	8	13	333.3%
Others	10	12	13	12	9	8	-20.0%

Table 9: Crude and oil products exports from Venezuela per continent. (PDVSA Annual Management Report 2010-2015)

US$ MM	2010	2011	2012	2013	2014	2015
Chinese Fund	6,302	14,637	16,213	16,559	14,371	8,371
Petrocaribe	4,968	4,764	2,728	3,214	2,251	108

Table 10: Energy Agreements: Value of Financed Oil Shipping, USD MM. (PDVSA Financial Statements, 2015.)

Table 10 outlines that at least a portion of these agreements has ended up as receivables from the government since the increase in this item is similar in size to the

value of the financing to the energy agreements. Also, figure 16 captures how much of the receivables come from the government and from public institutions.

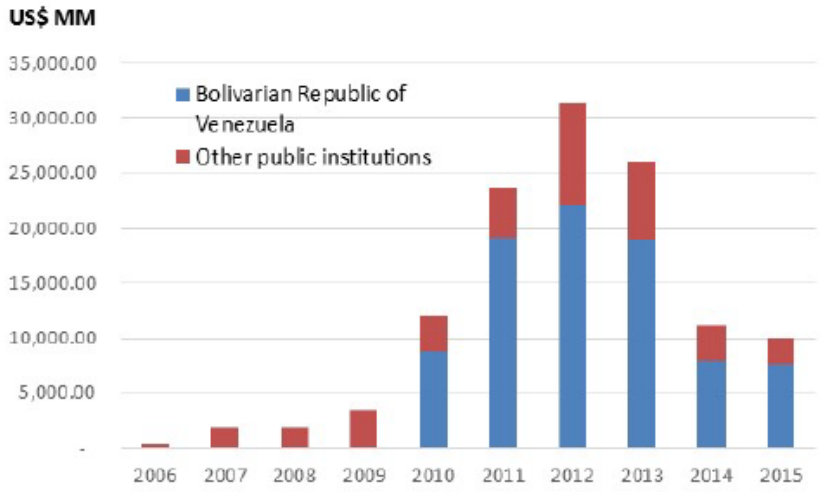

Figure 16: Accounts receivable USD MM (PDVSA financial statements, 2016)

Receivables from other public institutions are summarised in the table below. The largest share is represented by receivables from the National Electric Corporation (CORPOELEC) and the National Petrochemical Company PEQUIVEN.

US$ MM	2010	2011	2012	2013	2014	2015
CORPOELEC	2,357	2,093	2,676	2,857	1,032	304
Fondo Simón Bolívar para la Reconstrucción	305	-	2,612	-	47	64
PEQUIVEN	-	1,138	1,722	2,055	801	777
CVG	-	628	1,220	901	291	102
BANDES	-	90	89	90	90	90
PDVSA's RETIREE PENSION FUND	50	138	279	913	225	7
OTHERS	540	490	595	236	691	1,042

Table 11: accounts receivable by other public insitutions, USD MM (PDVSA Financial statement, 2016)

It is very clear that PDVSA is having problems in managing its revenue, but it is also necessary to know which are PDVSA's expenses just to evaluate how and in which extent it contributes to the government.

4.2.2. Expenses

PDVSA´s expenses have been affected by some of the following factors, which properly characterised Venezuela as a country suffering from Dutch Disease:

- Real appreciation of the official exchange rate.
- Changes in the type of crude being extracted.
- High government-take on the profits of oil projects.
- Large expenditures and transfers for social development and extra-budgetary funds.
- An increasing share of resources devoted to non-oil subsidiaries (newly created and expropriated).
- Increase in expenditures due to a larger payroll (in part resulting from the expropriation of oil service companies).

Operational Expenditures

Venezuela has several upstream oil projects: projects for increasing production in mature fields, brownfield extra-heavy Joint Ventures, mature field projects operated solely by PDVSA and new Greenfield projects in the Orinoco Oil Belt[26] but it has complications to carry them out.

One of the most significant problems for the operation of oil fields in the country during recent years has been the sustained appreciation of the exchange rate applicable to oil exports[27]. Therefore, in the absence of an adjustment in the exchange rate, local inflation levels would imply increasing costs for oil companies. This increase in costs from

[26] For a break down of the projects please see (Monaldi, 2015).
[27] Venezuela introduced a currency exchange in February 2003, by which the VEF/US$ exchange rate is fixed by the Central Bank of Venezuela.

the real appreciation of the exchange rate becomes more relevant as the share of costs to be covered in local currency increases.

In Venezuela, this problem is severely enhanced for two reasons. On the one hand, inflation levels in recent years have been the highest worldwide with an estimation of 720% for this year (Meza, 2016). If we take into account the different characteristics of the projects there exists a significant decline in operational costs at different exchange rates depending on the level of devaluation. On the other hand, there exist multiple rate foreign exchanges that severely distort the cost of production estimates, augmenting the uncertainty around the exchange rate at which oil companies would be allowed to sell their proceeds from exports.

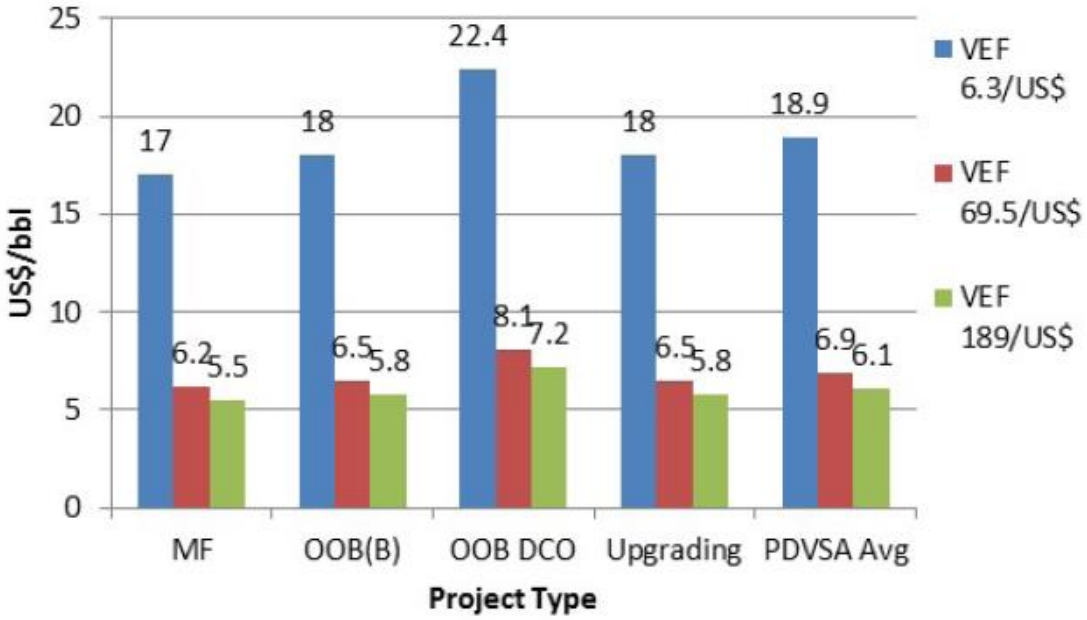

Figure 17: Estimated OPEX by type of project at different exchange rates. (IPD, 2016)

Note: MF=Mature Fields, OOB(B)= Orinoco Oil Belt projects with upgrader, OOB(DCO) = Orinoco Oil Belt new projects with Diluted Crude Oil, Upgrading = Orinoco Oil Belt new projects with upgrader.

With the introduction of the Exchange Agreement No. 35 in March 2016 by the Central Bank of Venezuela, the possibility opens for PDVSA and the Joint-Ventures to sell the proceedings from their exports at two different official exchange rates: the DICOM rate (VEF 3345 per USD by September 2017), and the DIPRO rate (VEF 10 per USD, and

was the only rate previously used to sell foreign currency). Therefore, depending on the exchange rate used the cost per-barrel changes significantly as can be seen in figure 17, then operational costs go from US$ 20 per barrel to US$ 6-8 per barrel, depending of the stage of the project and the fields considered for extraction.

PDVSA's fiscal regime and social expenditures

The direct contributions to the government are PDVSA's transfers to governmental entities or social programmes, and are made through both budget and off-budget mechanisms. These contributions can be classified in three main categories:

- Taxes, royalties, and dividends.
- Social development programmes
- Transfers to the National Development Fund, FONDEN.

According to PDVSA reports, total direct contributions are the sum of these mechanisms. Taxes, royalties, and dividends are PDVSA's main contributions to the state. These are channelled through the National Budget. Social development programmes and FONDEN contributions became relevant after a reform on the Central Bank Law in 2005, which allowed PDVSA to manage oil windfall revenues in off-Budget funds. Revenues are transferred to the Central Bank which might return to PDVSA a portion of the revenue when the Central Bank's International FX Reserves are declared "in surplus." Such surplus is managed by PDVSA for investment, social expenditures, and transfers to FONDEN.

Contributions to the National Budget: Taxes, royalties, and dividends (TRD)

The government's main sources of income are the taxes, royalties, and dividends paid by the oil industry. Between 2010 and 2015 they sum up more than US$ 110 billion or 52 percent of total direct contributions (which also include social programs and FONDEN). Budget contributions include taxes such as: royalties, extractive taxes, export registry taxes, superficial tax, and dividends. Royalties represent over 60 percent of the total TRD in that period.

The main contribution to the government come from royalties and until 2014 from the windfall tax, but after that, due to the oil price decline, there has not been any contribution through this mechanism[28].

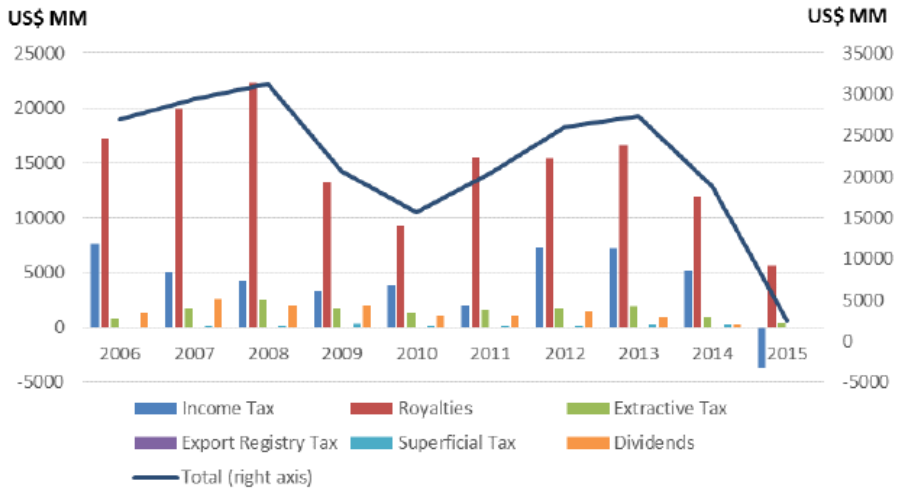

Figure 18 - Tax contributions, USD MM (PDVSA financial statement, 2016)

Royalties are 30% of total production and the extraction tax is equivalent to an additional royalty of 3.3%. As can be seen in Table 12, due to higher costs the government-take is lower in the Orinoco Projects. Assuming an average price of US$32 per barrel the government would receive an average of US$11 (34.3% of the price) per barrel in the Orinoco Belt and US$16 per barrel (49.9% of price) in conventional production.

	2014		2015		2016	
Government Take	**US$ per barrel**	**(%)**	**US$ per barrel**	**(%)**	**US$ per barrel**	**(%)**
Conventional Oil	66.35	75.04	24.79	55.52	15.95	49.85
Orinoco Oil Belt	56.69	64.00	15.63	35.01	10.99	34.33

Table 12: Government-take for conventional and unconventional oil projects. (CIEA calculation,2016).

[28] For further explanation on the contributions included in the government take, please see appendix 14

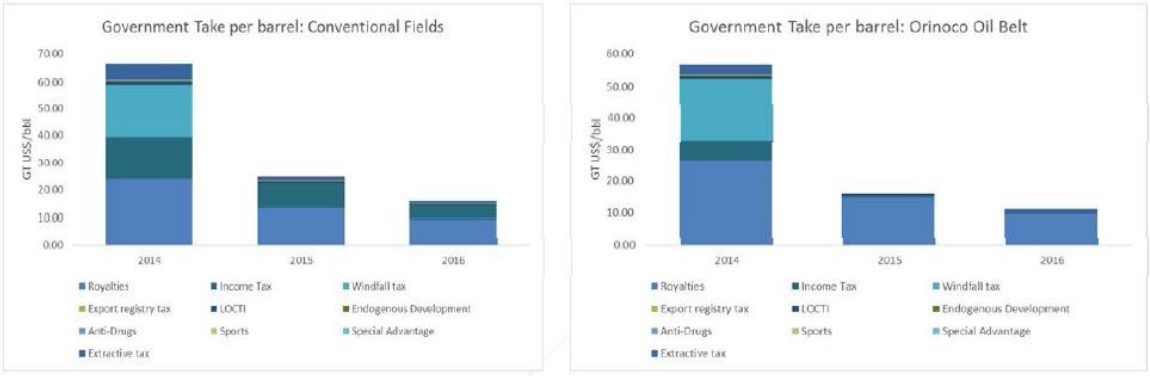

Figure 19: Estimation of government take for conventional and Orinoco Oil Belt projects Source: CIEA calculations

In order to know the cost of extraction of a barrel of oil and gas in Venezuela, the consulting firm Rystad Energy estimated the composition of the cost of extraction in different countries. For Venezuela, their estimate of gross taxes represents 38% of cost, just only below Russia and the highest in absolute terms in their sample.

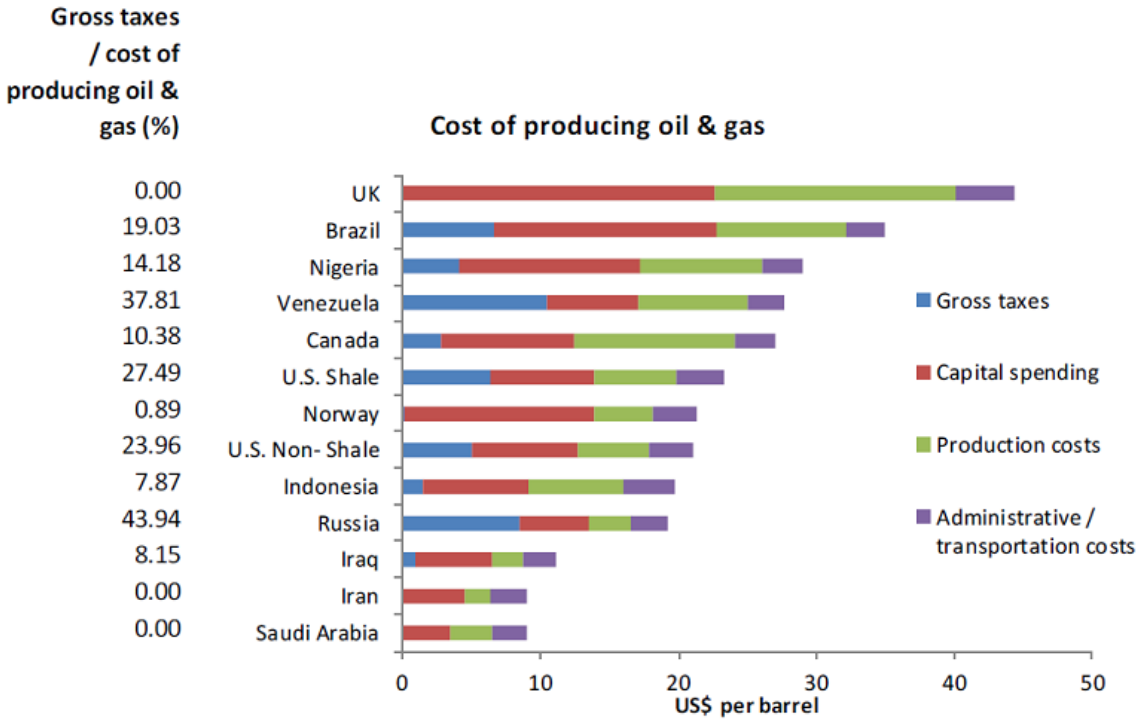

Figure 20: Cost of extraction oil & gas in selected countries. (Rystad Energy and Wall Street Journal, 2016*)*

Social Development Programs

While TRD were part of the budget, social development programs are an off-budget mechanism to finance social policy. Per PDVSA's Financial Statements, expenditure in social development programmes totalled US$ 48 billion from 2010 to 2015

(22.8 per cent of the total direct contributions). In table 13 it is important to notice that there are significant differences in the published figures for transfers related to social programmes, depending on the official source. PDVSA's Annual Management Reports offer figures on expenditures directed to each program[29]. Per this source, around half of disbursements to social programmes are destined to the Chinese Fund, while the two largest social programmes the *Barrio Adentro* Mission and the Miranda Fund get 18 per cent and 17 per cent respectively. The inclusion of payments made for the amortization of the Chinese Fund as a social programme, suggests that a key source of the discrepancy between the two official sources is precisely the write-off on receivables owed to PDVSA by the government. This reflects the fact that Management Reports do not expect the government to pay PDVSA back, nor does it offset the receivables from royalty payments. In order words, the Management Reports are classifying as "social programmes" unpaid debts to PDVSA by the government.

Type of Project	2010	2011	2012	2013	2014	2015	2015
Social Development Programmes							
Financial Statements	5.326 USD	15.604 USD	9.025 USD	7.829 USD	2.015 USD	8.125 USD	48,014 USD
Management Report	22.223 USD	28.657 USD	28.293 USD	23.341 USD	15.681 USD	19.242 USD	137,437 USD

Table 13: Social development contributions according to PDVSA reports, USD MM, 2010-2015

National Development Fund (FONDEN)

FONDEN (Fondo Nacional para el Desarrollo Nacional) is a government entity created in 2005 with the reform of the Banco Central de Venezuela Law. Its objective is to finance "production, education, health, *special circumstances*, and public debt". FONDEN is funded by PDVSA's oil revenue and the "surplus" international reserves from the BCV. Since the creation of the oil *windfall tax*, the receipts that it generates also go to FONDEN. According to the law, the Executive Board sets the international reserves level above which a "reserve surplus" must be recorded. PDVSA can retain the funds above this level. These funds are then allocated to PDVSA investments, social development programs, and FONDEN. Net contributions to FONDEN discount government subventions, i.e. compensations of expenditures already done in both currency and non-currency assets.

[29] The description and purpose for each program is described in Appendix 15

Once disclosed Venezuela's oil economic situation it is necessary to relate all this information with the econometric model developed in Chapter 2 in order to exemplify Venezuela as a proper case of Dutch Disease.

4.3. Venezuela, a model of Dutch Disease

As we showed in the econometric model for Venezuela there are not all statistical parameters available. Therefore, a bit different analytical approach is used. According to the numerous descriptions of the Dutch Disease the following effects can be used as symptoms:

1) Volatility of the GDP with the respect to natural resources market
2) Booming of the natural resources exploration sector
3) Declining or stagnation of the manufacturing sector
4) Growth of the services sector
5) Reinforcement (appreciation) of local currency
6) Growth of real wage rate

4.3.1. Volatility of the GDP with the respect to natural resources market

Figure 23 shows significant fluctuations of Venezuelan GDP during the 1980-2013 year period.

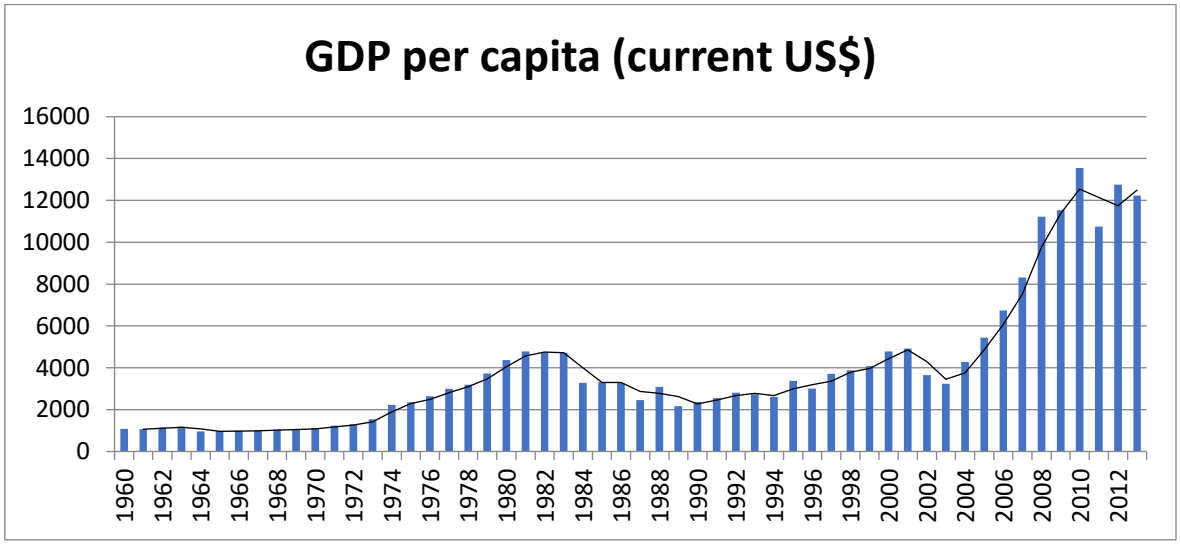

Figure 21: GDP of Venezuela in current US dollars from 1960-2013. (Worldbank, 2017)

There were periods of growth of GDP: 1980-1983, 1990-2001, 2004-2012; and periods of relative "stagnation" (because there was no certain growth trend): 1984-1989, 2002-2003, 2011.

The fluctuation of world prices indicates that from 1975-2013 there were several growth trends in the crude oil prices in the years 1978-1981, 1989-1990, 1999-2008, 2010-2013.

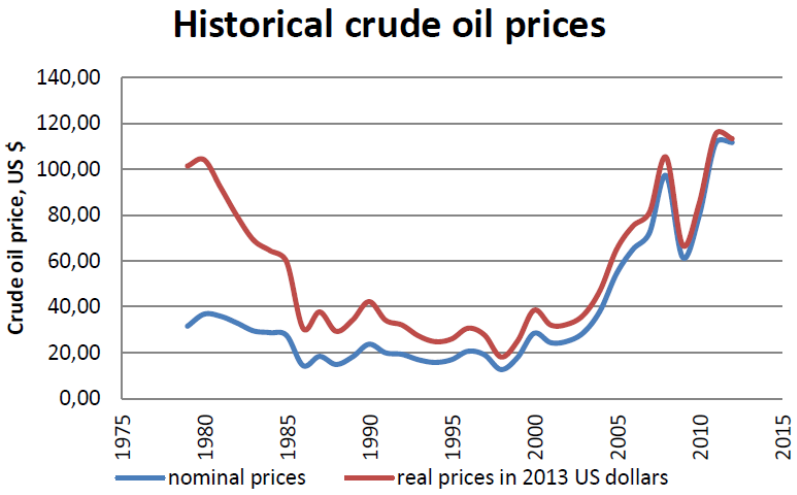

Figure 22: Nominal and real crude oil price. (Statistical review of world energy, 2016)

The comparison of the GDP growth periods with the oil prices growth periods reveals the following:

1) 1980-1983 GDP period of high GDP (slight growth) matches a period of high oil prices in 1980-1983. Further drop of the world oil prices is accompanied by a sharp decrease of Venezuelan GDP and long relative "stagnation".
2) Jump of the oil prices in 1989-1990 is not responded by the jump in Venezuelan GDP, but 1990 establishes almost a decade of stable growth.
3) Growth trend of oil prices since 2000 is followed by the growth of GDP, but in 2002 there was a significant drop of country's GDP. The most probable reason is political instability due to the attempt of turnover against President Hugo Chavez.
4) Since 2004 the GDP of Venezuela is visibly following the growth trend of world oil prices.

According to the facts given above, it is possible to conclude that Venezuela has such a symptom of Dutch Disease as volatility of the GDP follow the same trend as the natural resource market prices.

4.3.2. Booming of the natural resources exploration sector and declining or stagnation of the manufacturing sector

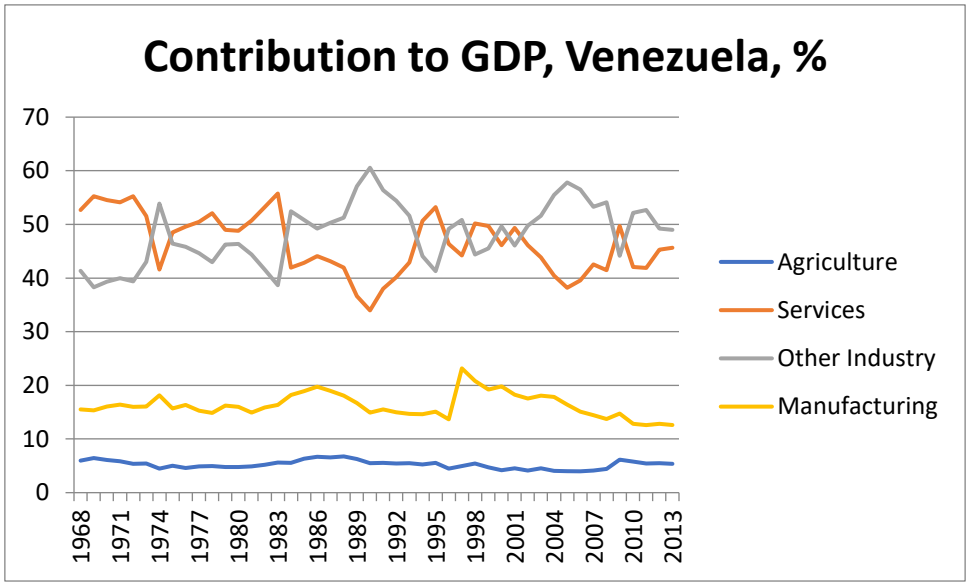

Figure 23. Contribution to GDP of various sectors of enezuelan economy in the period of 1980-2010. (WorldBank, 2017)

Figure 25 shows the share of industry, agriculture and services in the GDP of Venezuela from 1968 till 2013. The explanation of the plot will be as follows:

Venezuela's economy has 3 main sectors: agriculture, industry and services which together form 100% of GDP. The industry sector is divided into two sub-parts: "manufacturing" and "other industry". Since the data on the economic development of purely oil sector of Venezuela is not available, so oil sector is naturally a part of the industry category. At the same time, The World Bank delivers the statistic data on manufacturing. This would be the percentage of manufacturing to non-oil GDP. Although there might be other industries which are not counted in the manufacturing sector, it is possible to assume that among the rest of the industries, oil and gas extraction will be the major contributor to GDP in Venezuela.

As it was assumed that sector "other industry" is mainly formed by natural resources industry from figure 25 it can be noticed that:

- Resource extraction sector was in a decline after the 1980 following the price trend of oil; later it has grown till the pike in 1990;
- Decline in oil prices in the 1990's is followed by the decline of the resource sector in the share of Venezuelan GDP;
- Rising trend of the oil prices in the beginning of 2000th is followed by the growing trend of the resource sector;
- Fluctuations in the oil price after the beginning of World Economic Crisis in 2008 are repeated by the resource sector of Venezuela.
- There is additional evidence that Venezuelan export is mainly dependent on the resource extraction sector. Figure 26 shows that the resource sector and exports of the country are in pro-cyclical relation. At the same time, manufacturing performs rather counter-cyclical correlation with exports trends. Growth of resource sector is always accompanied with the decline of manufacturing contribution to GDP. (Services and agriculture are not considered for the following reason: services are usually consumed domestically and agriculture clearly shows stable low fluctuations in the contribution to country's GDP[30]);
- Data on the volumes of Venezuelan oil petroleum exports shows the same behaviour as total exports of Venezuela [31]
- Additional information from figure 28 shows that high-tech export of Venezuelan manufacturing is relatively small, it is near 3-4% of all manufacturing exports. That means low competitive advantages of countries high-tech.

[30] Check figure 25
[31] Check figure 27

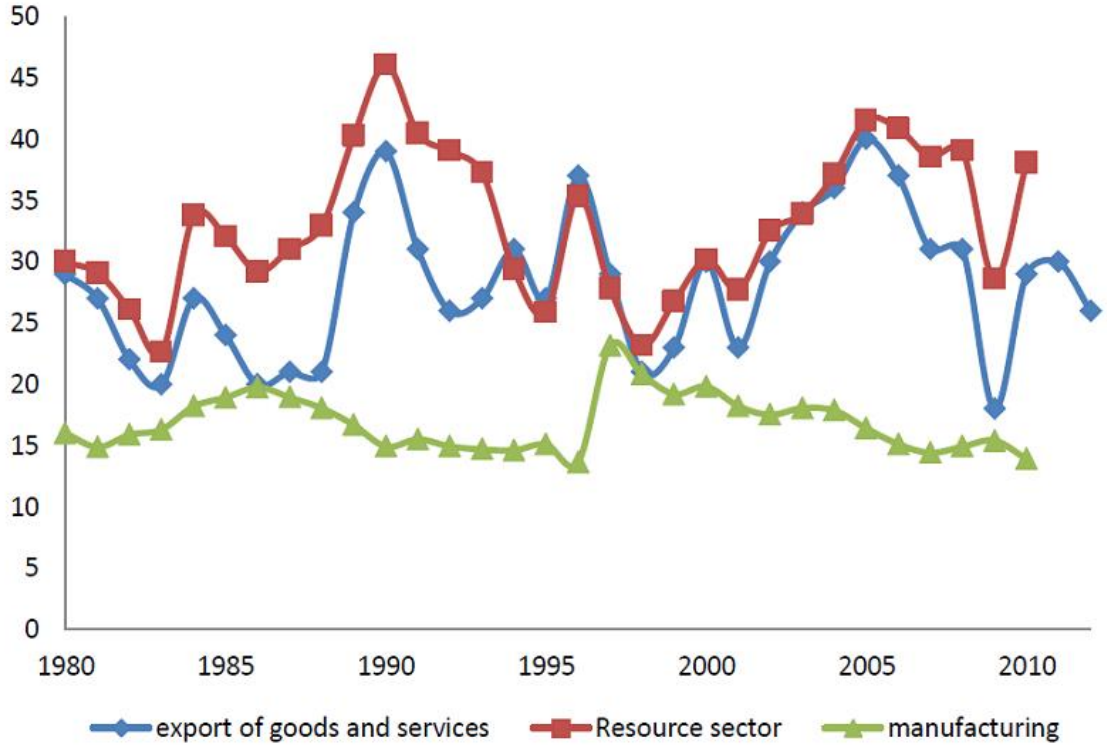

Figure 24: Share (%) of Venezuelan GDP contributed by the exports of goods and services, resource sector and manufacturing in 1980-2013. (WorldBank, 2017)

Figure 25: Real Prices of Venezuelan oil exports. (the Ministry of Energy and Mining, US, 2011)

Figure 26: High tech exports, % of manufacturing exports of Venezuela.

So, there are clear evidences that in the periods of high market prices on oil there were "booms" in the resource sector of Venezuela, therefore, two of the above before mentioned symptoms booming resource sector and declining or stagnation of the manufacturing sector are detected.

4.3.3. Growth of the services sector

Figure 25 shows that the service sector does not follow the same trend as the resource sector.

Generally, services sector contributes from 35 to 50% of country's GDP. So, there is no opportunity to clearly detect this symptom.

4.3.4. Reinforcement (appreciation) of local currency

The analysis of the Venezuelan currency appreciation is rather complicated and it can be seen when developing the model in chapter 2. First of all, there was a strong devaluation in 1983. Second, there was a money reform in 2007 when 1000 Bolivars were exchanged to 1 Bolivar Fuerte (VEB). And third, since 2003 the adoption of exchange control has been established with the fixed VEB-USD exchange rate which changed several times and which is highly deviating from the black market exchange rate in the country.

As explained in chapter 4 within the expenses section, nowadays it can be said that Venezuela is experiencing one of the biggest appreciation of its currency in history

establishing a very controversial currency system with 4 different types of currency exchanges. You can be in either the most expensive or cheapest country in the world if you compare its exchange rate with official one or the one from the black market (Disilvestro, 2016). Moreover, this situation is not caused by the dependence on the oil itself but rather on how the government spends the oil revenue. If we take for instance the inflation of the country, the booming energy sector causes domestic inflation greater than the world inflation rate and in this case Venezuela is expected to reach the massive magnitude of 720% at the end of the year (EFE, 2017).

4.3.5. Growth of real wage

For the analysis of this symptom in the absence of real wage rate historical data an indirect indicator, GDP per capita is used. In our econometric model we use the IPC, but when it comes to study the fluctuations of income in a population, it is more accurate to use the GDP per capita. This approach is based on the following statement regarding the real wage rate in Venezuela: "*during the fast growth period, wages appear to have risen more or less commensurate with the growth of output per capita*." where output per capita is a function of the GDP per capita (Berry, 2008).

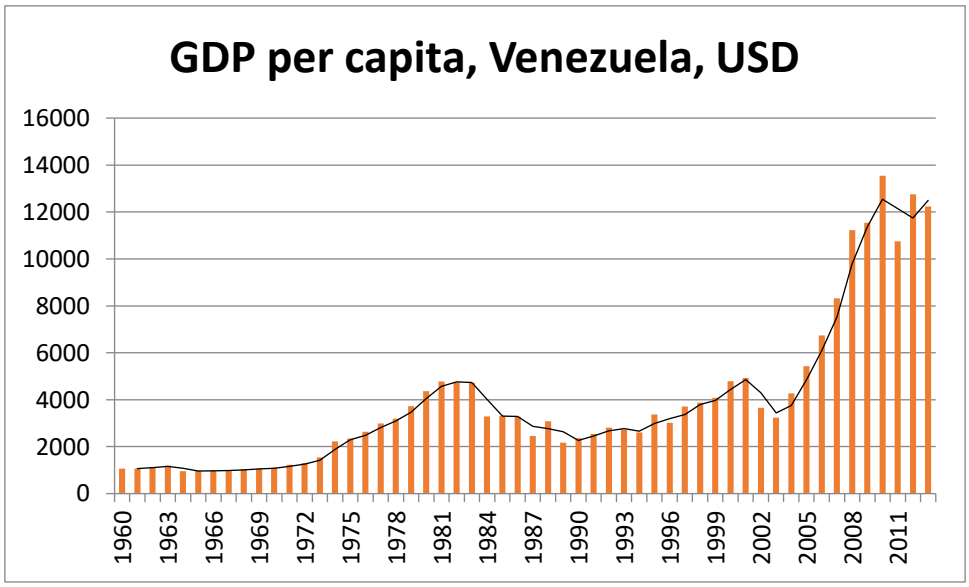

Figure 27: GDP per capita in Venezuela in 1960-2013 in current USD. (WorldBank, 2017)

As it can be seen from Figure 29, incomes of Venezuelan citizens are in pro-cyclical correlation with the oil prices, which means that during the oil booms, the country's economy experiences the rise on wage rates.

4.4. Conclusion for Venezuela

The analysis of Venezuelan economic indicators in the last three decades concludes that the Venezuelan economy performs rather typical features of a country exposed to Dutch Disease. Despite the absence of a proper accurate exchange rate analysis of local currency and relatively rough real wage rate analysis, most important symptoms of Dutch Disease are clearly detected. It means that the Venezuelan government did not manage to transfer the export revenues of the natural extraction sector to the creation of a strong and competitive manufacturing industry. On the contrary, the over spending of these revenues into repaying debt and investing in social programs have brought the country into the critical situation it is now.

Moreover, the country wasted a tremendous opportunity during a decade of high oil prices. A combination of massively dismissing human capital, the nationalization of operators and service companies, and the over-extraction of resources from the National Oil Company; led to investment stagnation and production decline, as well as PDVSA and the industry also face significant operational difficulties that would make it hard to rapidly recover production, even if the cash-flow and institutional environment significantly improves.

To conclude we can say that export revenues were mainly spent on solving current issues rather than investing in the long-run (Berry, 2008). However, there is no doubt that the outstanding resource base of Venezuela with better macroeconomic policies, and a more pro-investment regulatory framework, could lead to significant increases in production in the medium-term.

Chapter 5

5. Comparison

Here we will compare Norway's and Venezuela's oil economic situation and how Venezuela could learn to beat Dutch Disease by Norway's successful performance.

5.1. The comparison of the oil in Norway and Venezuela

Venezuela was the first of these two countries to discover oil on their territory. Already in 1913 the first oil field was discovered. Not until 1928 did Venezuela become an exporter of oil, and was at this point the second largest oil producer of oil in the world. Venezuela was also the first oil exporting country in the world, from 1928 until 1970. At its peak, Venezuela exported as much as 3 790 000 barrels a day. (PDVSA, 2016) Even though Venezuela was so advanced in their oil production at that time, it was not until 2005 that Venezuela created its first fund of oil reserves, called FONDEN.

Venezuela has another fund, the FEM, created in 1998 by Caldera and implemented by Chavez in 2003, into which the excess of the barrel price of oil goes, and it is also operating as an investment fund. (Gaceta Oficial, articulo 152, 2005) But due to its lack of transparency it is not working in the way it was intended to. (Cordero, 2017) This means that the only investment fund in function in Venezuela is FONDEN. From the time Venezuela found oil and began trading it, it has had plenty of opportunities to create the foundation to be a wealthy and thriving country. If we compare Norway and Venezuela from the 70's, when Norway discovered oil, they had almost the same starting point in terms of GDP per capita. At this time Venezuela had all the same advantages as Norway, but where Norway has managed to increase their wealth rapidly, Venezuela has stagnated. From the beginning of Norway's oil adventure, they created the 10 oil commandments, and later on the government pension fund with the government pension fund act. These laws were created to make sure Norway remained in control over the Norwegian Continental Shelf, and that the oil revenue was always used to Norway's advantage. They did this by investing money in a long-term perspective and facilitate

savings to finance pension expenditure that would benefit both current and future generations. In contrast to Venezuela, Norway's oil income and expenditures are very transparent. Everyone has access to information about how much money the Government Pension Fund is making and how the money is spent. Every year, when the Norwegian government puts up the yearly budget, everyone has access to see how their tax money and oil money are being used, and how the Norwegian people will be profiting later, from the taxes they are paying now. The complete transparencies of the oil fund and the laws that are in place have installed trust in the Norwegian population to those in control. People trust that those in control are acting for the benefit of both the current and the future generations – a prime example of great governing style. The trust and transparency also instils a sense of freedom for those in control of the fund. Everyone knows the commandments that they have to work by and therefore they are much more able to defend or explain the reasons for new initiatives being made or additional expenditures.

To give a clearer picture of the economic development in the two countries, we have added a graph, with numbers from the Worldbank, showing the development of GDP per capita for both Venezuela and Norway from 1960 to 2013 and 2015 respectively, these are shown in figure 30 below. As commented on earlier in this analysis, Norway began to extract oil in the beginning of the 1970's and from there the GDP took off. The chart also further exemplifies what was previously mentioned, namely that Norway was able to capitalize on their newfound oil revenue almost from the onset and has used this industry to propel their economy to being one of the richest in the world measured in GDP per capita.

The fact that Norway has been able to propel themselves into a positive growth spiral over the past 50 years, except for the worldwide recession, is a testament to their dedication to uphold the 10 commandments they initially created.

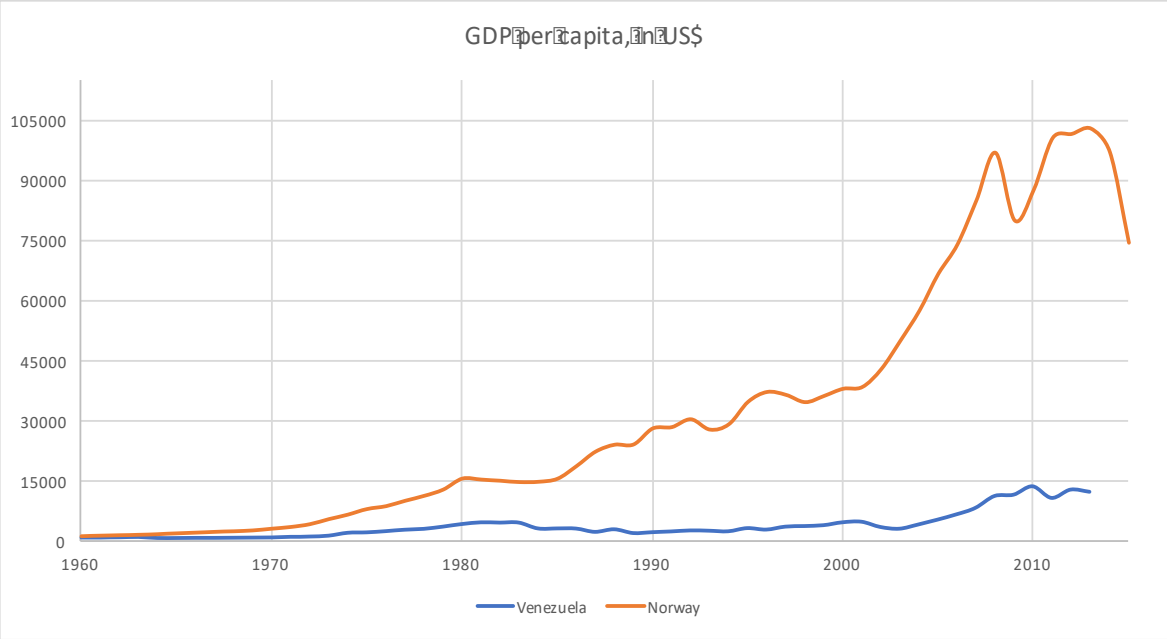

Figure 28 – GDP per capita, in US$ (worldbank, 2017)

From figure 28, we clearly see how Venezuela has been unable to create a very much higher wealth over the years despite their massive oil access, whilst Norway has done the complete opposite.

Having analysed and discussed the intricacies of each country's oil dependency, the connections that the oil revenues have had on the country's GDP developments throughout the years as well as the demographic similarities and differences, the next and final part of the analysis will focus more detailed on how the oil resources, that are present in each country, has lead to Dutch Disease in both countries and how it has been beaten in Norway and still is present in Venezuela.

5.2. The comparison of Dutch Disease in Norway and Venezuela

The analysis that has been conducted on both Norway and Venezuela in regards to their exposure and connection with the resource curse Dutch Disease reveals two economies that are vastly different. The countries are almost polar opposites when it comes to the management and utilisation of the increased revenues that they both benefitted from as a result of discovering and exporting oil. Everything from the

management of the oil sector, the governing body taking strategic decisions regarding expenditure and growth and the actual effects of the many initiatives taken couldn't have had more different outcomes.

One of the main indicators of Dutch Disease in a country's economy is a highly volatile GDP growth rate, which is often correlated to the fluctuations in the natural resources price. The figure below illustrates the differences in GDP growth rate between the two countries. Having analysed Norway's Annual GDP growth rate previously, it is clear that the country mainly experiences positive growth except for a few hick ups, which the global recessions take credit for. The opposite can be said for Venezuela. As previously discussed the economy and therefore the Annual Growth rate in GDP, has been highly dependent on its oil resources and continues to be so. This has resulted in a highly volatile GDP growth rate based on the fluctuations in the oil price. Because of this, it is clear that Venezuela's economy is highly resource dependent, indicating that they are in fact experiencing the effects Dutch Disease, while Norway could be labelled as resource abundant and thereby not effected by Dutch Disease.

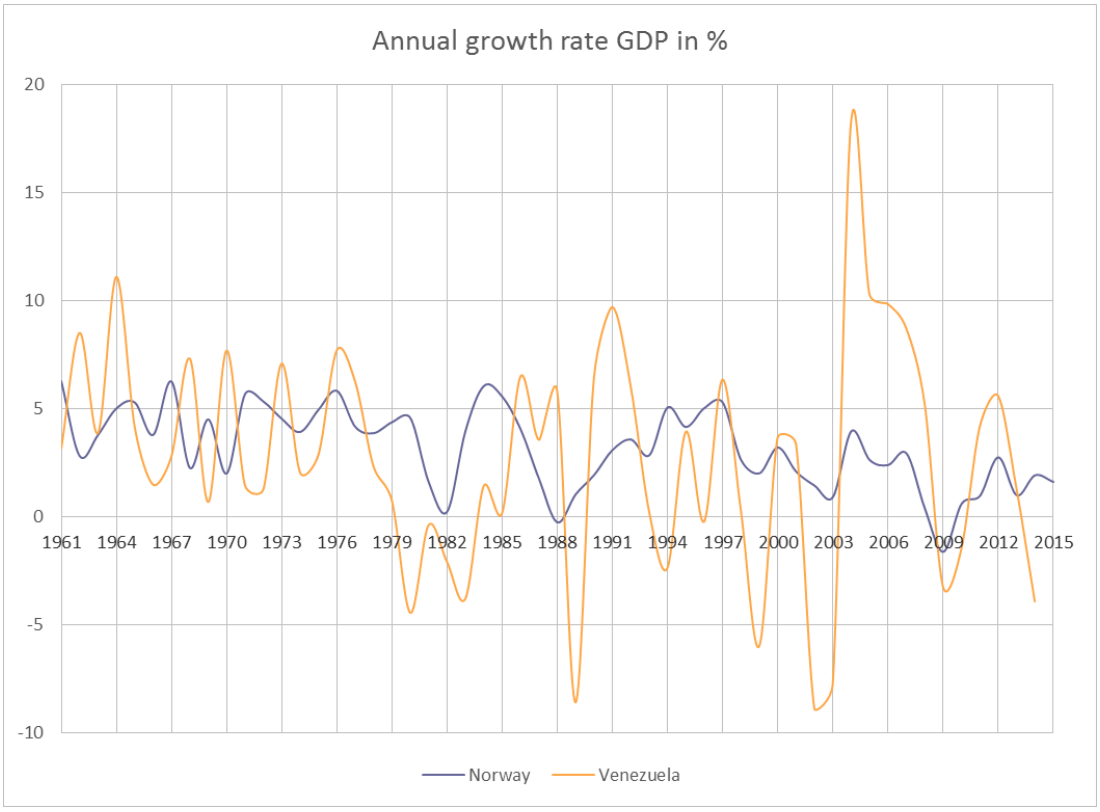

Figure 29: Annual growth rate GDP in %. (WorldBank, 2017)

Another factor indicating the presence of Dutch Disease that is completely different in the two countries, is the management and utilization of the revenues gained from extracting and exporting the country's natural resources. Venezuela has failed to make sufficient investments into the country's infrastructure as well as strengthening the servicing and manufacturing business, making them almost completely dependent on its oil export. Having chosen the short-term solutions, and badly executed long-term plans, Venezuela now finds itself in a difficult spot despite its vast natural resources. This is another heavy indication that Venezuela is experiencing the effects of Dutch Disease. Once again, the opposite can be said of Norway. From the beginning of the oil discovery Norway has been very methodical and well planned in how they plan to export the oil and how the revenues should be spent. Throughout the past 40 years, the government has taken wise, long term strategic decisions that not only empowers the current state of the country's economy, but also ensures that the rest of the economy follows suit and the future generations are secured financially as well. Everything from the planning, to the execution and the maintenance of the oil sector has seen completely different development lines in the two countries. Where the Dutch Disease heavily impacts Venezuela, Norway is not experiencing the symptoms.

Conclusion

From the onset of this paper, the main goal was to outline the different implications of having a large, oil based economy and the implications that this have had on the economy. Having pre-existing knowledge on the two vastly different economical statuses of Norway and Venezuela it made sense to analyse their economies, the effect that oil has had, the measures that the governments have taken to ensure prosperity and continued growth and then compare the two.

As expected, the models and the theory utilized in exploring the problem statement confirmed and explained the reasoning behind the differences of Norway and Venezuela. This being that Dutch Disease heavily affects Venezuela where Norway has managed to separate itself from the same symptoms that Venezuela is the victim of.

It has proven difficult to compare many of the factors involved in Dutch Disease between the two countries, as they are drastically different from the level of transparency in the government to the amount of data available publicly. Everything from general government policies, initiatives taken, and the results from said initiatives have been difficult to analyse properly due to the lack of transparency in Venezuela. This further goes to prove the notion that Dutch Disease indeed heavily affects Venezuela.

Digging deeper into the findings, we find that the way in which Norway has managed and handled their oil resources and the enormous additional revenues that follow, could be the blueprints for countries that suddenly come into possession of otherwise unutilized natural resources, and could be considered a prime example of how to utilize their natural resources. By keeping strict government control, setting up guidelines and following through with the agreed procedures, appears to be the main factoring pillars in avoiding Dutch Disease. Additionally, having complete transparency of the revenue and the way that the revenue is being invested and utilized in the country ensure that the country's population is kept happy and supportive of the initiatives.

Through the actual analysis of Dutch Disease, there are two main countermeasures for combatting the symptoms for a country that is already affected such as Venezuela. Firstly, they must sterilize the additional income generating from the resource sector. In order for this to happen the country must create a fund for collecting the funds and not letting all of this income flow directly into the domestic economy. Doing so will aid in long-term projects instead of the current short-term thinking and utilization. This however, has proven difficult to complete in low-income countries, as the sterilization of funds will create an initial drop in the economy. A second countermeasure would be to utilize the funds in a proper manner by investing in infrastructure to boost the countries' other sectors. As shown, Venezuela's export is almost completely made up of oil revenues, making them almost entirely dependent on the demand and price. If Venezuela was able to secure some of the revenues gained from the oil sector, and invest it in infrastructure and better possibilities for other segments of the economy to thrive, they would have taken the first couple of steps in order to rid themselves of Dutch Disease.

This is easier said than done, and as the current situation in Venezuela shows, there is a lot of distrust to government. The public has no idea of how the oil revenue is spent and they aren't experiencing any positive side effects from having the natural resources.

By using Venezuela and Norway as main focus points in this paper has proven to be the equivalent of comparing the best-case scenario to the worst-case scenario in regards to utilization of having vast oil resources. But through comparing two so drastically different ways of utilizing oil resources, more definable answers have been found, and reasoning for failing and possibilities to change have been outlined clearer. Venezuela is obviously in a difficult position, and you cannot expect them to change overnight, or even over the next decade to experience the prosperity that Norway has. It

is a process, and it all begins with the government's decision to properly manage the oil revenues and spend it in a smart long-term strategic manner.

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Appendices

Appendix 1

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0,98276142
R square	0,96582002
Adjusted R Square	0,96343537
Standard Error	0,02587996
Observations	47

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	3	0,813804119	0,27126804	405,015411	1,56682E-31
Residual	43	0,028800202	0,000669772		
Total	46	0,842604321			

	Coefficients	*Standard Erros*	*t Stat*	*P-Value*	*Lower 95%*	*Upper 95%*	*Lower 95,0%*	*Upper 95,0%*
Intercept	0,40099282	1,485042114	0,270021179	0,78843569	-2,593879986	3,395865631	-2,593879986	3,39586563
GE	-0,03843339	0,141587771	-0,271445696	0,78734723	-0,323972341	0,247105559	-0,323972341	0,24710556
MS	-0,42738386	0,139819891	-3,056674261	0,00383852	-0,709357543	-0,145410182	-0,709357543	-0,14541018
RGDP	0,5311273	0,199618558	2,660711054	0,0109168	0,128558121	0,933696489	0,128558121	0,93369649

Appendix 1: Norway´s DD regression using GE (WorldBank, 2016)

Appendix 2

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0,98273326
R square	0,96576467
Adjusted R Square	0,96337615
Standard Error	0,0259009
Observations	47

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	3	0,81375748	0,27125249	404,337416	1,62224E-31
Residual	43	0,028846841	0,00067086		
Total	46	0,842604321			

	Coefficients	*Standard Erros*	*t Stat*	*P-Value*	*Lower 95%*	*Upper 95%*	*Lower 95,0%*	*Upper 95,0%*
Intercept	0,53713678	1,39367072	0,38541154	0,7018326	-2,273468055	3,34774161	-2,27346805	3,34774161
RER	-0,00385153	0,060580254	-0,0635773	0,94960144	-0,126023252	0,11832019	-0,12602325	0,11832019
MS	-0,4607768	0,068740719	-6,70311293	3,4682E-08	-0,599405673	-0,32214793	-0,59940567	-0,32214793
RGDP	0,51584791	0,191277571	2,69685521	0,00995522	0,130099933	0,9015959	0,13009993	0,9015959

Appendix 2: Norway´s DD regression using RER (WorldBank, 2016)

Appendix 3

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0,9384567
R square	0,88070097
Adjusted R Square	0,87047534
Standard Error	0,06251886
Observations	39

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	3	1,00990772	0,33663591	86,12681098	3,1495E-16
Residual	35	0,136801266	0,00390861		
Total	38	1,146708986			

	Coefficients	*Standard Error*	*t Stat*	*P-Value*	*Lower 95%*	*Upper 95%*	*Lower 95,0%*	*Upper 95,0%*
Intercept	7,56846566	0,662054711	11,4317828	2,28531E-13	6,22442315	8,91250817	6,22442315	8,91250817
RER	0,43386341	0,165247654	2,62553446	0,012743023	0,09839284	0,76933398	0,09839284	0,76933398
MS	0,00868479	0,132185264	0,06570166	0,947989211	-0,25966556	0,27703514	-0,25966556	0,27703514
IPC	-1,57790597	0,438398324	-3,59925183	0,00097758	-2,46790188	-0,68791006	-2,46790188	-0,68791006

Appendix 3: Norway's DD Regression using Venezuela's variables (WorldBank, 2016)

Appendix 4

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0,97724911
R square	0,95501582
Adjusted R Square	0,95187739
Standard Error	0,07308062
Observations	47

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	3	4,87555153	1,625183843	304,297231	5,71976E-29
Residual	43	0,229653438	0,005340778		
Total	46	5,105204968			

	Coefficients	*Standard Error*	*t Stat*	*P-Value*	*Lower 95%*	*Upper 95%*	*Lower 95,0%*	*Upper 95,0%*
Intercept	21,1399729	4,193508016	5,041118982	8,8462E-06	12,68295806	29,5969877	12,6829581	29,5969877
GE	1,06229005	0,399819943	2,656921123	0,01102243	0,255976302	1,8686038	0,2559763	1,8686038
MS	-1,20476142	0,394827749	-3,051359542	0,00389466	-2,001007451	-0,40851539	-2,00100745	-0,40851539
RGDP	-1,52934097	0,563689081	-2,713093123	0,00954918	-2,666128327	-0,39255361	-2,66612833	-0,39255361

Appendix 4: Norway's DD regression using manufacturing and agriculture as dependent variable (WorldBank, 2016)

Appendix 5

Sum of square difference residuals	0,02307484
Sum of the square residuals	0,0288002
	0,80120414

Residuals	*R2*
-0,038109013	0,0014523
-0,032803021	0,00107604
-0,018380224	0,00033783
0,005768855	3,328E-05
0,028143166	0,00079204
0,033745294	0,00113874
0,007717791	5,9564E-05
0,015475941	0,0002395
-0,008859108	7,8484E-05
0,030654609	0,00093971
-0,028857255	0,00083274
-0,040504826	0,00164064
-0,037769109	0,00142651
-0,036430442	0,00132718
-0,011255651	0,00012669
-0,005085004	2,5857E-05
0,01224029	0,00014982
0,043056773	0,00185389
0,058054711	0,00337035
0,036238516	0,00131323
0,007546648	5,6952E-05
-0,007151978	5,1151E-05
0,00425936	1,8142E-05
0,008863216	7,8557E-05
0,017339774	0,00030067
0,035907211	0,00128933
0,007287964	5,3114E-05
-0,00241549	5,8346E-06
0,043105616	0,00185809
0,023465582	0,00055063
-0,032990004	0,00108834
-0,005266682	2,7738E-05
0,005832347	3,4016E-05
0,00422489	1,785E-05
-0,008468639	7,1718E-05
-0,01676326	0,00028101
-0,001407741	1,9817E-06
0,025534142	0,00065199
-0,003698188	1,3677E-05
-0,016405442	0,00026914
-0,013100663	0,00017163
-0,032213223	0,00103769
-0,039498356	0,00156012
-0,027967776	0,0007822
-0,007563931	5,7213E-05
0,002698925	7,2842E-06
0,015803405	0,00024975
	0,0288002

Residuals			
-0,032803021	-0,03810901	0,00530599	2,8154E-05
-0,018380224	-0,03280302	0,0144228	0,00020802
0,005768855	-0,01838022	0,02414908	0,00058318
0,028143166	0,00576886	0,02237431	0,00050061
0,033745294	0,02814317	0,00560213	3,1384E-05
0,007717791	0,03374529	-0,0260275	0,00067743
0,015475941	0,00771779	0,00775815	6,0189E-05
-0,008859108	0,01547594	-0,02433505	0,00059219
0,030654609	-0,00885911	0,03951372	0,00156133
-0,028857255	0,03065461	-0,05951186	0,00354166
-0,040504826	-0,02885725	-0,01164757	0,00013567
-0,037769109	-0,04050483	0,00273572	7,4841E-06
-0,036430442	-0,03776911	0,00133867	1,792E-06
-0,011255651	-0,03643044	0,02517479	0,00063377
-0,005085004	-0,01125565	0,00617065	3,8077E-05
0,01224029	-0,005085	0,01732529	0,00030017
0,043056773	0,01224029	0,03081648	0,00094966
0,058054711	0,04305677	0,01499794	0,00022494
0,036238516	0,05805471	-0,0218162	0,00047595
0,007546648	0,03623852	-0,02869187	0,00082322
-0,007151978	0,00754665	-0,01469863	0,00021605
0,00425936	-0,00715198	0,01141134	0,00013022
0,008863216	0,00425936	0,00460386	2,1195E-05
0,017339774	0,00886322	0,00847656	7,1852E-05
0,035907211	0,01733977	0,01856744	0,00034475
0,007287964	0,03590721	-0,02861925	0,00081906
-0,00241549	0,00728796	-0,00970345	9,4157E-05
0,043105616	-0,00241549	0,04552111	0,00207217
0,023465582	0,04310562	-0,01964003	0,00038573
-0,032990004	0,02346558	-0,05645559	0,00318723
-0,005266682	-0,03299	0,02772332	0,00076858
0,005832347	-0,00526668	0,01109903	0,00012319
0,00422489	0,00583235	-0,00160746	2,5839E-06
-0,008468639	0,00422489	-0,01269353	0,00016113
-0,01676326	-0,00846864	-0,00829462	6,8801E-05
-0,001407741	-0,01676326	0,01535552	0,00023579
0,025534142	-0,00140774	0,02694188	0,00072587
-0,003698188	0,02553414	-0,02923233	0,00085453
-0,016405442	-0,00369819	-0,01270725	0,00016147
-0,013100663	-0,01640544	0,00330478	1,0922E-05
-0,032213223	-0,01310066	-0,01911256	0,00036529
-0,039498356	-0,03221322	-0,00728513	5,3073E-05
-0,027967776	-0,03949836	0,01153058	0,00013295
-0,007563931	-0,02796778	0,02040384	0,00041632
0,002698925	-0,00756393	0,01026286	0,00010533
0,015803405	0,00269892	0,01310448	0,00017173
			0,02307484

Appendix 5:Norway´s Durbin-Watson Test (WorldBank, 2016)

Appendix 6

	Sum of square difference residuals	0,0894336			
	Sum of the square residuals	0,13680127			
		0,65374835			
R2		*Residuals*			
0,00048571					
5,4193E-06		0,00232794	0,02203874	-0,0197108	0,00038852
0,00025929		0,01610245	0,00232794	0,01377451	0,00018974
6,0133E-06		-0,0024522	0,01610245	-0,01855466	0,00034428
0,00275425		-0,05248092	-0,0024522	-0,05002872	0,00250287
0,01238965		-0,11130879	-0,05248092	-0,05882787	0,00346072
0,00608165		-0,07798491	-0,11130879	0,03332388	0,00111048
0,00533875		-0,07306675	-0,07798491	0,00491815	2,4188E-05
0,00091682		0,03027897	-0,07306675	0,10334572	0,01068034
0,00397908		0,06307997	0,03027897	0,03280101	0,00107591
0,00147313		0,03838133	0,06307997	-0,02469864	0,00061002
1,8569E-06		-0,00136268	0,03838133	-0,03974401	0,00157959
0,00136192		0,03690425	-0,00136268	0,03826694	0,00146436
0,00127326		0,03568273	0,03690425	-0,00122152	1,4921E-06
0,00075758		0,0275242	0,03568273	-0,00815853	6,6562E-05
0,00026401		0,0162483	0,0275242	-0,0112759	0,00012715
0,0027911		0,05283082	0,0162483	0,03658252	0,00133828
0,01000976		0,10004881	0,05283082	0,04721799	0,00222954
0,00374888		0,06122809	0,10004881	-0,03882072	0,00150705
0,00179857		0,0424096	0,06122809	-0,01881849	0,00035414
0,00730573		0,08547357	0,0424096	0,04306397	0,00185451
0,00202281		0,04497568	0,08547357	-0,04049789	0,00164008
0,0005354		-0,02313868	0,04497568	-0,06811436	0,00463957
0,00468703		-0,06846187	-0,02313868	-0,04532319	0,00205419
0,00326946		-0,05717921	-0,06846187	0,01128267	0,0001273
0,00956907		-0,09782162	-0,05717921	-0,04064241	0,00165181
0,00196652		-0,04434551	-0,09782162	0,05347611	0,00285969
0,000191		-0,0138203	-0,04434551	0,03052521	0,00093179
8,1139E-05		-0,00900774	-0,0138203	0,00481256	2,3161E-05
0,00119243		-0,03453157	-0,00900774	-0,02552383	0,00065147
0,00663409		-0,08144993	-0,03453157	-0,04691836	0,00220133
0,00249533		-0,04995326	-0,08144993	0,03149667	0,00099204
0,00154449		0,03930004	-0,04995326	0,0892533	0,00796615
0,00034276		-0,01851374	0,03930004	-0,05781378	0,00334243
0,00889607		-0,09431899	-0,01851374	-0,07580525	0,00574644
0,000832		-0,02884439	-0,09431899	0,0654746	0,00428692
0,00045831		0,02140812	-0,02884439	0,05025251	0,00252531
0,00140068		0,03742561	0,02140812	0,01601749	0,00025656
0,02768026		0,16637386	0,03742561	0,12894825	0,01662765
0,13680127					0,0894336

Appendix 6:Norway´s Durbin-Watson Test for interchangeable variables (WorldBank, 2016)

Appendix 7

Variables	Norway		Venezuela	
Dependent variable	**agriculture share**		**manufacturing share**	
	coefficient	**P-Value t-statistic**	**coefficient**	**P-Value t-statistic**
Constant	7,568465663	2,28531E-13 11,43178281	12,2863939	8,75098E-06 5,154216733
Government Expenditure			0,09362142	0,071588727 1,854925051
Real Exchange Rate	0,43386341	0,012743023 2,625534459		
Money Supply	0,008684791	0,947989211 0,065701659	-0,80562163	0,511371518 -0,663108347
Income Per Capita	-1,57790597	0,00097758 -3,599251827		
Real GDP			-0,9746335	0,000217365 -4,099426834
R squared	0,880700974		0,426679734	
Adjusted R squared	0,870475343		0,380194307	
Durbin-Watson	1,079811667		1,079811667	

Appendix 7: Econometric model interchanging the dependent variable

Appendix 8

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0,57133059
R square	0,32641864
Adjusted R Square	0,27180394
Standard Error	0,05336587
Observations	41

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	3	0,051063874	0,017021291	5,97675384	0,00198708
Residual	37	0,105372882	0,002847916		
Total	40	0,156436755			

	Coefficients	*Standard Error*	*t Stat*	*P-Value*	*Lower 95%*	*Upper 95%*	*Lower 95,0%*	*Upper 95,0%*
Intercept	1,51194968	0,721193314	2,096455492	0,04293754	0,05067324	2,97322613	0,05067324	2,97322613
RER	-0,16151622	0,0438778	-3,681046552	0,00073648	-0,25042109	-0,07261136	-0,25042109	-0,07261136
MS	0,11355022	0,034728926	3,269615109	0,00233233	0,04318273	0,18391771	0,04318273	0,18391771
IPC	-0,49506128	0,199510583	-2,481378539	0,01775623	-0,89930812	-0,09081444	-0,89930812	-0,09081444

Appendix 8: Venezuela´s DD regression using RER (WorldBank, 2016)

Appendix 9

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0,46339348
R square	0,214733518
Adjusted R S	0,151063262
Standard Err	0,057620506
Observation	41

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	3	0,033592215	0,0111974	3,372587661	0,028488415
Residual	37	0,122844541	0,00332012		
Total	40	0,156436755			

	Coefficients	*Standard Error*	*t Stat*	*P-Value*	*Lower 95%*	*Upper 95%*	*Lower 95,0%*	*Upper 95,0%*
Intercept	-0,579852459	3,591752452	-0,16143998	0,872625209	-7,857434151	6,69772923	-7,85743415	6,69772923
RER	-0,103352678	0,047274033	-2,18624625	0,035199137	-0,199138966	-0,00756639	-0,19913897	-0,00756639
MS	0,066810857	0,055534893	1,20304287	0,236601442	-0,045713524	0,17933524	-0,04571352	0,17933524
RGDP	0,048679029	0,351603754	0,13844855	0,890636711	-0,663737842	0,7610959	-0,66373784	0,7610959

Appendix 9: Venezuela´s DD regression using GE (WorldBank, 2016)

Appendix 10

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0,613157829
R square	0,375962523
Adjusted R S	0,32536489
Standard Err	0,051365778
Observation	41

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	3	0,058814357	0,01960479	7,430436945	0,000514176
Residual	37	0,097622398	0,00263844		
Total	40	0,156436755			

	Coefficients	*Standard Error*	*t Stat*	*P-Value*	*Lower 95%*	*Upper 95%*	*Lower 95,0%*	*Upper 95,0%*
Intercept	1,784466029	0,700836514	2,54619443	0,015186255	0,364436378	3,20449568	0,36443638	3,20449568
GE	-0,251856082	0,060096355	-4,19087121	0,00016561	-0,373622862	-0,1300893	-0,37362286	-0,1300893
MS	0,242487638	0,061085011	3,96967493	0,000318765	0,118717649	0,36625763	0,11871765	0,36625763
IPC	-0,267329862	0,169297447	-1,5790543	0,122835934	-0,610359071	0,07569935	-0,61035907	0,07569935

Appendix 10: Venezuela´s DD regression using GE (WorldBank, 2016)

Appendix 11

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0,65320727
R square	0,42667973
Adjusted R S	0,38019431
Standard Err	0,04861064
Observation	41

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	3	0,06506824	0,02168941	9,17878489	0,00011334
Residual	37	0,08743077	0,00236299		
Total	40	0,15249901			

	Coefficients	*tandard Erro*	*t Stat*	*P-Value*	*Lower 95%*	*Upper 95%*	*Lower 95,0%*	*Upper 95,0%*
Intercept	12,2863939	2,38375577	5,15421673	8,751E-06	7,45644594	17,1163418	7,45644594	17,1163418
GE	0,09362142	0,05047181	1,85492505	0,07158873	-0,00864418	0,19588702	-0,00864418	0,19588702
MS	-0,80562163	1,21491704	-0,66310835	0,51137152	-3,26727735	1,65603409	-3,26727735	1,65603409
RGDP	-0,9746335	0,23774872	-4,09942683	0,00021736	-1,45635817	-0,49290883	-1,45635817	-0,49290883

Appendix 11: Venezuela's DD Regression using Norway's variables (WorldBank, 2016)

Appendix 12

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0,645262107
R square	0,416363186
Adjusted R S	0,369041283
Standard Err	0,070373782
Observation	41

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	3	0,13072334	0,043574448	8,798529916	0,00015593
Residual	37	0,18324136	0,004952469		
Total	40	0,3139647			

	Coefficients	*tandard Erro*	*t Stat*	*P-Value*	*Lower 95%*	*Upper 95%*	*Lower 95,0%*	*Upper 95,0%*
Intercept	5,563163247	0,95104051	5,849554469	1,00378E-06	3,636172155	7,49015434	3,63617215	7,49015434
RER	-0,10575131	0,05786183	-1,827652351	0,07567496	-0,222990513	0,01148789	-0,22299051	0,01148789
MS	0,05185289	0,04579717	1,132229025	0,264822661	-0,040940998	0,14464678	-0,040941	0,14464678
IPC	-1,032236326	0,2630954	-3,923429711	0,000365041	-1,565318247	-0,4991544	-1,56531825	-0,4991544

Appendix 12: Venezuela's DD regression using manufacturing and agriculture as dependent variable (WorldBank, 2016)

Appendix 13

Sum of square difference residuals	0,058075534
Sum of the square residuals	0,105372882
	0,551143078

Residuals	*R2*		*Residuals*			
0,065729078	0,00432031					
-0,028483835	0,00081133		-0,028483835	0,06572908	-0,09421291	0,00887607
0,003177456	1,0096E-05		0,003177456	-0,02848384	0,03166129	0,00100244
-0,03551697	0,00126146		-0,03551697	0,00317746	-0,03869443	0,00149726
-0,013191831	0,00017402		-0,013191831	-0,03551697	0,02232514	0,00049841
-0,017442841	0,00030425		-0,017442841	-0,01319183	-0,00425101	1,8071E-05
-0,040889758	0,00167197		-0,040889758	-0,01744284	-0,02344692	0,00054976
-0,060564986	0,00366812		-0,060564986	-0,04088976	-0,01967523	0,00038711
-0,064250755	0,00412816		-0,064250755	-0,06056499	-0,00368577	1,3585E-05
-0,057915019	0,00335415		-0,057915019	-0,06425075	0,00633574	4,0142E-05
-0,052697614	0,00277704		-0,052697614	-0,05791502	0,00521741	2,7221E-05
-0,033832211	0,00114462		-0,033832211	-0,05269761	0,0188654	0,0003559
0,015805246	0,00024981		0,015805246	-0,03383221	0,04963746	0,00246388
0,05062119	0,0025625		0,05062119	0,01580525	0,03481594	0,00121215
0,077558507	0,00601532		0,077558507	0,05062119	0,02693732	0,00072562
0,087660141	0,0076843		0,087660141	0,07755851	0,01010163	0,00010204
0,070224382	0,00493146		0,070224382	0,08766014	-0,01743576	0,00030401
0,021758787	0,00047344		0,021758787	0,07022438	-0,04846559	0,00234891
0,041143776	0,00169281		0,041143776	0,02175879	0,01938499	0,00037578
0,038356733	0,00147124		0,038356733	0,04114378	-0,00278704	7,7676E-06
0,047836667	0,00228835		0,047836667	0,03835673	0,00947993	8,9869E-05
0,027150561	0,00073715		0,027150561	0,04783667	-0,02068611	0,00042791
0,051156461	0,00261698		0,051156461	0,02715056	0,0240059	0,00057628
-0,009453289	8,9365E-05		-0,009453289	0,05115646	-0,06060975	0,00367354
0,027838455	0,00077498		0,027838455	-0,00945329	0,03729174	0,00139067
0,070720479	0,00500139		0,070720479	0,02783846	0,04288202	0,00183887
-0,006367777	4,0549E-05		-0,006367777	0,07072048	-0,07708826	0,0059426
-0,058701492	0,00344587		-0,058701492	-0,00636778	-0,05233372	0,00273882
-0,023938556	0,00057305		-0,023938556	-0,05870149	0,03476294	0,00120846
-0,068965364	0,00475622		-0,068965364	-0,02393856	-0,04502681	0,00202741
-0,045676813	0,00208637		-0,045676813	-0,06896536	0,02328855	0,00054236
-0,076148973	0,00579867		-0,076148973	-0,04567681	-0,03047216	0,00092855
-0,068224561	0,00465459		-0,068224561	-0,07614897	0,00792441	6,2796E-05
-0,078900983	0,00622537		-0,078900983	-0,06822456	-0,01067642	0,00011399
-0,057873964	0,0033494		-0,057873964	-0,07890098	0,02102702	0,00044214
-0,033170211	0,00110026		-0,033170211	-0,05787396	0,02470375	0,00061028
0,082932602	0,00687782		0,082932602	-0,03317021	0,11610281	0,01347986
0,052706055	0,00277793		0,052706055	0,0829326	-0,03022655	0,00091364
0,04219985	0,00178083		0,04219985	0,05270605	-0,01050621	0,00011038
0,032730449	0,00107128		0,032730449	0,04219985	-0,0094694	8,967E-05
0,024900928	0,00062006		0,024900928	0,03273045	-0,00782952	6,1301E-05
	0,10537288					0,05807553

Appendix 12: Venezuela´s Durbin-Watson Test (WorldBank, 2016)

		Sum of square difference residuals	0,09440877			
		Sum of the square residuals	0,08743077			
			1,07981167			
Residuals	*R2*		*Residuals*			
-0,0612807	0,00375532					
-0,00471374	2,2219E-05		-0,00471374	-0,0612807	0,05656696	0,00319982
-0,05698348	0,00324712		-0,05698348	-0,00471374	-0,05226974	0,00273213
-0,01169439	0,00013676		-0,01169439	-0,05698348	0,04528909	0,0020511
-0,01705047	0,00029072		-0,01705047	-0,01169439	-0,00535608	2,8688E-05
-0,01791049	0,00032079		-0,01791049	-0,01705047	-0,00086002	7,3964E-07
0,01926232	0,00037104		0,01926232	-0,01791049	0,0371728	0,00138182
-0,01270968	0,00016154		-0,01270968	0,01926232	-0,031972	0,00102221
-0,05113027	0,0026143		-0,05113027	-0,01270968	-0,03842059	0,00147614
-0,03016091	0,00090968		-0,03016091	-0,05113027	0,02096936	0,00043971
-0,02958246	0,00087512		-0,02958246	-0,03016091	0,00057845	3,3461E-07
0,0248247	0,00061627		0,0248247	-0,02958246	0,05440716	0,00296014
0,0398951	0,00159162		0,0398951	0,0248247	0,0150704	0,00022712
0,08224917	0,00676493		0,08224917	0,0398951	0,04235407	0,00179387
0,07154369	0,0051185		0,07154369	0,08224917	-0,01070548	0,00011461
0,06736919	0,00453861		0,06736919	0,07154369	-0,00417449	1,7426E-05
-0,01686197	0,00028433		-0,01686197	0,06736919	-0,08423116	0,00709489
-0,04140888	0,0017147		-0,04140888	-0,01686197	-0,02454691	0,00060255
0,00408556	1,6692E-05		0,00408556	-0,04140888	0,04549444	0,00206974
0,00493567	2,4361E-05		0,00493567	0,00408556	0,0008501	7,2267E-07
-0,00566019	3,2038E-05		-0,00566019	0,00493567	-0,01059586	0,00011227
-0,02157482	0,00046547		-0,02157482	-0,00566019	-0,01591463	0,00025328
-0,00395334	1,5629E-05		-0,00395334	-0,02157482	0,01762148	0,00031052
-0,05772611	0,0033323		-0,05772611	-0,00395334	-0,05377277	0,00289151
0,14901111	0,02220431		0,14901111	-0,05772611	0,20673722	0,04274028
0,09824547	0,00965217		0,09824547	0,14901111	-0,05076564	0,00257715
0,03681932	0,00135566		0,03681932	0,09824547	-0,06142615	0,00377317
0,05776815	0,00333716		0,05776815	0,03681932	0,02094883	0,00043885
0,02719812	0,00073974		0,02719812	0,05776815	-0,03057003	0,00093453
-0,03145349	0,00098932		-0,03145349	0,02719812	-0,05865161	0,00344001
-0,05368551	0,00288213		-0,05368551	-0,03145349	-0,02223201	0,00049426
0,00236348	5,586E-06		0,00236348	-0,05368551	0,05604899	0,00314149
0,00122046	1,4895E-06		0,00122046	0,00236348	-0,00114302	1,3065E-06
0,00033573	1,1272E-07		0,00033573	0,00122046	-0,00088472	7,8274E-07
0,00735844	5,4147E-05		0,00735844	0,00033573	0,00702271	4,9318E-05
5,9764E-05	3,5717E-09		5,9764E-05	0,00735844	-0,00729867	5,3271E-05
0,01277186	0,00016312		0,01277186	5,9764E-05	0,0127121	0,0001616
-0,05819066	0,00338615		-0,05819066	0,01277186	-0,07096252	0,00503568
-0,05535708	0,00306441		-0,05535708	-0,05819066	0,00283358	8,0292E-06
-0,02923373	0,00085461		-0,02923373	-0,05535708	0,02612335	0,00068243
-0,03899494	0,00152061		-0,03899494	-0,02923373	-0,00976121	9,5281E-05
	0,08743077					0,09440877

Appendix 13: Venezuela´s Durbin-Watson Test for interchangeable variables (WorldBank, 2016)

Appendix 14

Taxes for the oil industry, Venezuela.

Tax	Rate	Threshold	GO
Royalties	30%-20%	If mature or heavy-oil wells are not profitable. In the Orinoco Oil Belt royalties may be diminished until 20%.	LOH 38.493
Superficial tax	(100 U.T.*x)ˆy	For each km2 of surface per year. X increases 2% each year for 5 years, later on it increases 5% yearly.	LOH
Own consumption tax	10%	For each mt3 of derivatives produced and consumed in operations, estimated as price sold to final consumers.	LOH 38.493
General consumption tax	30-50%	For each lt. of hydrocarbon derived-products sold in the national market. The rate is decided each year in the Budget Law.	LOH 38.493
Extractive tax	1/3	Of liquid hydrocarbons' value, paid monthly alongside royalties. The tax may be reduced by the value of royalties (both cash and in kind) and other special advantages payment.	LOH 38.493
Export Registry tax	0.1%	Of any exported hydrocarbon, estimated at the sell-price.	LOH 38.493
Special contribution Extraordinary prices	20%	If price is bigger than Budget estimates and less or equal than 80 US$/bbl. Tax is estimated as proportion of the difference in both prices. If the tax is bigger than 80 US$/bbl, the tax is estimated from the difference between 80 $ and the budget estimate.	Decree #8.807

Special contribution Exorbitant tax	Trench 1: 80% Trench 2: 90% Trench 3: 95%	Portion of revenues. If price is… Trench 1: bigger than 80US$/bbl and less than 100 US$/bbl. If price is more or equal than 100$/bbl, it is calculated as a percentage of the difference of 100 and 80. Trench 2: more or equal than 100 US$/bbl and less than 110 US$/bbl. If price is more or equal than 110$/bbl, it is estimated as a portion of the difference of 110 and 100. Trench 3: more or equal than 110 US$/bbl.	Decree #8.807
Rent tax	50%	Applies on the difference between revenues minus costs, royalties, special contributions, export registry, LOCTI, and endogenous development taxes. If this difference is 0, no rent tax is applied.	Decree #2.163
LOCTI: Organic	1%	Of revenues.	LOCTI 6151
Law of Science and Technology Endogenous Development	1%	Of net revenues after royalties.	N/A PDVSA website: "An address by the Minister of Energy and Petroleum and President of PDVSA, Rafael Ramírez Carreño, to the National Assembly Plenary on the Model for Mixed Companies." Link
Anti-Drugs tax	1%	Of revenues after (previous) taxes, unless after tax revenues equals 0.	39.510
Sports tax	1%	Of revenues after (previous) taxes, unless after tax revenues equals 0.	39.741

Special advantage (shadow tax)	50%	If tax take is less than 50% of gross revenue after all taxes and levies, the Joint Venture pays the difference between 50% of revenue after taxes and total tax take.	N/A Uria Menendez and D'Empaire Reyna Abogados. Link
Value Added Tax	12%	On sales, services and imports.	

Appendix 14: Taxes for the oil industry, (CIEA Energy in figures, 2016)

Appendix 15

Social development programs: disbursements and goals, Venezuela.

PROGRAM	GOAL	EXPENDITURE 2001-2014 USD MM	SHARE OF TOTAL OFF-BUDGET	SHARE OF SOCIAL DEV. PROGRAMS
MISIÓN RIBAS	To provide education to adults without high-school diploma.	3,460.00	1.48%	2.32%
MISIÓN ALIMENTACIÓN	To offer access to food through regulation and management of trade, market, distribution, reception, provision, deposit, conservation, quality and consumption of food. Includes entities such as: PRODUCTOS CASA, MERCAL, PDVAL, FUNDAPROAL, SADA, VENALCASA, LOGICASA.	7,843.00	3.35%	5.26%
MISIÓN BARRIO ADENTRO I, II Y III	To offer health services in low-income neighborhoods through outpatient clinics. Barrio Adentro II: to increase the number of outpatient clinics. Barrio Adentro III: to construct 600 integral diagnosis centers and 600 integral rehabilitation centers. Barrio Adentro IV: consists of a specialized infant-cardiology hospital.	26,740.00	11.43%	17.92%
MISIÓN VUELVAN CARAS	To develop skills in unemployed youngsters and adults in common interest areas. To constitute productive and services cooperatives.	672.00	0.29%	0.45%
MISIÓN MILAGRO	To attend free of charge to low-income population with visual disabilities. This	159.00	0.07%	0.11%

	program is designed by cooperation with Cuba.			
MISIÓN SUCRE	To provide high-level education through the Bolivarian University to form social communicators, historians and lawyers.	966.00	0.41%	0.65%
MISIÓN CIENCIA	To promote and coordinate development and follow-up of initiatives to utilize scientific and technological knowledge, incentivizing its use and articulation with economic, social, academic and political networks, which allow the use and production of knowledge in function of endogenous, scientific and technological development of the country.	319.00	0.14%	0.21%
MISIÓN REVOLUCIÓN ENERGÉTICA	To generate awareness on energy importance. To freely substitute light bulbs by 82 million energy-saving light bulbs, to reduce energy consumption. 15 million were allocated to food supplies (Mercal).	6,175.00	2.64%	4.14%
GRAN MISIÓN HIJOS DE VENEZUELA	To assist families and mothers with less than 18 years old children or any disabilities, which income is less than minimum salary.	598.00	0.26%	0.40%
GRAN MISIÓN VIVIENDA VENEZUELA	To provide credits to construction, acquisition or expansion of housing to low-income families.	8,074.00	3.45%	5.41%
GRAN MISIÓN AGROVENEZUELA	To guarantee food rights through	1,140.00	0.49%	0.76%

	technical assistance, inputs provision and financing agricultural producers.			
GRAN MISIÓN EN AMOR MAYOR VENEZUELA	To offer pensions to third-age workers but cannot earn social security pensions.	1,241.00	0.53%	0.83%
GRAN MISIÓN BARRIO TRICOLOR	To structure and organize “comunas” (community grassroots) and to proportionate worthy living conditions in low income neighborhoods. To guarantee the strategic security and defense of the country with grassroots, with participation of militia. To provide inputs to maintain these communities.	325.00	0.14%	0.22%
PROYECTOS AGRÍCOLAS	N/A Agricultural projects.	4,048.00	1.73%	2.71%
PROYECTOS DE INFRAESTRUCTURA	N/A Infrastructure projects.	2,024.00	0.87%	1.36%
PROYECTOS AUTOGAS	To develop infrastructure for vehicular natural gas use by 1) constructing service stations with vehicular natural gas supplies; and 2) incentivizing changes in vehicles to use biofuels.	733.00	0.31%	0.49%
FONDO ALBA CARIBE	To finance programs and social policies, prioritizing healthcare, education and housing, as well as socio-productive policies that promote economic development through cooperatives, and SMEs.	152.00	0.06%	0.10%
FONDO BICENTENARIO	The Bicentenario Alba-Mercosur Fund	887.00	0.38%	0.59%

	is an investment mechanism to strengthen productive capacity destined to exports.			
FONDO ESPECIAL DE LA JUVENTUD	N/A. Special Youth Fund.	40.00	0.02%	0.03%
FONDO SEGURIDAD	N/A. Security Fund.	558.00	0.24%	0.37%
FONDO MIRANDA	N/A.	19,894.00	8.50%	13.34%
FONDO DEPORTE	N/A Sports Fund.	125.00	0.05%	0.08%
FONDO CHINO	Cooperation Fund with China to finance policies in Venezuela. It is financed by the Chinese Development Bank and Venezuela's National Endogenous Development Fund. Funds are managed through BANDES.	28,889.00	12.35%	19.37%
PLAN DE VIALIDAD	To finance road infrastructure.	3,745.00	1.60%	2.51%
PLAN CARACAS BICENTENARIO	Too finance policies regarding healthcare, social protection, road maintenance, social infrastructure rehabilitation, socio-environmental formation, and refuge family from 2010 natural disasters.	402.00	0.17%	0.27%
OBRAS HIDRÁULICAS	To construct water treatment plants, potable water infrastructure, water sanitation, and flood control.	1,088.00	0.46%	0.73%
NÚCLEOS DE DESARROLLO ENDÓGENO	To organize communities to use resources for local development.	283.00	0.12%	0.19%
APORTES SECTOR ELÉCTRICO PDVSA	Electric turbogeneration, equipment installment, construction, expansion of electric substations, grid adjustments and electric transformer.	11,001.00	4.70%	7.37%
APOYO A EMERGENCIA POR	N/A. Emergency support	534.00	0.23%	0.36%

LLUVIAS	due to rain.			
APORTES A COMUNIDADES	Works in Nueva Esparta island. Policies of students' preferential passage. Support to train the Army's National Guard troops. Extraordinary plan for environmental sanitation in Maracaibo, Zulia. Debris collection in Tachira. Habilitation and repairmen of infrastructure in Valencia.	8,304.00	3.55%	5.57%
APORTE SOCIAL. PROYECTOS DE INVERSIÓN PDVSA	N/A. Social support investment projects of PDVSA.	4,485.00	1.92%	3.01%
FONDO DE AHORRO DE LOS TRABAJADORES	N/A. PDVSA workers savings fund.	2,446.00	1.05%	1.64%
OTRAS MISIONES Y APORTES	N/A. Others.	1,828.00	0.78%	1.23%
FONDO ESPECIAL PARA LA OFENSIVA ECONÓMICA	N/A. Not active. Special Fund for Economic Offensive.	-	0.00%	0.00%

Appendix 15: Social development programs: disbursements and goals. (PDVSA Annual Management report, 2016)