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Diploma Thesis

PERSPECTIVES OF VENEZUELAN ECONOMY DEVELOPMENT IN RELATION TO ITS OIL INDUSTRY POLICY

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Declaration

I declare that I have worked on my diploma thesis **"Perspectives of Venezuelan Economy Development in Relation to its Oil Industry Policy"** by myself and that I used only the sources mentioned at the end of the thesis.

In Prague on 8th of April 2011 ....

Kateřina Damborská

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PERSPECTIVES OF VENEZUELAN ECONOMY DEVELOPMENT IN RELATION TO ITS OIL INDUSTRY POLICY

PERSPEKTIVY VÝVOJE VENEZUELSKÉ EKONOMIKY VE VZTAHU K POLITICE ROPNÉHO SEKTORU

Summary

The diploma thesis is mainly concerned with the impact of oil revenues on an economy of an oil producing and exporting country. The theoretical part of the diploma thesis discusses this impact as well as problems these countries face in relation to their oil industries. Venezuela pertains to this group of countries and its economy is also strongly affected by oil revenues. The practical part of the diploma thesis starts with the analysis of Venezuelan economy and with defining the position and importance of the oil sector in the economy. Then, the econometric model is constructed showing the relationship between oil export and GDP. Based on the model, the importance of the oil export for the economy is estimated. The main hypothesis is that Venezuela is a rentier state and the oil revenues represent an important part of the country's GDP. The analysis of Venezuelan economy revealed that Venezuela is really a rentier state because the oil revenues represent about half of the government budget. The share of oil revenues on GDP has decreased in recent years, implying that Venezuela is becoming less oil-dependent. However, the oil export revenues affect the value of GDP significantly, as the econometric model demonstrates. Attention is also paid to the current economic policy and how it aims to shape the development of the economy. Finally, after consideration of all findings, the perspectives of Venezuelan economy development can be estimated.

Keywords: Venezuela, rentier state, rentier economy, oil industry, GDP, econometric model, oil export, economic policy, perspectives of development.

Souhrn

Diplomová práce se zabývá především vlivem ropných zisků na ekonomiku zemí, které těží a vyvážejí ropu. Teoretická část diplomové práce řeší tento vliv a také s tím spojené problémy, kterým tyto země čelí ve vztahu k jejich ropnému průmyslu. Venezuela patří do této skupiny zemí a její ekonomika je také silně ovlivněna ropnými zisky. Praktická část diplomové práce začíná analýzou venezuelské ekonomiky a určením pozice a důležitosti ropného sektoru v ekonomice. Jako další krok je zkonstruovaný ekonometrický model, který ukazuje vztah vývozu ropy a HDP. Na základě modelu je odhadnuta důležitost ropného vývozu pro ekonomiku Venezuely. Hlavní hypotézou je, že Venezuela je rentiérský stát, a že ropné zisky představují důležitou část HDP země. Analýza Venezuelské ekonomiky ukázala, že Venezuela je skutečně rentiérským státem, protože ropné zisky představují přibližně polovinu rozpočtu vlády. Podíl ropných zisků na HDP se v posledních letech snižuje, což značí, že Venezuela se stává méně závislou na ropě. Avšak zisky z vývozu ropy značně ovlivňují hodnou HDP, jak ukazuje ekonometrický model. Pozornost je také věnována současné ekonomické politice a tomu, jakým způsobem chce současná vláda zasáhnout do vývoje ekonomiky. Na základě zhodnocení všech poznatků je možné odhadnout perspektivy vývoje venezuelské ekonomiky.

Klíčová slova: Venezuela, rentiérský stát, rentiérská ekonomika, ropný průmysl, HDP, ekonometrický model, vývoz ropy, ekonomická politika, perspektivy vývoje.

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1. INTRODUCTION

The topics of oil production, world oil reserves and oil utilization are widely discussed because oil is very important for any economy in the world and no alternative fuel has replaced its position yet. Therefore, oil is an immense revenue generator for countries that have vast reserves of this asset. Such countries are commonly denoted as rentier states among scholars. From the political point of view, oil is an area of conflict because of its large profit generation possibilities and significant geostrategic value.

When studying the oil producing countries, scholars have focused mainly on the impacts of oil revenues on the economies of the countries. Other studies concentrate on effects of oil revenues on political regime formation, either democratic or authoritarian. This diploma thesis contributes to the debate about the impact of oil revenues on the economy of an oil producing country and it will demonstrate it on the case study of the Bolivarian Republic of Venezuela (further only Venezuela).

The reason why this work is particularly concerned with Venezuela is because Venezuelan oil industry has had a demonstrative effect on the economy, which means that the economy has the typical features of a rentier economy. In addition, the country is one of the largest oil exporters in the world, has the second largest reserves of conventional oil (light and heavy crude) in the western hemisphere, and the largest reserves of non-conventional oil (extra-heavy crude) in the world. Venezuela was the initiator of the foundation of OPEC. Moreover, the current political regime and its economic policies shape the position oil industry has had within the economy.

The diploma thesis analyzes the economy of Venezuela and searches the features of rentier economy as it is assumed that they are present in the economy. An important part of the diploma thesis is the quantification of the relationship between the oil export, the major source of revenues, and GDP with the help of econometric model, and also estimation of the importance of the oil export for the economy. The attention is paid to the economic policy of the current government and to how it shapes the economy. The final step of the diploma thesis is to derive perspectives of future economic development of Venezuela based on the previous findings.

It is expected that the diploma thesis might be limited by bad data availability due to the fact that Venezuela is a developing country and that detailed statistical information

might not be available. Moreover, there is the suspicion that the data from the official government sources might lack credibility due to the controversial nature of the current political regime.

2. OBJECTIVES AND METHODOLOGY

Objectives

The main objective of the diploma thesis is to analyze the position of oil industry in the economy of Venezuela and to evaluate the effect of the oil industry on the development of the economy. The main objective will be achieved by completing several partial objectives.

The first partial objective is to decide whether the Venezuelan economy has the characteristics of a rentier economy by studying oil industry indicators and other economic indicators.

The second partial objective is to quantify the relationship between crude oil export as the explanatory variable and GDP as the explained variable with the use of econometric model.

The third partial objective is to consider what impact the economic policy of the current Venezuelan government will have on the perspectives of economic development. By combining all the findings the perspectives of Venezuelan economy development can be estimated.

Hypotheses

The theoretical part of the diploma thesis discusses mainly the rentier state theory that explains what are the features and problems typical for a rentier state. Several sources mentioned Venezuela as pertaining to this group of extraordinary countries. The main hypothesis of this diploma thesis is that Venezuela is a rentier state and possesses the most important features that such state has.

The secondary hypotheses are connected to the main features of the rentier economy. As the outcome of the diploma thesis, it is expected that the economy of Venezuela is affected by the features of the rentier state. First, it is expected that the revenues from oil are an important part of GDP of Venezuela as well as of the government budget. Next, it is supposed that the economy is export oriented with emphasis on oil and the oil exports are a very important source of revenues. Further, it is

assumed that the concentration on the oil sector leads to a slowdown in industry and agriculture, while products of these sectors are then imported.

Methodology

In this section, the process of the diploma thesis elaboration is explained. First, the literature review was chosen for the theoretical part of the diploma thesis. The publications concerning the rentier state theory and its components were reviewed and the consequences of rentierism were explained in the empirical evidence. The hypothesis was formulated based on the literature review.

The decision was made to study the effects of rentierism on the case study of Venezuela. For this purpose, **three methods** were chosen for the practical part of the diploma thesis; **analytical, quantitative and the method of synthesis**. The analytical method was applied for analyzing the economic situation of Venezuela with relation to the oil industry. In this section, a graphical method (figures) and economic indicators were employed. In the quantitative part, relations between the economy and the oil industry were quantified and appropriate variables were selected for the econometric model. Then, the synthesis connected the findings of the previous methods used and the conclusion was derived with the consideration of the current economic policy objectives of the Venezuelan government. The process of the diploma thesis elaboration is illustrated by the following flow chart.

Figure 1: Methodology flow chart

Econometric Model

An econometric model serves for the investigation of the relationships among the economic variables captured by an algebraic model. To confirm the algebraic economic theory, the algebraic model has to be confronted with the appropriate economic data. There is a problem arising from the fact that the data seldom exhibit the exact relationship among the number of variables as the algebraic economic model portrays. But the data are given and cannot be modified. Therefore, the algebraic economic model has to be modified to reflect the nature of the economic data. The particular feature of the relevant data which the model intends to show has to be explained. To perform the modifications a set of assumption is needed to generate data in the underlying economic model. (Seddighi *et al*., 2008) The software Gretl was used for the estimation of the parameters of the econometric model.

The general form of multiple linear regression model

The dependent variable is presented by 'Y', the regressors by 'X' and the parameters of the model by β. According to the economic theory, the dependent variable Y is a function of 'k' regressors, i.e.:

$$Y = f(X_1, X_2, X_3, \ldots, X_k) \qquad (2.1)$$

To construct a general linear econometric equation, it is assumed there exists a linear relationship between the dependent and independent variable (linearity in parameters), hence:

$$Y_t = \beta_1 + \beta_2 X_{2t} + \beta_3 X_{3t} + \ldots + \beta_k X_{kt} + u_t \qquad (t = 1,2,3,\ldots) \qquad (2.2)$$

where:

t…… is a relevant observation at time t

u…… is an error term

X_1…… is a unit vector to allow for an intercept term. (Seddighi *et al*., 2008)

The type of the model used in this work is the **two-equation recursive model**. The recursive models have a triangle matrix B. They allow only forward linkages among endogenous (explained) variables. (Tvrdoň, 2001)

The construction of the econometric model is divided into several stages:
- formulation of an economic model
- collection of statistical data
- estimation of parameters
- economic and statistical verification
- application of the model in practice. (Tvrdoň, 2001)

Parameters estimation

The structural parameters γ or β express a direction and an intensity of the impact of predetermined variables on endogenous variables. For their estimation the ordinary least squares method (OLS) was used. This method is based on finding parameters that minimize the sum of squares of variances of theoretical values of explained variable from its real values. The formula is:

$$\gamma = (X^T X)^{-1} X^T y$$

(2.3)

where:

γ ......is the vector of estimated parameters

X...... is matrix that contains observed values of explanatory variables

y...... is vector containing observed values of explained variable. (Čechura, et al. 2009)

Verification of econometric model

a. **Economic verification**

The economic verification of the model constructed in this diploma thesis examined the direction and intensity of the explanatory variables' impact on the explained variables. If the parameters' size and mark would not agree with the economic presumptions, a new specification of the model would be necessary.

b. **Statistical verification**

The statistical verification was used to examine the statistical significance of the estimated parameters. T-test examined the significance of the parameters. R^2 is the coefficient of multiple determination, which was employed in the diploma thesis to measure in percentage to which extent were the changes of the dependent variables explained by the changes of the independent variables.

c. **Econometric verification**

This verification examined the assumptions of the econometric model. The test of autocorrelation of residuals (Durbin-Watson statistics) and multicollinearity check of the explanatory variables was used for the verification of the model. To find the multicollinearity the correlation matrix was utilized showing whether a strong correlation between two explanatory variables existed in one of the equations. If high multicollinearity is present, it is not possible to separate the effects of each explanatory variable on the endogenous variable and it is not possible to reach the exact estimation of parameters of variables causing the multicollinearity. The strong multicollinearity is present if one of the correlation coefficients is more than 0.9. (Čechura, *et al.* 2009) If high multicollinearity existed in the model, explanatory variables would have to be transformed.

Application of the model

When the model is verified, it can be applied in practice. The method of simulation is used to apply the econometric model on the Venezuelan economy. The future price of oil was taken as the external force influencing the economy and the simulation of value

changes of oil export, and consequently the value of GDP, was performed. The findings served for the estimation of perspectives of the Venezuelan economy development.

Data sources

The time series for the econometric model data were set for 20 years; therefore, the data were collected for the period 1989 – 2009. Non-availability of the data for some selected variables was a problem. Thus the selection of the variables had to be modified in order to have the time series of 20 years. The data were obtained from the websites of following organizations: OPEC, International Energy Agency (IEA), Banco Central de Venezuela (BCV), Oficina Nacional de Presupuesto (National Budget Office) and the World Bank.

The non-availability of the data was the problem also in the analytical part of the diploma thesis. It was difficult to find the reliable data concerning government budget revenues and expenses. Data sources used for the analytical part were Ministerio de Poder Popular para la Energía y Petróleo (Ministry of Popular Power for Energy and Petroleum), Ministerio de Planificaión y Finanzas (Ministry of Planning and Finances) and International Trade Centre. It should be noted that the credibility of the Venezuelan data sources, especial governmental, is uncertain as the government regime is rather controversial.

3. LITERATURE REVIEW

3.1. Rentier State Theory

Studies focus on two major themes of the development of a rentier state: the first, the economic development and the second, the political and institutional development. This work will be primarily focused on the consequences the "rentierism" has on the state economy.

Scholars studying the economic development focus on the impact of "windfall profits" on policy, allocation of the profits in the state and on investment. Development priorities depend on the structure of revenue. Another aspect of the rentier economy is that rent-seekers often prevail in the state, not producers. (Okruhlik, 1999) The basic concepts of the rentier economy and its development will be discussed in the following chapters.

3.1.1. Economic Rent

In the economic history, the notion of the economic rent was connected to the land possession. In the classical economic theory, the rent was defined as "any surplus left over after all costs of production had been met, and was paid to the owner of the land for use of its natural resources." In the petroleum economics, the rent or "oil surplus" is defined as "the difference between the price of a given quantity of oil sold to consumers in the form of petroleum products and the total average cost incurred in discovering, producing, transporting, refining, transporting and marketing this crude." (Yates, 1996)

The economic theory says a little about the rentier because "the rentier is a social agent who does not actively participate in the production process, yet still shares the fruits of the product." Yates says that for each income factor, there is an effort involved. For a wage it is the work, for a profit it is the risk management and for an interest it is the capital employed. But for the pure rent, there is no such effort needed. In the economic theory, the rent does not make sense because it is not a result of the value added process. Classical economists like Smith and Ricardo viewed the economic rent as a mere by-product of surplus or remainder of feudal order. Karl Marx distinguished two

types of the rent. For him, the rent of the Middle Ages pertaining to feudal landlords was a result of "use value" but the rent received by property owners based on production in capitalism was a result of "exchange value." (Yates, 1999)

3.1.2. Sources of Rents and Features of Natural Resource Sector

Oil is a typical example of the natural resource that produces the rents. Other natural resources that provide rents are copper deposits, kimberlite diamonds and other. The features of the natural resource sector that distinguish it from other production sectors are listed below and have some effect on generation of the public revenue.

- Easily taxable

  The natural resource sectors tend to be easily taxable, because the large sunk costs[1] involved in the extraction of resources create an inelastic revenue base that provides the state with multiple opportunities for the rent appropriation.

- Capital-intensive

- Geographically concentrated

- Export oriented

- No widespread linkages to other productive processes

- "Work" of state

  The sub-soil resources are considered to be a public utility in which the state reserves a sovereign interest and thus, has the right to collect the rent.

- "Lootable" vs. "non-lootable" natural resources

  Some natural resources don't produce rents. There are determinants that have effect on that. Geographically dispersed natural resources are distinct from geographically concentrated resources. Geographically dispersed resources with low economic barriers to entry are usually "lootable", which means that they can be easily overtaken by private actors. "Non-lootable" resources are geographically concentrated and capital intensive, like oil. This draws the distinction of whether the revenues that the resources produce can be easily appropriated by the state

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[1] A cost that has been incurred and cannot be reversed.

or not. Geographically concentrated, non-lootable resources easily supply revenues to the state.

- Market power

  The natural resources like diamonds, oil, or copper often involve monopoly or oligopoly elements shaping the market power of the resource. This also determines whether the resource can provide fiscal basis for the state. The state has a strong ability to extract a certain portion of rents from the monopoly by using taxation. (Dunning, 2008)

3.1.3. Concept of Rentier State

The rentier state theory comprises of ideas concerning the patterns of development and nature of states with their economies dominated by an external rent. The concept of the "rentier state" was specified by Hussein Mahdavy in 1970 in connection with the Pahlavi Iran.[2] Later, the specialists on the Middle East started to use it in their discussion about Arab world. The broadest definition of the theory of the rentier state is that the rentier states are those "countries that receive on regular basis substantial amounts of external economic rent." (Mahdavy, 1970) The definition is not exclusive to Persian Gulf or the Middle East countries but the theory has been most widely used in connection with the Middle East especially in the period 1951-1981, when the states gained large economic rents from their oil industries. Many oil producing states became the rentier states after nationalization of the oil exploiting companies; states started getting large amounts of foreign currency. In 1970s prices of oil started increasing dramatically because of the growing strength of the OPEC cartel, Arab oil embargo in 1973, and the fall of Shah of Iran in 1979. The oil rent for oil-exporting countries increased. (Yates, 1999)

Two specialists on the Middle East Hazim Beblawi and Giacomo Luciani were examining the possible impact the large amount of money obtained in short time would

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[2] The Pahlavi dynasty represented two Iranian monarchs, father Reza Shah Pahlavi (reg. 1925—1941) and son Mohammad Reza Pahlavi (reg. 1941—1979). The Pahlavi dynasty ended in 1979 when Mohammad Reza Pahlavi was overthrown in the Iranian Revolution.

have on the Arab states. They also opposed Mahdavy's definition of the rentier state because they thought his definition focusing only on the state was too restrictive and said nothing about the economy. Beblawi and Luciani thus came with the concept of "rentier economy" in which the rent plays a major role and, in which the rent is external to the economy. For them the state is a subset of the rentier economy and the nature of the state depends on its size relative to that economy and on the sources and structures of its income. (Beblawi, Luciani, 1987)

Beblawi defines three characteristics a state must possess in order to be classified as the rentier state. First, the **rent situations** must **predominate** in the rentier economy, of which the state is a subset. Beblawi as well as Mahdavy maintain that there exists no pure rentier economy, and the determination when an economy becomes a rentier is a matter of judgment. Second, the **origin of this rent must be external** to the economy, meaning it comes from foreign sources. Third, **only few are engaged in the generation of the rent** in the rentier state and the majority distributes and consumes the rent. Therefore, a large economy with extensive foreign trade, which creates wealth, cannot be rentier because a large part of society is actively involved in the wealth creation. Finally, the **government must be the principal recipient of the external rent.** (Beblawi, Luciani, 1987)

Mahdavy also pointed out that for states the most important advantage of being rentier is that oil industry "enables the governments of oil producing countries to embark on large public expenditure programs without restoring to taxation." (Mahdavy, 1970)

Luciani distinguishes two types of states. First is the production state that is dependent on taxation of its economy for income generation, and for which the economic growth is essential. The rentier state (also called allocation state) itself is actually the primary source of revenue in the domestic economy. Also, the allocation state has the problem of finding something that would require an appellation of domestic policy.

Luciani then specified more narrowly the concept of rentier/allocation state as one, "whose revenues derive predominantly (more than 40%) from oil or other foreign sources and whose expenditure is a substantial share of GDP." (Beblawi and Luciani, 1987)

Dunning has some more recent observations to add to the concept of the rentier state. He also explains what means the "rentier state." Whether a state can be considered as the rentier state, depends on the extent to which the resources provide the fiscal basis

for the state. In other words, **the rentier state has high resource-to-revenue ratio**. Not all natural resources provide a source of income for states. The natural resources, which are geographically concentrated like crude oil or diamonds, are capital intensive in production and have high barriers of entry, can be easily taxed by the state. It is more difficult for the state to tax the revenue from alluvial diamonds diffused in rivers because many private persons are involved in harvesting these. The government has to take money from the income of large number of private people, unlike in the first case. This involves higher political costs. So crude oil is more likely to produce the rent than other types of resources. (Dunning, 2008)

Resource Abundant (Resource rich) vs. Resource Dependent Country

It is also important to explain the distinction between a **resource abundant and a resource dependent rentier state.** A country can be resource abundant or resource rich which both have the same meaning. When a country is resource abundant, it does not always mean that it is the rentier state. To be the rentier state, the country has to derive a substantial part of revenues from resources. Further, the rentier state can be either resource dependent or not resource dependent. Where the resource rents make an important part of overall economy, the state is resource dependent. In other words, the country has high resource-to-GDP ratio. On the other hand, in the state where private sector[3] comprises of a large part of the economy and where the resource rent is an important income for the state but not the most important one, it means that the state is resource abundant but not resource dependent. In other words, the state has low resource-to-GDP ratio. (Dunning, 2008) The types of resource rich countries are illustrated in the figure 2.

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[3] By private sector is understood the non-resource sector - manufacturing, services and agriculture - where private citizens are engaged.

Figure 2: Variation in resource rich countries
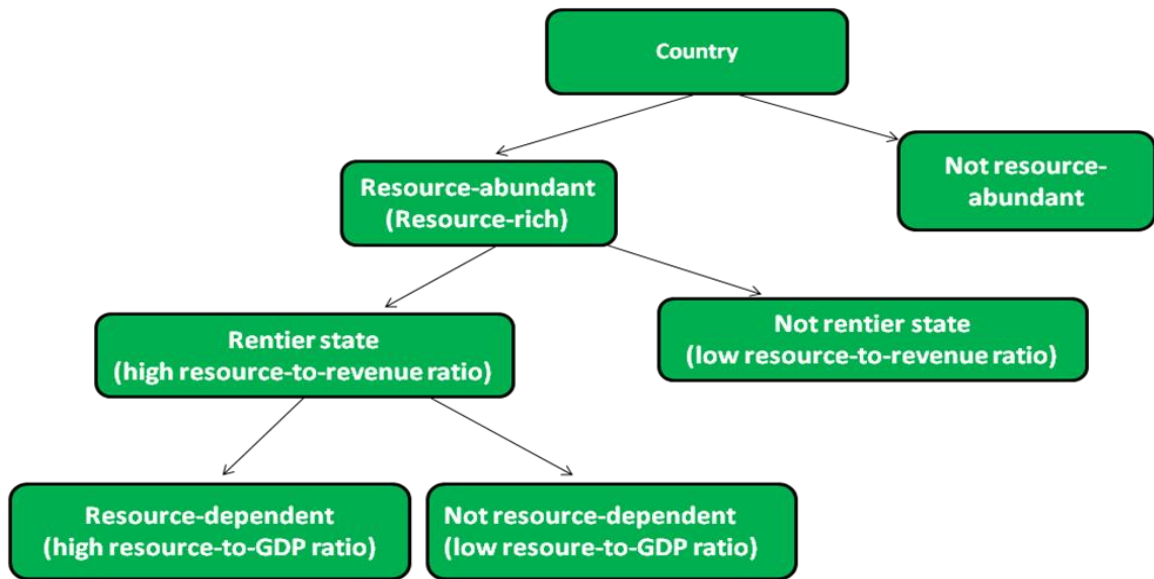
Source: Dunning, 2008, own elaboration.

The resource rich Latin American countries have been generally perceived as resource abundant. During the oil boom in Venezuela in 1970s the oil revenues constituted 80 % of the government's budget, but in the same time the contribution of oil to GDP was only between 10 – 20 %. The private sector remained large during this period. Also in Chile the revenues from copper during the First and Second World Wars made up 40 % of the government expenditures but only 7 -20 % of GDP.

On the other hand, countries in Persian Gulf and West Africa are considered to be mostly resource-dependent. During its oil boom Saudi Arabia's oil revenues constituted 80% of the state budget, like in Venezuela, but at the same time contributed 80% to the country's GDP. (Dunning, 2008)

Capital-surplus vs. Capital-deficient Country

Another way exists to categorize oil-exporting countries. Karl distinguishes between the **capital-surplus** and **capital-deficient** oil-exporting countries. These two categories stem from the ratio between the population of countries and their estimated oil reserves before the 1973 boom. The capital-deficient countries have larger populations and smaller per capita reserves of their resource, while the capital-surplus countries have the opposite. Therefore, the lower is the population/reserves ratio, the better for the country. Moreover, the capital-deficient countries have lower GDP per capita and shorter depletion horizon of their resource.

Karl includes into the capital-surplus countries Saudi Arabia, Iraq, Kuwait, Libya, Qatar, and the United Arab Emirates. On the other hand, Mexico, Algeria, Venezuela, Indonesia, Nigeria, Iran, Ecuador, Gabon, Oman, Egypt, Syria, and Cameroon are marked as the capital-deficient. This categorization is important because it distinguishes between further economic developments of the countries. The capital-deficient countries have larger unskilled labor force and more diversified economy. They are able to absorb the revenues from a boom period and in most cases still import the capital. Their ratio of population/reserves is unfavorable and so they have limited time for carrying the development. Thus, the capital-deficient countries are more willing to diversify away from oil. Their money from oil is viewed as essential for the diversification. It is why they are so oil-dependent. The capital-surplus countries are not able to absorb the surplus capital and have the balance-of-payments surpluses when prices of oil are high. (Karl, 1997)

3.2. Main Problems of Rentier Economy

One of the worst problems of the rentier economy is that it is vulnerable to external price shocks. Another problem is that the austerity measures, the governments employ in times of low oil prices, could not ease of the structural constrains. They cannot change the structure and source of revenue of the state. The most difficult question to solve is how to diversify the economy. Governments of the rentier states assumed that they can purchase the development, but it is not possible because the development is a process. (Yates, 1999)

Mahdavy noted that oil revenues had a little relationship with the production processes of the domestic economy. Petroleum industries tend to be enclave industries generating few backward[4] and forward[5] linkages. (Mahdavy, 1970)

The prerequisite of the rentier economy is the **massive inflow of the external rent in form of foreign exchange** (dollars, euro, pounds). The possession of foreign exchange is important for all the developing countries because it allows buying the technology and the capital for the advanced type of industrialization. So it seems great for the rentier state to have a lot of foreign currency, however, the influx of foreign rent causes the input-output system of the economy to be imbalanced. (Yates, 1999) The main effects of the massive inflow of the external rent can be seen in figure 3.

Another consequence of the foreign currency is that the state tends to **loosen constrains on foreign exchange.** The rentier state can acquire foreign goods without the high costs of exchange. It leads to the situation when **foreign goods have the tendency to replace domestic goods.** This happens mainly in agriculture and manufacturing sectors of domestic products, which cannot compete with foreign goods produced under economies of scale. The competition between domestic and foreign food products on local market and the departure of rural workers to cities, where rent is situated, result in decline in agricultural production. Food exporters become suddenly food importers. (Yates, 1999) The causality is visible in the figure 3.

Another consequence of the foreign rent is the **ability of the state to start large capital-intensive development projects.** There are short-term benefits because

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[4] Purchase of local inputs.

[5] Domestic use of the sectoral output in further productive operations.

the development of infrastructure employs domestic labor. But the long-term consequences of such development are bad. The productive capacity of the economy is not enlarged because there is a high import of production activities for infrastructure. Thus, there is no increase in inter-sectoral linkages. These state projects can also drive small local firms out of business. State-owned industries tend to rely on imports and do not build the inter-industry relations. Moreover, it can happen that, due to constant inflow of the foreign rent, the unprofitable projects receive constant support while successful project may lose governmental investment when state revenues decrease. (Yates, 1999)

The **demand for domestically produced goods is lower** than the demand for imported goods in the rentier state. This phenomenon has several reasons. First, there is the so called "conspicuous consumption," which means "the consumption of goods for the purpose of the creation of invidious comparison." (Gelb, 1984) Simply said, imported goods are more attractive. Second, imported goods have often better quality. Third, there is the effect of exchange rate on domestically produced goods. Governments in the rentier states want to maintain artificially high exchange values for their currencies in order to enhance the purchasing power of their money. This is possible because of the abundance of the foreign rent. The price of imported goods becomes relatively lower in comparison with domestic goods, which disadvantages local producers on domestic as well as foreign markets. If there was any export-oriented industry, it lost its comparative advantage. The fourth explanation for the phenomenon is that some **goods manufactured domestically don't have markets** to buy them. Governments often want do develop industries not because there is the demand for the industry's products but because it is prestigious to have such an industry. This is a diversification pursued for its own sake. The **domestic industry becomes consumer of net income and not a supplier.** (Yates, 1999)

According to Yates the comparative advantage of the oil exporting rentier state is the abundance of cheap oil. The developed countries have always dumped their surplus production on the markets of oil-rentier states but rentier states do not have any foreign markets where to dump their surplus industrial production. The poor developing countries cannot afford to buy it. As a result, the **rentier states become dependent on imports** and experience decline in sectors for tradable goods. This situation is called the Dutch Disease, a phenomenon discussed later in this work. (Yates, 1999)

The **sectors of agriculture and industry decline,** but the **service sector enlarges** as the state needs allocating bureaucracies to expand. Also financial services expand because of new foreign currency as well as various oil transportation services like pipeline maintenance, storage tanks, port facilities and so on. The situation of rentier economy brings growth of only the third sector. However, the service sector is created by the primary and secondary sectors and it cannot be done reversely. (Yates, 1999)

Yates also discusses the problem of **absorptive capacity of rentier economy**. In the short-term, the domestic productive processes are too small in size to absorb the sudden large amount of investment. It is why the rentier state sends the external revenue to invest in foreign countries, e.g. banks in Switzerland or foreign real estate. (Yates, 1999)

The labor is also distorted in rentier economy. The **"demonstration effect"**, a notion devised by Seers, means that wages earned by laborers in one sector drive up the wages in other sectors artificially. (Seers, 1964) Getting access to rent from oil is more important for the labor than the efficiency of production. Workers realize that their wages are not dependent upon their performance but upon the acquaintance with important persons. (Yates, 1999)

Remittances of migrant workers are also a part of rentier economy. Stauffer notes that "remittances by expatriate workers are direct cost and should be debited from the GNI." During the boom years migrant workers come to the rentier state and do the "dirty work", the domestic workers don't want to do it but in recession they are expelled. (Stauffer, 1987)

Unions in rentier economy **have small power**. Firstly, because the state has the possibility to employ expatriate workers, and secondly because the tools of influence like strikes are not effective, when a reward is not linked to the work done. Luciani also notes that unions miss their traditional source of power, the factories, and that it is difficult to form a union in the service sector. (Luciani, 1987)

Another important distortion in rentier economy is the **measurement and distribution of income**. The per-capita income is not a good measurement of the standard of living of the population because it includes income from oil, which is mainly in hands of corporations and rentier elites. In reality, the per-capita income is much lower. The rent is not evenly distributed among the population. (Yates, 1999)

3.2.1. Rentier Mentality

Liberal and radical economists insulted rentiers and denoted them as unproductive and antisocial because they did not contributed to the production but got income; they broke the work-reward causation. Mahdavy lamented this fact as he, among the first, saw the contrast between underdeveloped states with poor population, where there was present the urgency for change leading to political action, and the rentier states where the welfare from abroad prevented the urgency for change and rapid growth, which then led to the state of inertia. (Mahdavy, p. 1970)

The inertia has two components according to Mahdavy. First, the extensive resource reserves persuade the rentier state to expect increasing rents in the future. Second, the rentier becomes satisfied with present material conditions and wants to maintain it preventing this way any social and economical transformation. (Mahdavy, 1970)

With the expectation of increasing the external rent in the future, the spending and consumption increase. The rentier state lacks the necessity, which would lead to the invention needed or any economical advancement. Beblawi notes that for the rentier state "reward becomes a windfall gain, an isolated fact" due to the break in the work-reward relation. (Beblawi, 1987)

The rentier mentality has consequences for productivity. The consequences are following. The government gives contracts not because it is economically rational but because of other interests. Businessmen abandon their businesses and go to some speculative sector connected with oil, like real estate, and the best workers abandon the private businesses and seek a lucrative governmental employment. Also manual labor is given to foreigners and money in form of remittances leave the country. Beblawi also notes that such consequences are "serious blow of the ethics of work." (Beblawi, 1987)

3.2.2. Rentier Multiplier

The rentier multiplier is one of the causes for a state to become dependent on the foreign rent. Unrequited resources, like mineral resources or aid, cause a multiplicative effect on the recipient's economy. It is similar to Keynesian multiplier in that it also explains that "an injection of funds causes a larger increase in effective demand and thus

leads to an increase in income greater than the net injection." (Beblawi, Luciani, 1987) The rentier multiplier, however, is not created by the deficit spending but by spending revenues from export of mineral resources or another type of revenue received externally and unreciprocated.

In case of the oil industry, most of the income from the industry goes to the government. Part of the income is saved, part is spent on imports and part is used to purchase the local currency with the foreign exchange, which is then spent domestically. The recipients spend the money on imports while the capital leaks out of the economy. The government spending in non-oil sector contributes to the creation of non-oil income by the increase of production in other sectors; however, the problem is that there is the extreme leakage of the capital in a form of imports. (Beblawi, Luciani, 1987)

Only the rent from foreign transactions can create the rentier multiplier. Domestic sales of oil do not create the multiplier mechanism. The main disadvantage of the rentier multiplier is that it intensifies the dependence on the external rent. (Beblawi, Luciani, 1987)

3.2.3. Dutch Disease

The Dutch Disease means that new discoveries or favorable price changes in one sector of the economy cause harm in other sectors. It is an economic disease which brings the increase of income in one sector of the economy but income does not increase in other sectors of the economy. The Dutch Disease is characterized by rapid and distorted growth of services, transportation and other non-tradables, which cannot be imported, while in the same time hurting industrialization and agriculture, which produce tradables that can be imported. (Karl, 1997)

The reason for the unequal growth is that the increase of income in one sector of the economy causes a higher demand for imports because the domestic production cannot meet the new demand quickly enough. The increased income also raises the demand for services and the domestic market increases the supply of them as it is not so easy to import services. The new large demand for imported goods and domestic services causes the increase in prices. Higher prices should cause the domestic production to increase, but it does not happen because there is a large inflow of foreign currency into

the economy, which has brought general inflation of wages and prices. Therefore, it is not profitable for producers to increase output.

The Dutch Disease is mainly associated with the boom of oil industry, when the oil industry brings distress to agriculture and manufacturing. However, the Dutch Disease is not automatic. Whether it sets on in an economy depends on the decision making and policies of the government. (Karl, 1997)

Below is the figure depicting various possible effects of external oil rent on the recipient economy, which were described above.

Figure 3: Chain of causality in rentier state
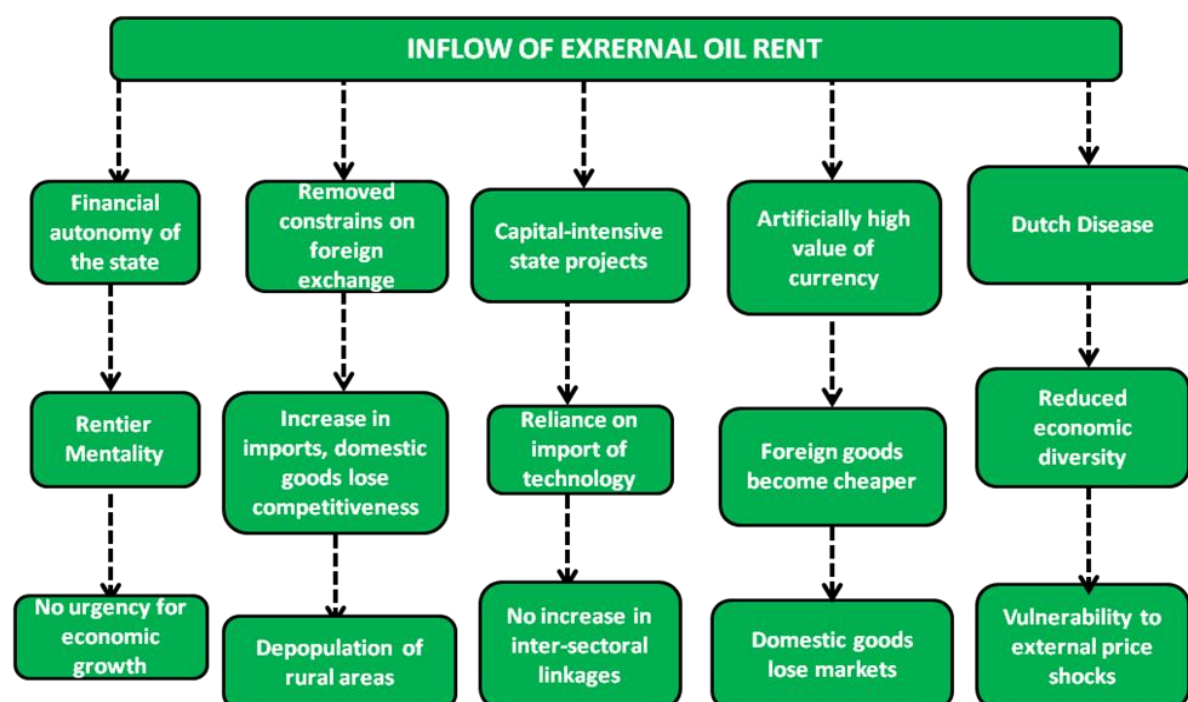
Source: Yates, 1999, own elaboration.

3.2.4. Problems of Investment in Oil-exporting States

Mabro and Monroe contemplate the danger for world oil consumers if oil producing Arab countries stop producing oil. The oil shortages, the consumer countries can face, could hinder their economic growth. For example, the Arab countries may wish to stop extracting oil because they may wish to finance a war. This happened in 1973, when Arab countries were financing the Fourth Arab-Israeli War. Another reason can be that Arab

countries may not know what to do with surplus funds from the sale of oil. (Mabro, Monroe, 1974)

Not all oil producing countries can accumulate surplus funds. For example, Iraq, Iran, and Algeria have large population with the need to increase their standard of living and they have other resources than oil that need to be developed. These countries can use their surplus funds at home. Therefore, only countries with small population and few alternative resources can accumulate surplus funds. Such states are, for example, Saudi Arabia, Kuwait, United Arab Emirates and Libya.

According to Mabro and Monroe three variables can affect the size of spare funds accumulation. They are the price of oil, world demand for oil, and the future import inclination of the oil producing states. All of these variables are difficult to predict. (Mabro, Monroe, 1974)

Oil-exporting states have four possible ways how to invest their surplus funds**; at home, in development of the whole region, in international oil industry, and on capital markets abroad**. In countries, having few resources other than oil, possibilities of investment at home are limited. The public expenditure in oil producing countries goes in four areas. First, it is the investment into **armaments and internal security**. They are used as defence against local neighbours. This expenditure might increase as armaments become quickly obsolete and new more expensive ones are needed. The second outlet for home investment is **the public employment**. It is a popular method how to get the oil revenues back into the economy. Higher oil revenues lead to higher wages, bonuses and various allowances. Third, the country can spend oil revenues on **health care, education and welfare services**. Final options for the states are the **home development and investment programs**. These include road infrastructure, public utilities, airlines and banking. But Arab countries have scarce skilled labour and missing non-oil resources, which restricts the number of profitable projects. Agriculture offers few possibilities for investment and the industrialization is slow. Petrochemical industry is also an option but fertilizers are already in over-supply. It is important to note that not all funds can be invested at home because the home economy cannot absorb it. (Mabro, Monroe, 1974)

Another possibility for using the excess funds from oil can be to use them for the **development of the region as a whole**. For example, gifts have been given to poor countries on Israel's borders during the Arab-Israeli conflict. Concerning the development

aid, there could be the return on interest from loans to industrial and commercial enterprises in Egypt, Tunisia, Sudan, etc. However, countries fear a political risk when investing the money to other Arab countries, with exception of some purchases of urban property. Overall, the investment in other countries of the region is relatively small because of political reasons. (Mabro and Monroe, 1974)

One and rather obvious way how to invest surplus funds is to **invest** it **in the oil industry**. The market is familiar and therefore not so hazardous for the investing countries. Some investment accrues to the production of crude oil and gas, and some to transport, refining, marketing and exploitation. But if a country only produces oil, the possibilities for investment are small and starting to refine and transport oil is difficult because it involves economies of scale. As a consequence, for oil producing countries the possibility to invest in international oil industry is limited. (Mabro, Monroe, 1974)

3.3. Politics of Rentier State

There is an extent literature describing the relationship between oil industry and economic and political stability. Both of these spheres are important for the functioning of the state and they are interconnected and affect each other. Political development themes in the rentier theory are concerned with the fact that the external rent breaks the linkages between people and the state. The state does not tax citizens; the state only distributes the rent. The state uses the distributive function as the source of legitimacy.[6] The states are not held politically accountable, as they would, if they were constrained by taxation. By having wealth from the rent, the state controls the structure of the market and the flow of funds. The political consequences of rentierism are discussed in this chapter but in a smaller extent than the economic consequences were discussed previously.

It is also worth of noticing that rentierism affects also state institutions. The institutional development is restrained in times of plenty, while extractive and regulative abilities are not used. In crisis, when the institutions are needed, they are missing. Also coercive ability and a bureaucratic organization is absent. (Okruhlik, 1999)

3.3.1. Effect of Oil Revenues on Taxation

In most of developing countries mineral resources like oil have been owned and extracted by the state. Even if the resources are privately owned, they are a ready source of income for the state. Because the oil rents are mostly appropriated by the state, they are then allocated and distributed by political authorities. When a state enjoys a resource rent, the state is then less likely to engage in generating revenue from the public by taxation. It does not have to take the private income from people and redistribute it. Redistribution is the main focus of political economy of public finance, but for a rentier state this isn't usually true. The state mainly distributes the revenues from the rent. (Dunning, 2008)

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[6] Legitimacy is the popular acceptance of a governing law or regime as an authority.

The resource rents tend to displace other sources of revenues as the basis for public finance. The state has the power to restrict the access to natural resources, so it can push the resource extracting company to pay royalties to the state. Also the resource tax base is inelastic, stable, so the state gets relatively stable value of revenues from the rent. The rent is often called a "windfall gain" by researchers. Generation of revenue from natural resources is less costly for the state than other forms of revenue generation like taxation of citizens. (Dunning, 2008)

During oil booms the fiscal and bureaucratic systems are changed and the income taxation generally declines as the extractive efforts of the state decline. Taxation of private companies and citizens becomes unnecessary and the decline of the extractive apparatus follows. This has happened in the developing countries like Saudi Arabia, Peru and Chile, but also in the developed countries like the UK and the USA. Generally, taxes are lower in resource rich countries. For illustration, non-oil tax revenue as a percentage of GDP for rentier states Venezuela, Indonesia, Iran, Algeria, Nigeria, was only 11.32 % in the period 1871 - 1973. (Dunning, 2008)

The reason why taxation is affected by oil revenues is that taxation and other forms of revenue extraction from citizens are costlier than the collection of resource rents by the state, which is relatively costless. Moreover, the aggregate cost of taxation may be that it encourages the diversion of production to non-taxable activity or by promotion of capital outflow. Another reason is that taxation of individuals and companies requires the creation of capable state bureaucracy and costly monitoring.

The decline of internal taxation is not the only consequence of resource boom. Other redistributive policies may be affected as well. For example, land reforms. (Dunning, 2008)

3.3.2. Consequence of Missing Taxation

The most important consequence of missing taxation is the dismantling and the decline of extractive institutions. Instead, institutions that are designed to distribute revenues emerge. The decline is bad for the long-term development of all parts of the bureaucracy. "Extractive institutions are the base of administration, without which regulation and redistribution are impossible. Setting up an extractive apparatus is the most

'intrusive' and the first economic act of the state, involving the centralization of the fiscal apparatus, territorial control, political and economic decisions about target groups, the acquisition of information, and the design and implementation of collection mechanisms and enforcement procedures." (Chaudhry, 1989) The political dimension of the process entails creating long-term economic and fiscal priorities and stating legal obligations. Taxation and data collection accompanying it represent a way how to regulate the private sector and direct the economy.

The extractive and redistributive functions of the bureaucracy are important for the state in the field of information gathering. Without the information, the state spending cannot be based on economic rationality. The absence of basic data on the economy has negative effects on the quality of local investments. Apart from that, taxation policies have large effect on the practices of private sector. Commercial and investment taxes force entrepreneurs to adopt uniform management techniques and accounting procedures. They also influence consumption patterns. Taxation policies are also the outcome of what society expects from the government. Demand for political participation is often a response to taxation. (Chaudhry, 1989) All these mechanisms become restrained when proper taxation is absent in a country.

3.4. Empirical Evidence of Economic Impact of Oil Revenues

The purpose of this section of the diploma thesis is to show how the theory of the rentier state has proved itself in practice. This section gives evidence that the theoretical statements of scholars really resemble the historical development.

Economic Impact of Oil Revenues on Oil Exporting Countries

The sudden large oil revenues of 1973-1974 had immense impact on oil exporting countries. It was the cause of fourfold increase in oil prices in comparison to the 1960s. The prices then rose slowly from 1975 to 1978 and then doubled. Governments of oil-exporting countries believed they must act quickly before their oil reserves depleted. With petrodollars and the state spending, they wanted to achieve prosperity, autonomy, stability, and equity. The government expenditures increased rapidly, in some cases over 50 %, in comparison to previous years. Governments started spending on huge public projects. Many large projects were made in the heavy industry. (Karl, 1997)

The state spending led to **the multiplier effect**. Since the state spending created a new demand, it was an incentive for the private sector to rise their investment. Private sector got direct incentives, in form of credit grants and higher money supply, as well as indirect incentives. Wages also rose regardless of productivity and new employment opportunities were created. Foreign workers moved to oil countries.

The government spending helped to the rapid growth in non-oil sectors. All oil exporting countries enjoyed 12% increase in average in non-oil sectors growth between 1974 and 1976. (Amuzegar 1982)

The state spending also led to **higher public welfare**. There were more goods and services for people, new employment opportunities and necessary goods were subsidized. Private consumption increased at the annual rate of 7%. Taxes were reduced and housing was subsidized. The countries of Persian Gulf came with free medical care, education, and generous pension plans. However, the state expenditures became larger than oil revenues. In late 1970s, there were already budget deficits that changed into surplus only temporally because of the new price increase of 1979-1980. (Karl, 1997)

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The Dutch Disease started spoiling the economies of oil countries. It came to light because of several changes that happened. First of all, **import of goods** increased remarkably because the domestic production was not able to keep up with the increasing demand. It was caused by inflexible suppliers, overuse of services and bottleneck in production. The imports of oil countries grew by 67% in average between 1976 and 1978. (Amuzegar, 1982)

Next, the **real exchange rates appreciated**. This fact discouraged local production and export of local goods and made countries dependent on imports. Another problem was that the foreign trade, which increased dramatically during the boom years, was too big for unsatisfactory infrastructure and small ports. This caused delays in transport of materials and other goods, which were needed for the large state-financed projects. As a consequence, the cost of these projects increased, in some cases even by 100%. The output of domestic enterprises was not able to catch up with the national income and because of that, prices for domestic products increased. Many large projects were postponed or canceled which was very wasteful.

All has resulted in **inflation**. Most states tried to reduce inflation by reducing prices, cutting imports and employing price controls, all mainly in agricultural sector. These policies had a bad impact on the relations between rural and urban areas and, at the end, actually made the country even more dependent on imported goods. (Karl, 1997)

The states started to distribute **subsidies** to unprofitable firms and low income population. Subsidies grew twice as fast as the rate of the GDP growth in the period 1974-1978. (Gelb, 1984) Part of the subsidies were low domestic oil prices (somewhere prices were set at the cost of production), input or credit support for inefficient local industries, limits on cost of food, and public-works programs. Of course it was very difficult for governments to cancel these subsidies in times of lower oil revenues. (Karl, 1997)

Another outcome of the large-scale state spending was the growing **foreign debt**. Oil-exporting countries were able to guarantee the borrowings by the oil reserves, which they believed would keep appreciating in value if left in the ground. Oil-exporters were creditworthy and governments were offered cheap credits and thus, they borrowed a lot in 1970s. They borrowed even more than the least developed countries (LDC). It is interesting that oil-exporters borrowed more funds than oil importers even though they had large revenues from oil. By 1980, capital-deficient oil exporting countries had a combined

debt of over $99 billion compared to $19,5 billion in 1972, before the first oil boom. In 1994 the total debt of the countries was over $275 billion and their debt service was only $43,5 billion. (Karl, 1997)

In spite of the large domestic investment, the rate of economic growth was not corresponding. At the end of 1970s the annual average growth rate of oil exporters was 5.6%, which was much lower than the annual 9% growth before the first oil boom. Gelb estimated that overall average growth rates were 4.1% lower in years 1979-1981 than they would have been if the countries had sustained the same growth rates they were enjoying from 1967-1972. (Gelb, 1984)

Paradoxically, the **dependence on petroleum** increased, even though governments tried hard to diversify their economies. Between 1973 and 1980 the oil industry was increasing its share as a percentage of GDP. However, agriculture (almost self-sufficient in pre-boom period) declined, and the manufacturing as a share of GDP increased only little. (Amuzegar, 1982)

In 1978 governments started planning some **austerity policies**, which were needed. However, because of the Iranian revolution of 1979, prices of oil increased sharply again and current-account deficits of oil exporters got in surplus. (Amuzegar, 1982) New round of boom effect started again.

In 1980s the **OPEC nations started to lose their position** as the main supplier of oil to the world market. Their share of world oil output decreased from 54% to 32%. It was due to the entry of new exporters on the market (Mexico, Norway, Great Britain) and because of the lower demand for oil due to the utilization if coal, nuclear power, and natural gas. (Karl, 1997)

In 1986 the price per barrel was only $13 and the capital-deficient countries reached huge current-account deficits. Oil exporters faced the decline in all sectors of the economy, the decline in employment and wages, exit of capital, and inflation. The total oil revenues of oil-exporting countries dropped to 39.4% from 1980 to 1986. The changing periods of policies of spending and policies of austerity led to political instability and consequent regime changes. Examples are the revolution in Iran, political liberalization in Mexico, civil war in Algeria or crisis of democracy in Venezuela. (Karl, 1997)

4. CASE STUDY OF VENEZUELA

4.1. History of Venezuelan Oil Industry

It was known since the pre-Columbian times that Venezuela disposes of large oil supplies. The extraction of oil started in 1912. Royal Dutch Shell and Rockefeller's Standard Oil were the main oil producers in Venezuela. By 1929, Venezuela was the second largest producer of oil while the US was the first, but Venezuela became the largest oil exporter at that time. In 1920 the share of oil in Venezuelan exports was only 1.9% but rose to 91.2% in 1935. The impact of this increase on the economy was in the form of the Dutch Disease. The main outcomes were that the agricultural production declined almost to zero and Venezuela was slow in industrialization compared to other Latin American countries. (Wilpert, 2007)

In 1943 the government of Venezuela passed the Hydrocarbons Act, a crucial reform of the oil industry. Before that the state received income from oil based on concessions.[7] After the act, the oil revenues for the state were in the form of taxes based on income from mining. The act also established that the profits foreign oil companies made from oil could not be higher than the amount they paid to Venezuelan state. The increase of oil income made the state gradually more dependent on oil as the source of revenue instead of individual income taxes. However, in 1950s, because of the increase production of oil in the Middle East and the imposed quotas on imports in the US, there started to be an oversupply of oil in the world. This led to low prices of oil. As a consequence, in 1960, the Venezuelan government instigated the formation of the Organization of Petroleum Exporting Countries (OPEC). In the same year, Venezuela established the Venezuelan Oil Corporation, which constituted the basis for Venezuelan oil industry nationalization. (Wilpert, 2007)

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[7] A **concession** is a business operated under a contract or a license associated with a degree of exclusivity in business within a certain geographical area. The owner of the concession — the *concessionaire* — pays either a fixed sum or a percentage of revenue to the entity with the ability to assign exclusive rights for an area or facility. In mining, it may involve merely the transfer of exclusive or non-exclusive easements (the right to use the real property of another without possessing it).

The Middle East oil embargo of 1973 caused a fourfold increase in world oil prices between 1972 – 1974. Venezuela's oil revenues grew rapidly, which allowed the president Carlos Andrés Perez to engage in the project called *La Gran Venezuela*", which was aimed to use the oil revenues to fight poverty through price controls and income increases, and the diversification of the economy through imports. Another purpose of the project was the nationalization of oil industry, which was completed in 1976 with the creation of Petroleos de Venezuela (PDVSA) from several oil companies. (Wilpert, 2007)

However, the nationalization was not a "true" nationalization because the management and its practices stayed the same, only the ownership was transferred. The government lacked control of the company.

In 1983, due to the implementation of the currency exchange control, there was the currency crisis in Venezuela. The government wanted to use PDVSA's investment fund to help out the country from the crisis. As a reaction, PDVSA's executives decided to internationalize the company by investing abroad. The company bought refineries in the US and Europe. PDVSA also used the transfer pricing to sell Venezuelan oil at discount to the company's subsidiaries, transferring indirectly its profit abroad. (Wilpert, 2007)

In 1989, PDVSA started using a worldwide combined accounting method enabling the costs and losses of subsidiaries abroad to be balanced against revenues in Venezuela. Because of this provision, PDVSA has to give a smaller portion of revenues to the government.

As a part of the internationalization, PDVSA started a global vertical integration mainly because Venezuelan oil was a heavy crude variety,[8] which needed a very proficient refining process, which only some refineries can carry out. PDVSA acquired foreign refineries that could process Venezuelan crude oil and then supply finished oil products to the market close to the refinery, guaranteeing markets for Venezuelan heavy crude oil. However, the refineries were unprofitable, thus PDVSA started providing the Venezuelan crude oil under the market price and later, they were purchasing lighter crude oil from Russia. The costs of these operations were again set against the revenues in Venezuela, lowering the taxes to the government. ((Wilpert, 2007)

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[8] A type of crude oil, which has many components undesirable for finished products such as sulfur, nitrogen and metal elements. Requires a sophisticated refining process.

In order to avoid government taxes, PDVSA did not obey OPEC quotas on oil at extraction, which led to lower oil prices and lower oil revenues. From 1983 the quotas were measured at ports, while previously it was at wells. Thus, the oil used domestically was not included in OPEC quotas and the government did not know how much oil was produced. It is why PDVSA did not have to pay royalties on some of the oil. In 1981, PDVSA paid 71% of its gross revenues in taxes, decreasing to 39% in 1998.

PDVSA was not efficient in comparison to other state-owned companies. In 2000, PDVSA was the largest company in Latin America, but had one of the lowest positions in regard to efficiency. Also in 2001 PDVSA paid only US$8.34 to the government per barrel of oil produced while Mexico's PEMEX paid US$24.66 to the Mexican government. Moreover, PDVSA had twice as many employees than it needed, which also hampered the efficiency. (Wilpert, 2007)

The control of PDVSA was very important for Venezuelan economy in the history of the oil industry. The present government has the matter of the PDVSA control as an important part of its economic policies.

4.2. Analysis of Venezuelan Economy with Respect to Oil Industry

In this chapter, the oil sector, trade and inflation, government's relation to oil industry, and income distribution to households are analyzed. This analysis should provide an understanding of how important for the economy, government, and inhabitants the oil sector is.

4.2.1. Oil Sector

The position of the oil sector in the economy of Venezuela is evaluated by presenting several oil sector indicators. These include proven crude oil reserves, crude oil production, output and consumption of refined products within the country, a share of the oil sector in GDP, oil export revenues, a share of oil export in total export, a share of oil exports in GDP, a share of oil revenues in the government budget and FDI in the sector.

Oil Reserves of Venezuela

Venezuela has very high crude oil reserves, last estimate is 211,173 mil. barrels of crude oil. This volume is the second biggest among the 12 OPEC countries after Saudi Arabia. Its share is 19.8% of all OPEC reserves. OPEC then disposes of 79.6% of all world proven oil reserves. The share can be seen in figure 4. For Venezuela, the amount of oil reserves is very important as it promises inflow of funds from oil exploitation in the future. On the other hand, this prospect can have a negative effect on the economy because it prevents the necessity for diversification, which is so important for facing oil price shocks.

Figure 4: Venezuelan share of crude oil reserves in OPEC (bn barrels)
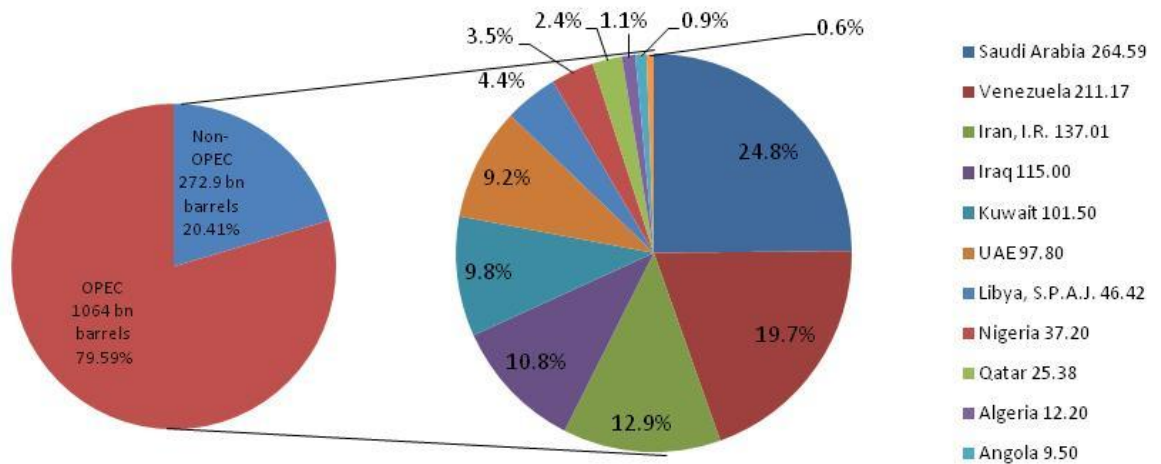
Source: OPEC 2011, own elaboration.

The volumes of crude oil reserves indicate whether the rentier state is capital-surplus or capital-deficient. According to the rentier state theory, a country with the low population/reserves ratio is the capital-surplus country. Table 1 lists selected oil producing countries that have reserves over 10,000 mil. barrels of crude oil as of 2009. Among the countries Venezuela has the fifth lowest population/reserves ratio, which means that Venezuela pertains among the capital-surplus countries.

**Table 1: Population/reserves ratios for selected countries**

Country	Population	Crude oil reserves (mil. barrels)	Population/ Reserves ratio
Venezuela	27223228	211173	128.91
Saudi Arabia	25731776	264590	97.25
Iran	76923300	137010	561.44
Iraq	29671605	115000	258.01
Kuwait	2789132	101500	27.48
UAE	4975593	97800	50.88
Libya	6461454	46422	139.19
Nigeria	152217341	37200	4091.86
Qatar	840926	25382	33.13
Algeria	34586184	12200	2834.93
USA	310232863	19121	16224.72
Brazil	201103330	12802	15708.74
Mexico	112468855	12187	9228.59
Kazakhstan	15460484	39800	388.45
Russia	139390205	79432	1754.84
China	1330141295	18000	73896.74

Source: CIA, OPEC, 2011, own elaboration.

## Crude Oil Production in Venezuela

Figure 5 below shows the development of crude oil production since 1980 as the yearly average of the daily production. From 1980 the production level was decreasing every year till 1988 and then, it was mostly increasing. There was sudden large increase in the production between 1997 (2,411 b/d) and 1998 (3,210 b/d). The peak of the production was in 2005 when Venezuela produced 3,128 barrels per day in average. After that, the production was slowly decreasing. In 2009 Venezuela produced 2,878 barrels per a day in average. This represents the eleventh position in the world. (OPEC Annual Statistical Bulletin, 2009) It is also useful to look at the annual growth rate of oil production, where the increments in oil production are more visible. Figure 6 shows the fluctuation in growth rate, while the highest increments in production can be seen in the years 1990, 1998 and 2004. The annual average growth rate from 1980 to 2009 is 1.42%.

Figure 5: Crude oil production
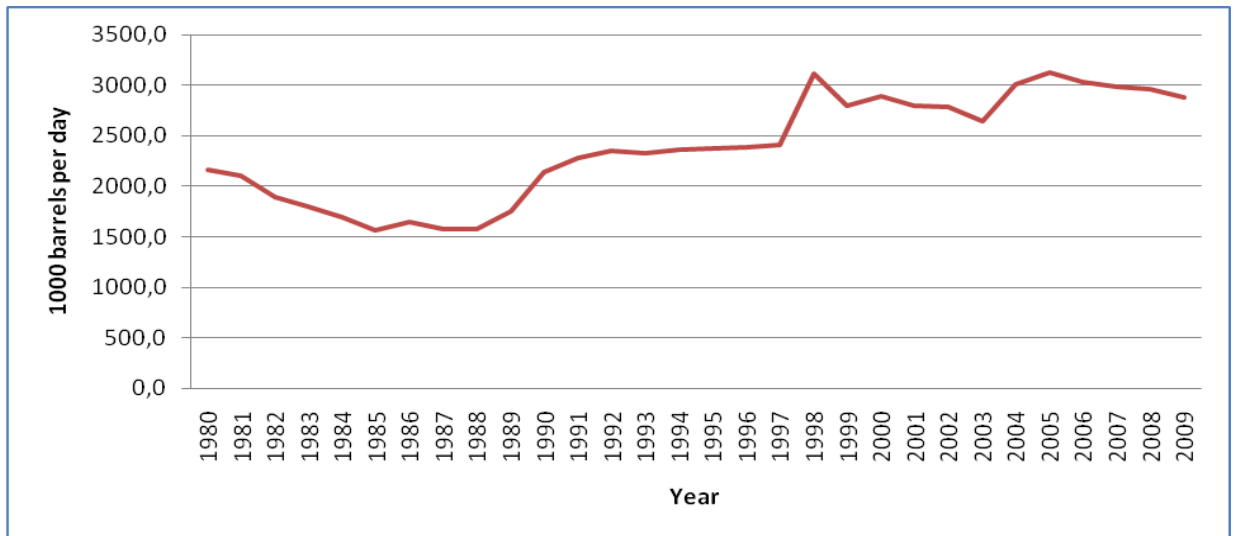
Source: OPEC Annual Statistical Bulletin 2001, 2005 and 2009, own elaboration.

Figure 6: Annual growth rate of oil production
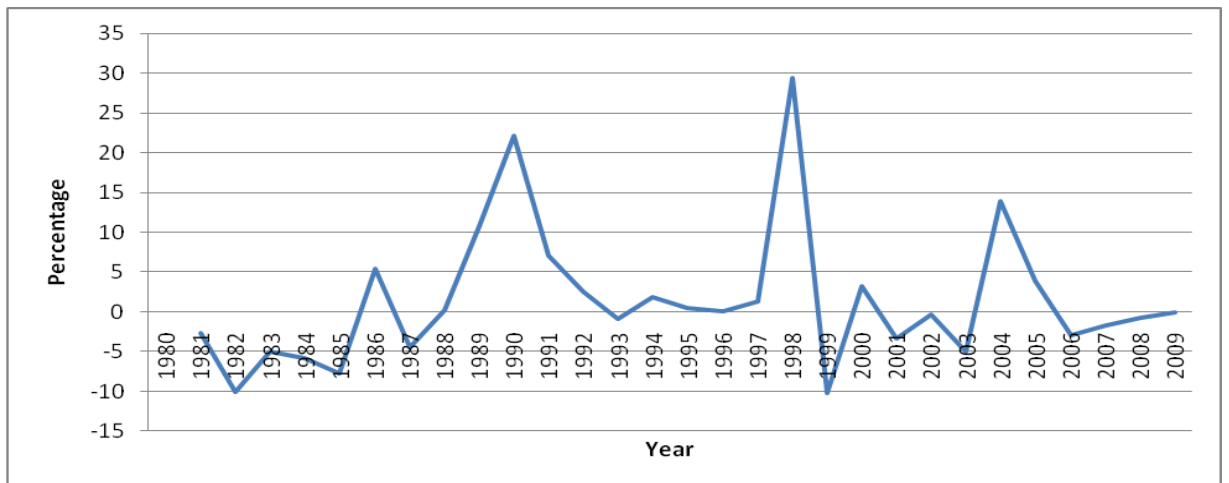
Source: OPEC Annual Statistical Bulletin 2001, 2005 and 2009, own calculation.

Output and Consumption of Refined Products

Figure 7 shows Venezuelan output and consumption of refined products from 1995 till 2009. The refined products are composed of gasoline, kerosene, distillates, residuals and other products. The output of the petroleum products and the consumption of petroleum products are measured as a yearly average of the daily production. It is clear from the graph that Venezuela produces more petroleum products than it consumes.

Therefore, the difference between the two lines is the amount of petroleum products being exported. In 1996 the output of refined products was the highest in the stated years and reached 1,335,200 b/d in average. Then the output was rather decreasing. On the other hand, the consumption of refined products was increasing reaching the peak of 667,900 b/d in average in 2009. (OPEC Annual Statistical Bulletin, 2009)

Figure 7: Output and consumption of refined products
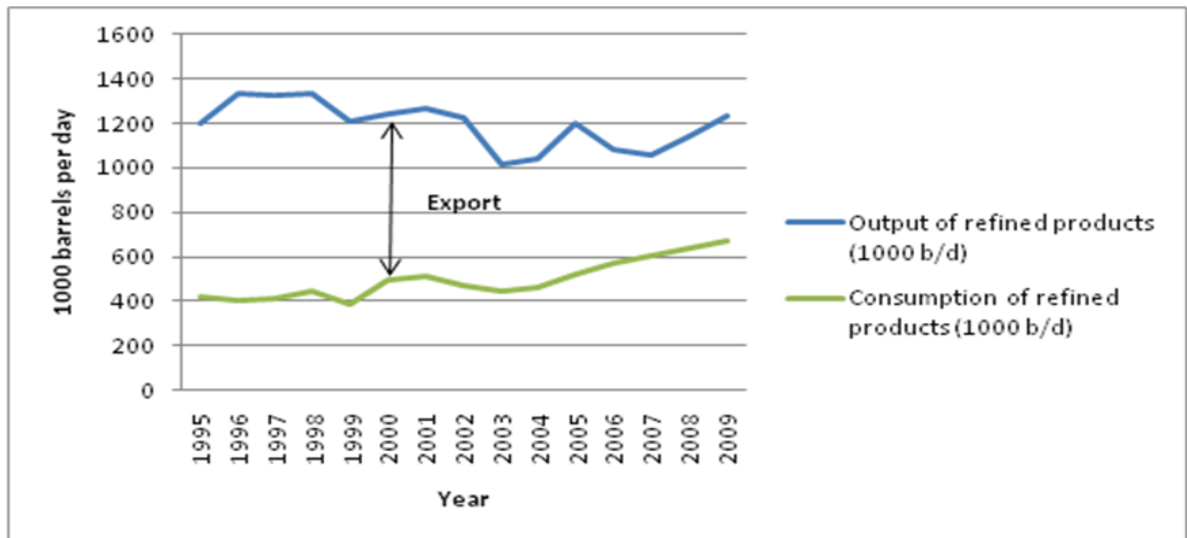
Source: OPEC Annual Statistical Bulletin 2001, 2005 and 2009, own elaboration.

Crude Oil Production and Output of Refined Products

In figure 8, the difference can be seen between the amount of crude oil produced and the amount of output refined from the crude oil. The difference represents the amount of crude oil, which is produced but not used for the refined products and thus, it is exported in the form of crude oil. The output of the refined products is rather low currently representing less than 50% of the total crude oil production.

Figure 8: Crude oil production and output of refined products
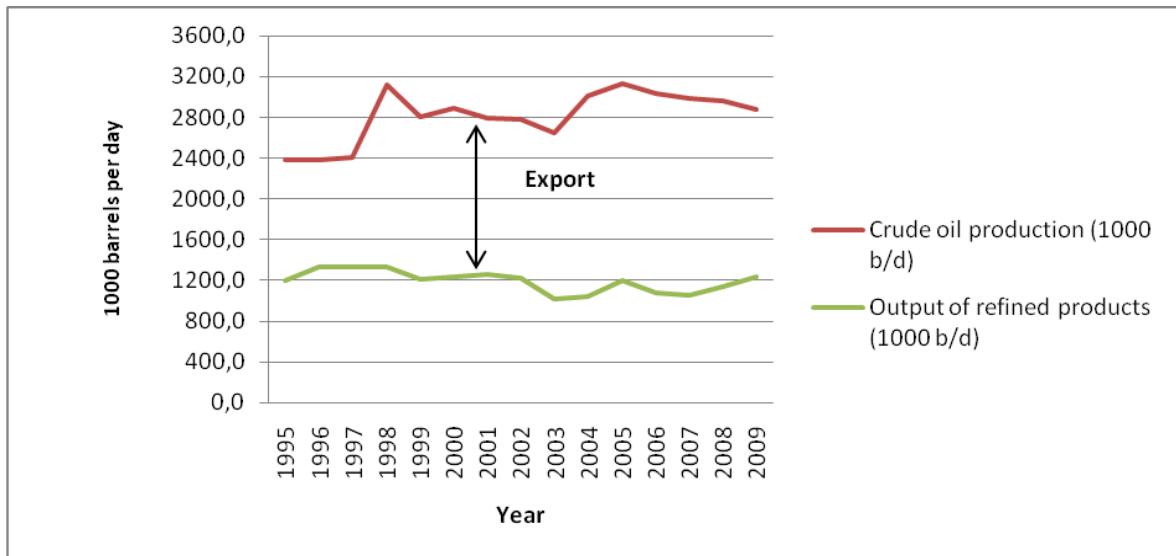
Source: OPEC Annual Statistical Bulletin 2001, 2005 and 2009, own elaboration.

Share of Oil Sector in GDP of Venezuela

In 2009 GDP of Venezuela was US$348.8 bn (purchasing power parity). Currently, the oil revenues represent about 30% of the GDP. In 2009, real GDP contracted by 2.9% as a result of a drop in oil prices, which caused the decrease in the government expenditures and private consumption. (U.S. Department of State, 2010)

Figure 9 depicts the development of Venezuelan GDP. The aim is to show the participation of nonpetroleum and petroleum activities on GDP. The data were computed by the Central Bank of Venezuela (BCV) and the units are thousands of Bolívares.[9] The GDP of nonpetroleum activity is the sum of product generated from mining, agriculture, manufacturing, electricity and water, construction, trade and repair services, transportation and storage, communications, real estate, entrepreneurial and renting services, general governmental service, financial institutions and insurance. GDP from petroleum activity, GDP from nonpetroleum activity and net taxes on products make up the consolidated GDP. From the graph it can be seen that the GDP from the nonpetroleum activity was fluctuating more than the GDP generated from

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[9] Data could not be found in US$ units. The exchange rate now is 1 US$ $\cong$ 4,290.6 VEB (Venezuelan Bolívar).

the petroleum activity, which has been quite stable since 1997. Until the year 2003, GDP from the petroleum activity represented a bigger portion of the overall GDP. Apart from 2003 the nonpetroleum sectors, mainly manufacturing, electricity and water, trade services, real estate and government services, were growing. In 2009, the petroleum activities produced 6,471.4 mil. Bolívares (11.6% of consolidated GDP), the nonpetroleum activities 43,435.3 mil. Bolívares (77.5% of consolidated GDP), net taxes on production were 6,116 mil. Bolívares (10.9% of consolidated GDP) and the consolidated GDP was 56,022.7 mil. Bolívares. Surprisingly, the Central Bank of Venezuela shows the share of petroleum activity on total GDP to be quite small.

Figure 9: GDP from petroleum and nonpetroleum activities at constant prices from 1997
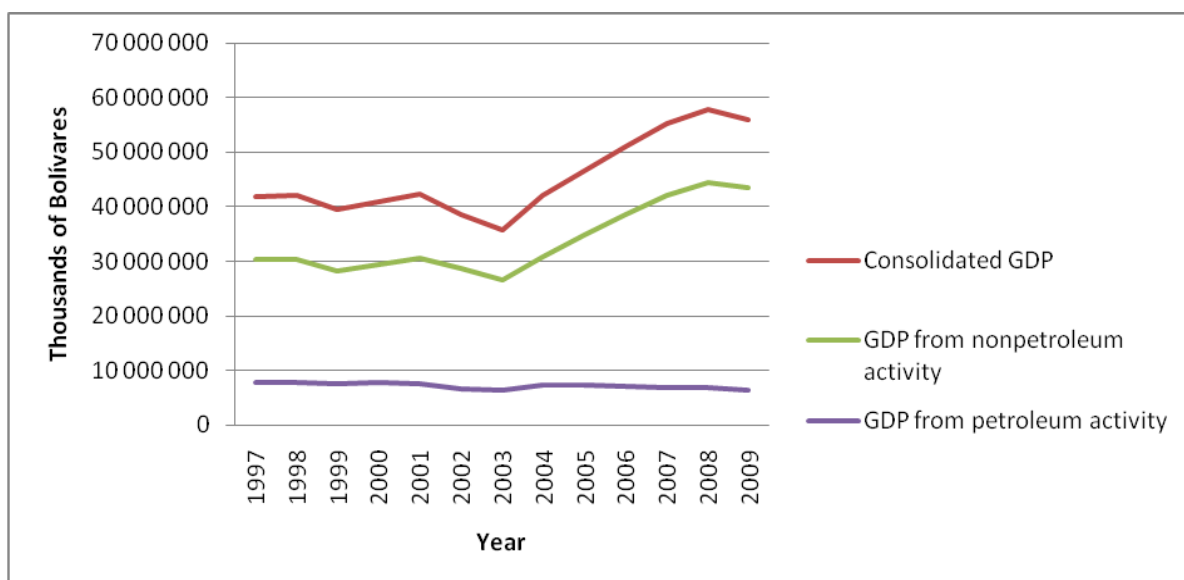
Source: Banco Central de Venezuela, 2010, own elaboration.

Figure 10 shows the percentage shares of the petroleum and the nonpetroleum activities on total GDP. From 1997, the share of the nonpetroleum activity was growing from approx. 72% to approx. 78% in 2009. On the other hand, the share of petroleum activity in the same time period was decreasing from approx 19% to approx. 12%. This is a good sign for the Venezuelan economy as it seems that it is becoming less dependent on the oil sector. **According to the data of the Central Bank of Venezuela, Venezuela has currently a low resource-to-GDP ratio, meaning that the country is not resource dependent.** However, the question is, to what extent are the numerical data, which the Central Bank of Venezuela presents, reflecting the reality. Other reliable sources as

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the U.S. department of State or the OPEC state that the oil sector participates by 30% on total GDP of Venezuela. According to these sources, Venezuela has higher resource-to-GDP ratio and is more dependent on oil revenues.

Figure 10: Percentage shares of petroleum and nonpetroleum activities on consolidated GDP
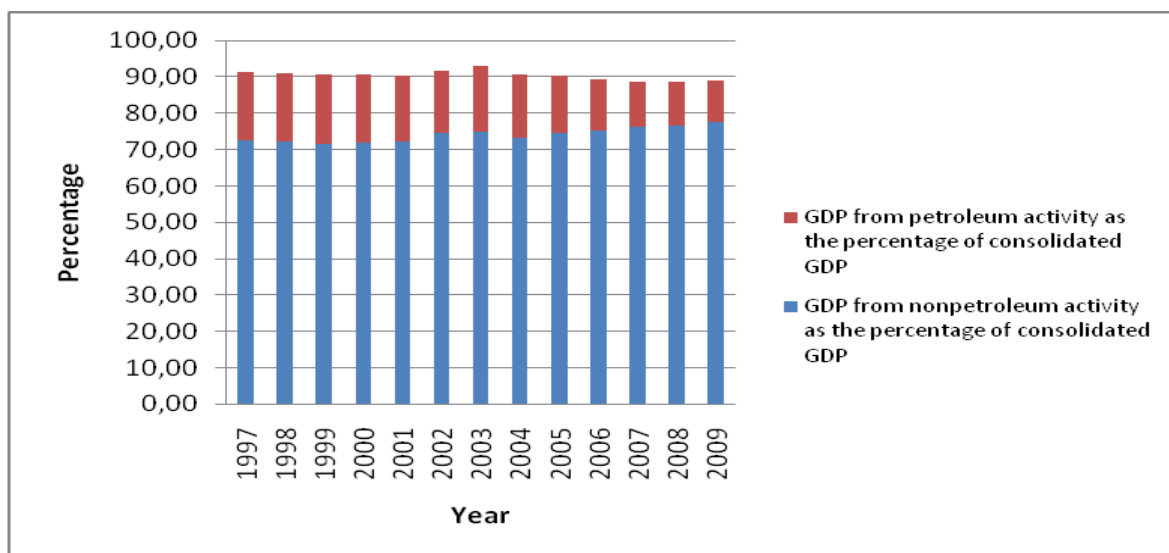
Source: Banco Central de Venezuela, 20010, own elaboration.

To get deeper insight into the economy of Venezuela, it is useful to look at how each economic activity participates on the value of GDP. The general composition of GDP by economic sector is following: agriculture 4.1%, industry 34.9%, and services 61,1% as estimated in 2009. (C.I.A. – World Factbook, 2010) The detailed composition of GDP by type of economic activity can be seen in figure 11 below.[10]

In 2003, 25% of GDP was produced by petroleum activity, which is a high share. Other parts of industry like manufacturing, construction, electricity and water supply represented together 19%, which is a low share in Venezuelan economy. Agriculture represented only 6% of GDP, which is normal in a developed country where agricultural production is efficient, but in Venezuela today, two-thirds of food needs have to be imported. (U.S. Department of State, 2010) The service sector seemed to be quite developed but it has to be taken in consideration that a large part of services is connected with the oil sector (transportation), or is financed by the government from the oil revenues. Providers of governmental services and social services are mostly financed by oil revenues

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[10] The data is from the year 2003 because actual data did not include all sectors.

and have quite high share in GDP. Financial institutions and commerce had low share. The rentier theory points out that in the rentier economy services grow because they are not easily tradable but the development of industry and agriculture slows down because their products are easily tradable and can be imported.

Figure 11:GDP by type of economic activity, year 2003, in stable prices from 1984
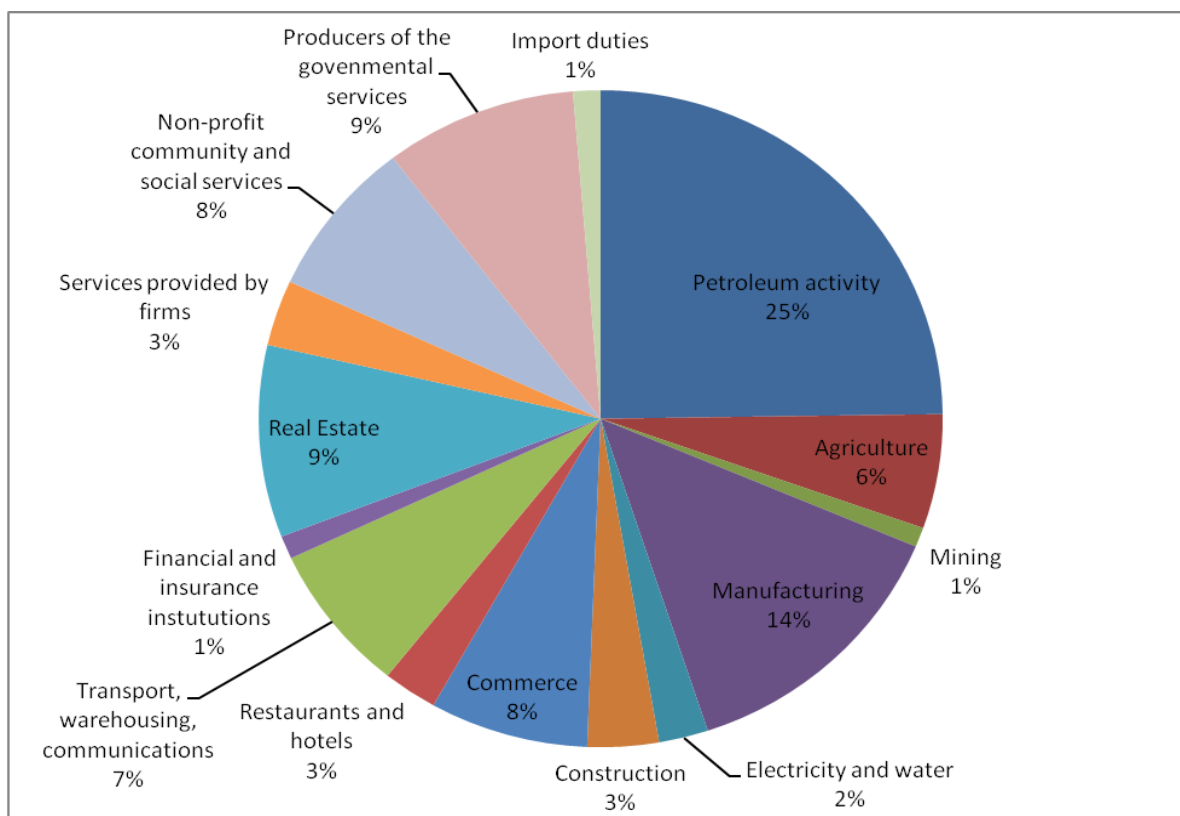
Source: Banco Central de Venezuela, own elaboration.

Share of Petroleum Exports in GDP and Share of Petroleum Exports in Total Exports

The share of the value of petroleum exports in the GDP of Venezuela is a useful indicator for showing the importance of the petroleum exports for Venezuelan economy. In figure 12, the GDP development line traces the line of export development to some extent. When the total exports were increasing between the years 2000 and 2008, GDP also increased, so GDP reacts on changes in the oil sector. The growth of GDP was very steep

in recent years, which was caused by the growth of the nonpetroleum sectors as noted in the section before. The data for GDP, collected in current US$, were divided by the GDP deflator in order to see the development of GDP in constant prices. The development of the GDP deflator can be seen in figure 13. The steep growth of GDP in recent years was largely due to large increase in the government spending enabled by the high export earnings. (C.I.A. – World Factbook, 2010)

Moreover, the similarity of the values of total exports and petroleum exports is worth to observe. The petroleum export revenues account for about 90% of total export earnings. (C.I.A. – World Factbook, 2010) The petroleum export earnings increased dramatically from 2004 because of the high oil prices. In 2009, the total exports reached US$57.6 bn, while the oil exports were US$54.2 bn. Venezuela does not import any crude oil. (C.I.A. – World Factbook, 2010)

Figure 12: Venezuelan GDP, values of total exports and values of petroleum exports in constant market prices, mil. US$
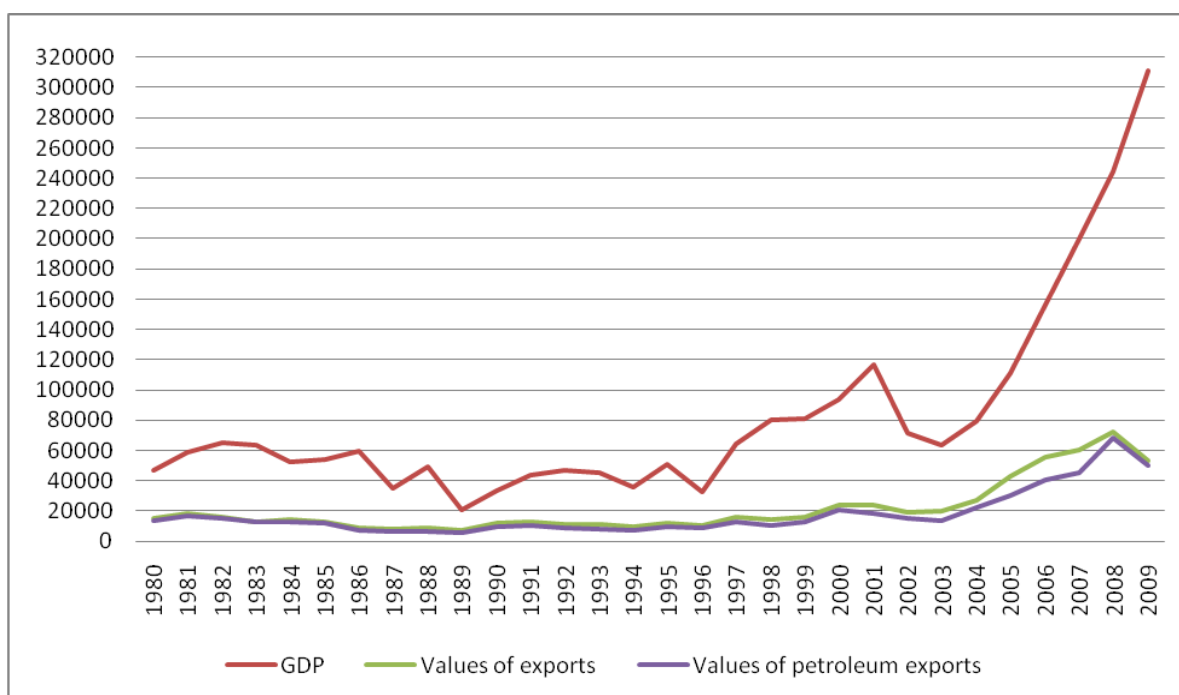
Source: OPEC Annual Statistical Bulletin 2001, 2005 and 2009, own elaboration.

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Figure 13: Inflation in Venezuela, GDP deflator (annual %)[11]
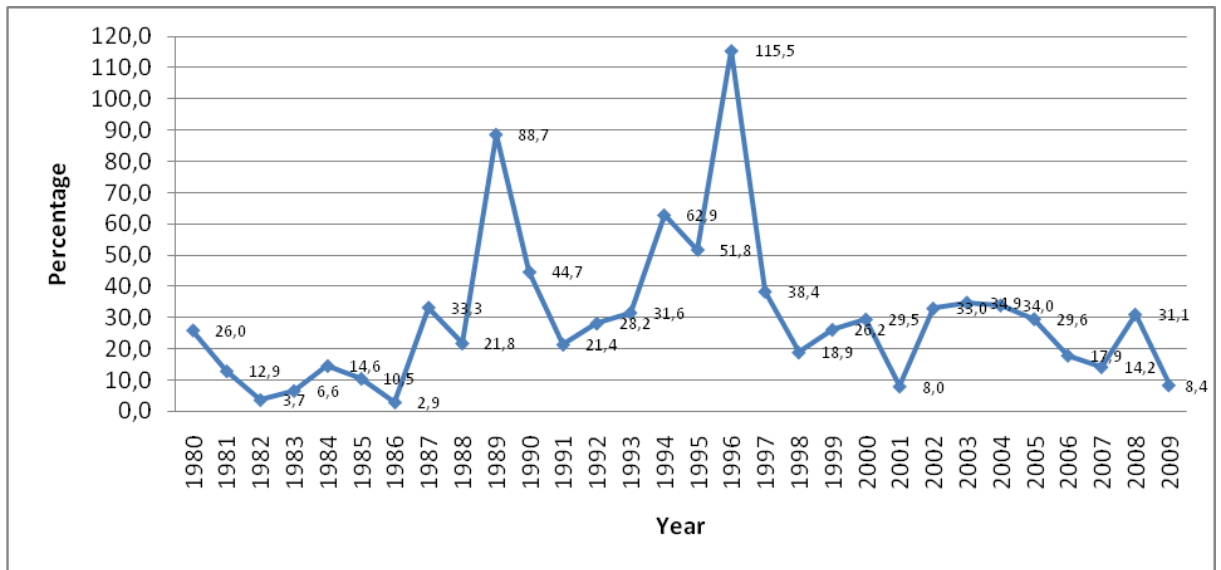
Source: The World Bank Data, 2010, own elaboration.

Figure 14 says more about the shares of total exports and petroleum exports on GDP of Venezuela. The share of total exports on GDP was fluctuating between approx. 14% in 1986 and approx. 38%, reached in 1996. The share of petroleum exports on GDP was evolving in a similar way ranging from approx. 12% to approx. 30%. In 2008, the share of petroleum exports on GDP was the highest in recent years, approx. 28%. **This data analysis supports the hypothesis that Venezuela has the high resource-to-GDP ratio and is the resource-dependent country.** Lastly, the share of petroleum exports on total exports was ranging from approx. 70% to approx. 99%. In 2009, the share was over 90%.

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[11] The GDP implicit deflator is the ratio of GDP in current local currency to GDP in constant local currency.

Figure 14: Percentage shares of total exports on GDP, petroleum exports on GDP, and petroleum exports on total exports
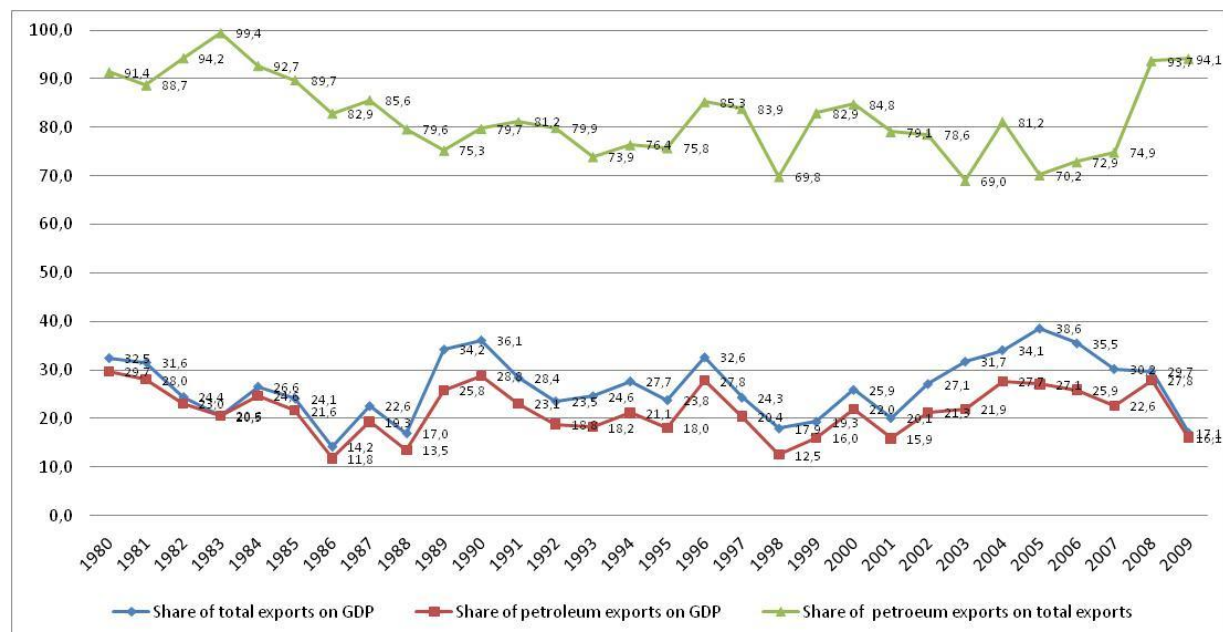
Source: OPEC Annual Statistical Bulletin 2001, 2005 and 2009, own elaboration.

4.2.2. Trade and Inflation

Balance of Payments

As figure 15 shows, the balance of payments of Venezuela have been rather low or even negative. According to the rentier state theory, the countries having low positive or negative balance of payments are the capital-deficient countries. Therefore, from this viewpoint **Venezuela can be considered as the capital-deficient**. The country absorbs the revenues it gains from export of its resource and still imports capital. The capital-deficient countries tend to diversify their economy because they don't want to stay vulnerable to oil price shocks. Oil price shocks cause the situation when the country is without the capital and becomes indebted. The balance of payments of Venezuela is in positive numbers only because the current account balance has been high due to the oil export. Figure 16 shows the changes in the current account.

Figure 15: Balance of payments
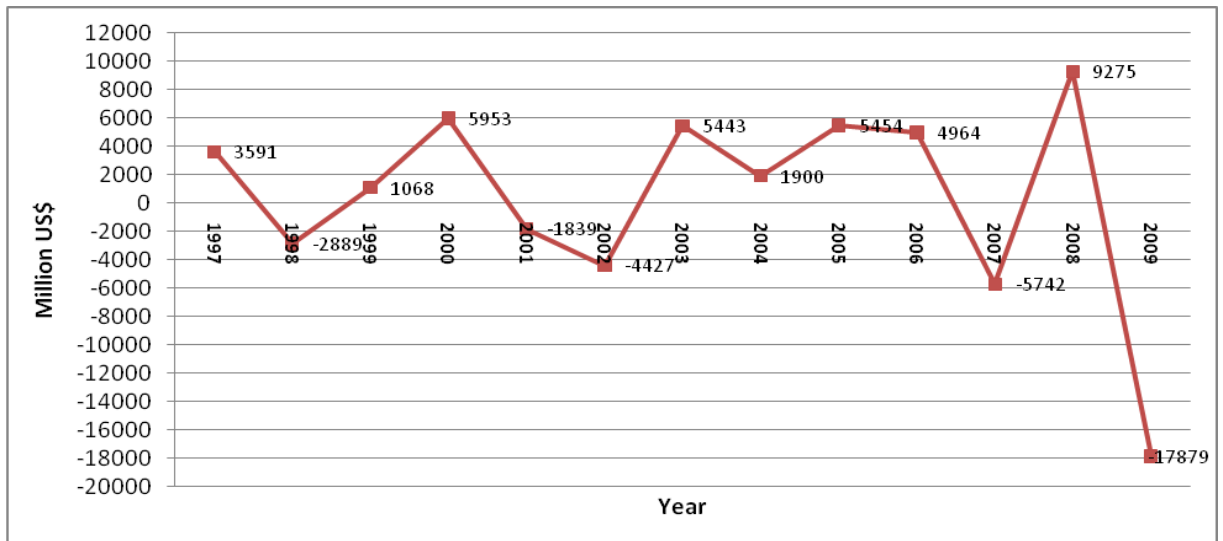
Source: Banco Central de Venezuela, 2010, own elaboration.

The current account balance of Venezuela has been reaching high values in recent years. The high value of the current account in 2008 is certainly caused by a very high value of petroleum exports. The value of exports is higher than the value of imports, but Venezuela exports lower value of services than it imports. It is important to note that Venezuela exports very little the nonpetroleum products but imports big amounts of the nonpetroleum products.

Figure 16: Current account balance
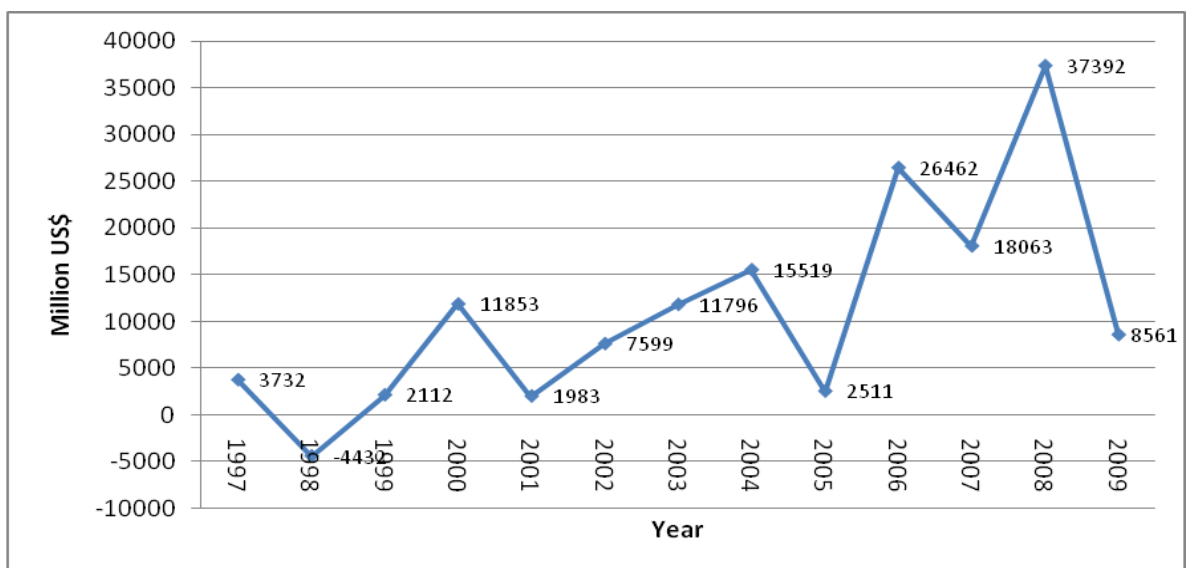
Source: Banco Central de Venezuela, 2010, own elaboration.

Composition of Trade

The commodity structure of Venezuelan trade is imbalanced, meaning that the country exports different products than it imports. Venezuela imports more value added products than it exports.

Commodity Export

The export of Venezuela rests on one commodity – oil. Mineral fuels, oils, distillation products, etc. represent 95.85% of total exports. As can be seen from the graph, other commodities have a marginal character. Iron and steel, aluminum and articles thereof, ores, slag and ash, inorganic and organic chemicals, etc. account together for less than 4% of total export. Venezuela's main trading partners for export are the United States (32%), Netherlands Antilles (15.8%), European Union (7%), China (3.2%) and Brazil (2.2%). (International Trade Centre, 2010, data for the year 2009)

Figure 17: Commodity composition of export
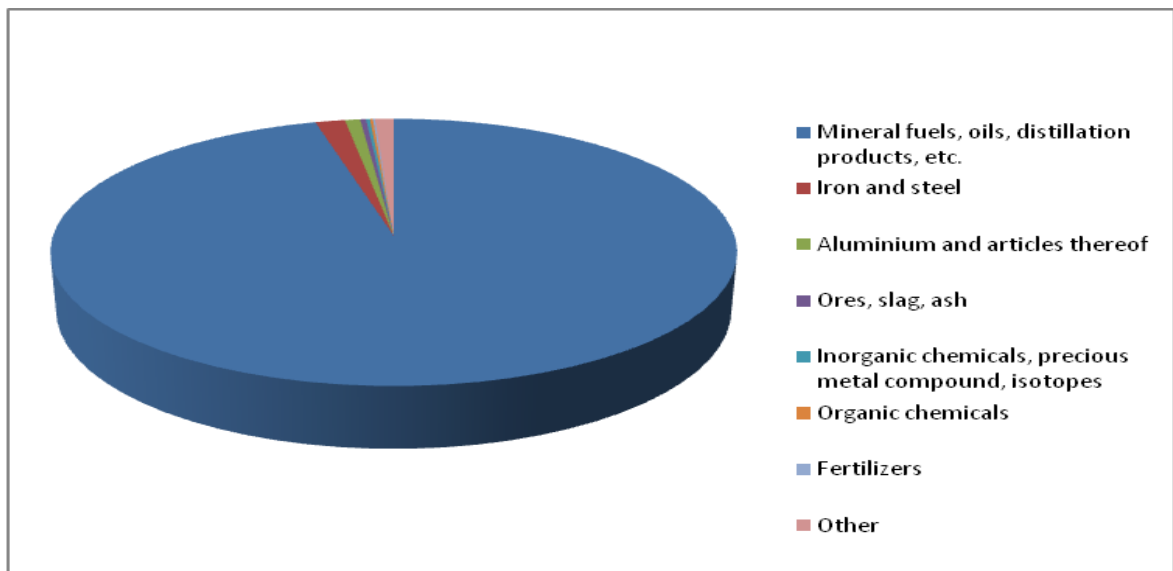
Source: International Trade Centre, 2010, own elaboration.

Commodity Import

The commodity import to Venezuela is more diversified. The biggest portion of imports to Venezuela represent machinery, nuclear reactors, boilers, electrical and electronic equipment, pharmaceutical products, organic chemicals, optical, photo, technical apparatus, vehicles, etc. It is important to note that food products (meat, cereals, dairy products, animal and vegetable fats) represent about 11% of total import, which is a high share. As previously mentioned, Venezuela is not sufficient in most areas of agriculture. The country imports about two-thirds of its food needs. The problem with agriculture is typical for the rentier economy and is the product of the Dutch Disease. Main importers to Venezuela are the United States (27.0%), Colombia (14.5%), EU (12.8%), China (10.2%), Brazil (8.2%). (International Trade Centre, 2010, data for the year 2009) Despite the political conflict between Venezuela and the United States, the US remain Venezuela's most important trading partner in both export and import.

Figure 18: Commodity composition of import
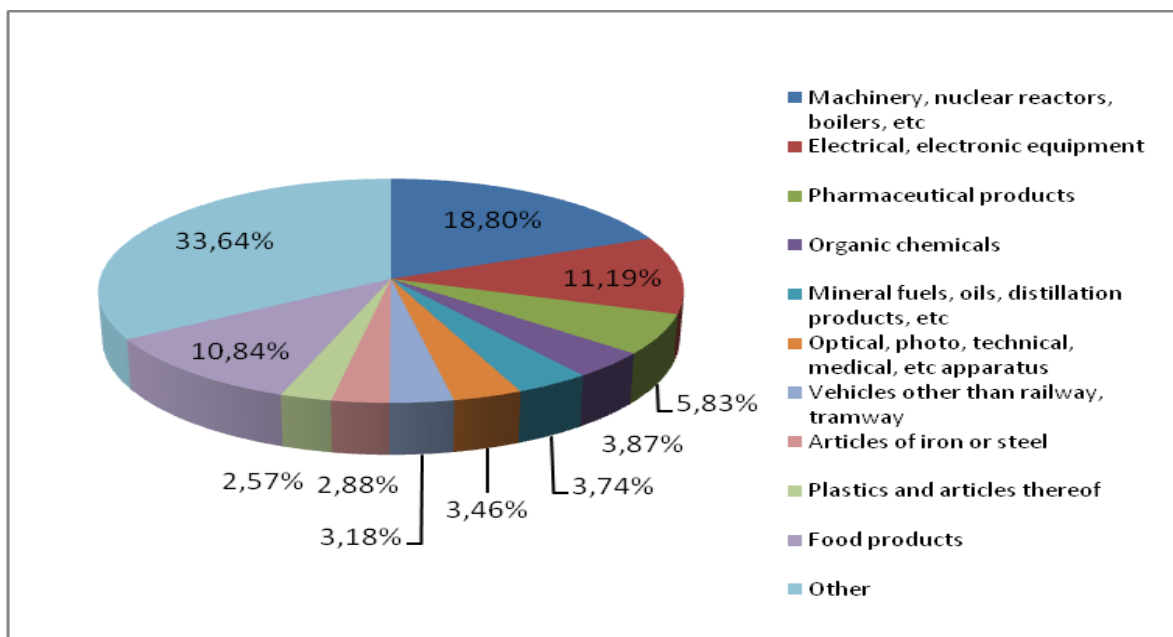
Source: International Trade Centre, 2010, own elaboration.

Foreign Direct Investments into Oil Sector

The foreign direct investments (FDI) into the Venezuelan oil sector have been very unstable. This fact can be seen from the figure 19. (The data were available only for the period 1994 – 2005.) It is due to the fact that countries did not invest regularly, for example, France invested 2,878 mil. Bolívares in 1999 and the next year, it did not invest at all. Traditionally, the biggest investor are the United States that are responsible for the major part of FDI inflow. Their highest investment was in 2005, when they invested 59,220 mil. Bolívares into the oil sector. During the selected period, the peak in FDI was in 2001, when the Netherlands invested 53,670 mil. Bolívares into the Venezuelan oil sector. According to the Ministry of Energy and Petroleum, the Netherlands is the second largest investor. (Petróleo y otros datos estadísticos, PODE 2005)

Figure 19: FDI into the oil sector
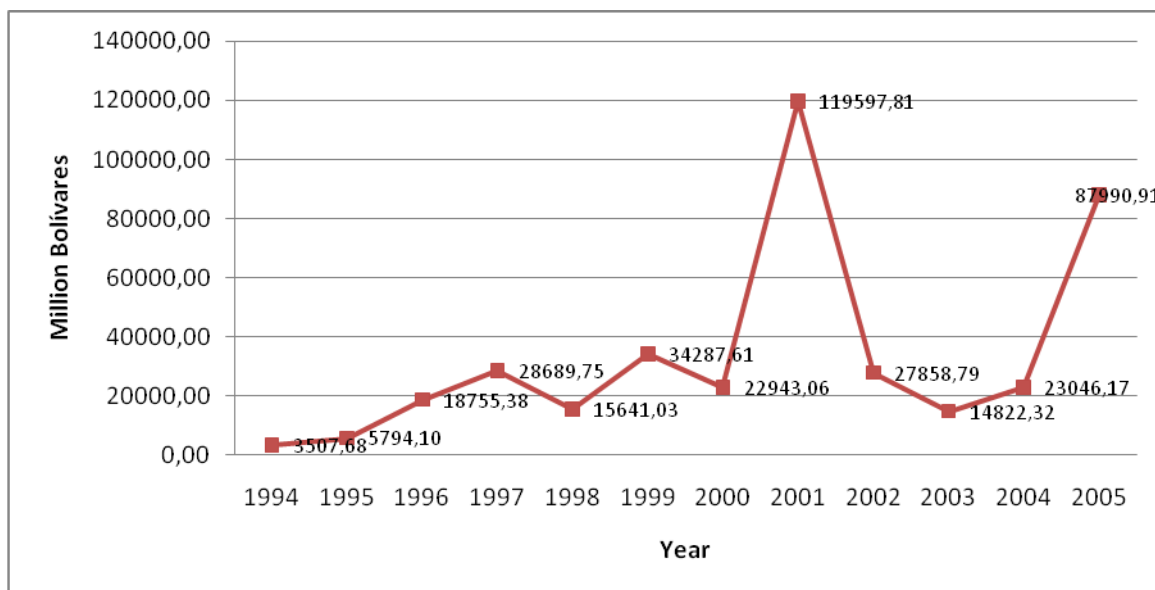
Source: Petróleo y otros datos estadísticos, PODE 2005, own elaboration.

Inflation

The inflation rate of Venezuela has been very high and also very unstable. The development of the inflation rate can be seen in figure 20 below. From the year 1980 on, the lowest rate of inflation was 6.3% in 1983 and the highest rate was in 1996 when it reached 99.9%. In recent years till today, Venezuela's inflation rate has been the highest in Latin America; in 2009 it was 28.6%. The causes of such a high inflation are complex. One of them is high social spending, high amounts of imports compared to exports and scarcity of the products. (World Bank, 2010)

Figure 20: Annual inflation (consumer prices)
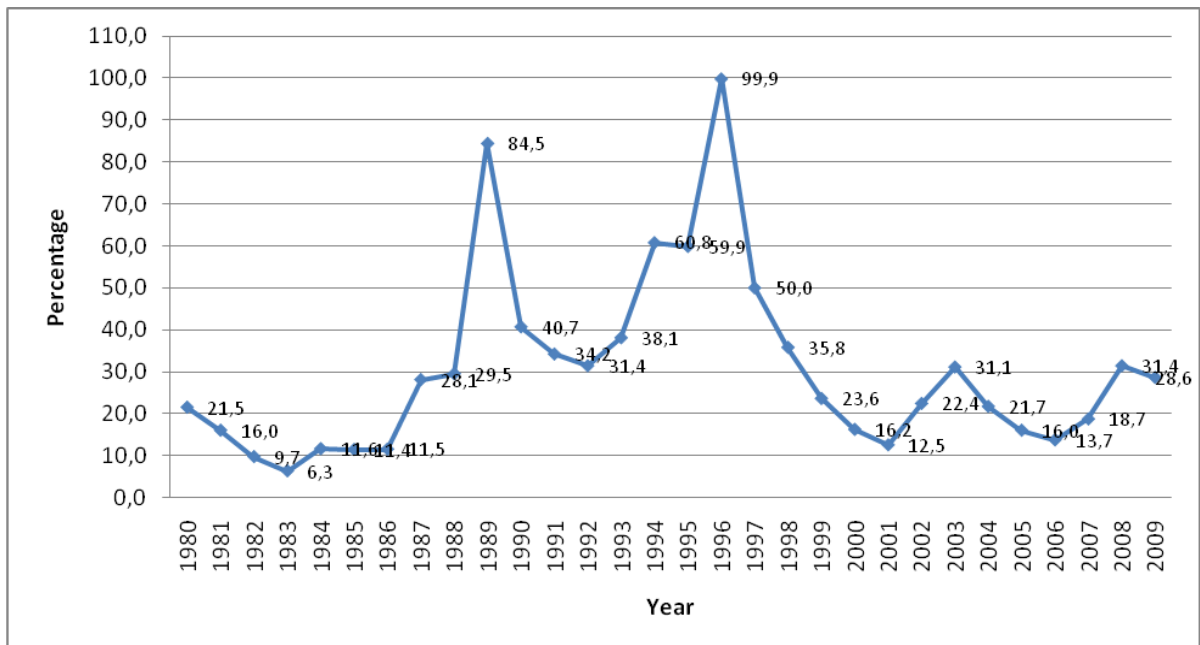
Source: The World Bank Data, 2010, own elaboration.

The Big Mac Index can tell whether a currency is overvalued or undervalued in a long term. The Big Mac Index of Venezuela is **2.13$,** which was the price of McDonald's Big Mac in US$ in Venezuela at current exchange rates as of January 12th, 2006. This is the 39th position among countries, where the index was measured. At that time the price of Big Mac in the United States was **3.15$**. (The Economist, 2010) This means that the currency bolívar was undervalued against the US$ by 32%. This conclusion does not seem logical as the inflation of Bolívar has been very high. The reason for this discrepancy

can be the pegging of Bolívar to US$. The exchange rate is 1US$ = 4.3 VEF (bolívar furerte).

4.2.3. Government and Oil Sector

Share of Oil Revenues in Governmental Budget

Oil revenues currently represent about 50% of governmental budget revenues of Venezuela, which is a large share. In 2009, the Venezuelan budget revenues were US$66.53 bn and the oil revenues constituted about half of the sum. The following figure shows the share of oil revenues in government's total budget revenues. The data was adjusted for inflation. It is visible that the share of oil revenues has been about half of the budget. In 2009 there was a decrease in oil revenues caused by the economic crisis. The cut-down of government revenues followed. In 2008, the oil revenues reached 82,432 mil. Bolívares (62,734 mil. Bolívares in constant prices) and total budget revenues were 166,098 million Bolívares (126,407 mil. Bolívares in constant prices), while in 2009 the gain from oil was only 53,230 mil. Bolívares (41,393 mil. Bolívares in constant prices) and total revenues were 151,529 mil. Bolívares (117,827 mil. Bolívares in constant prices).

According to the rentier state theory, the rentier state has the high resource-to-revenues ratio. **Oil revenues represent half of the total government revenues of Venezuela, thus the ratio is ½, which can be considered as high. It is why Venezuela is the rentier state.**

Figure 21: Government budget revenues and oil revenues (constant prices)
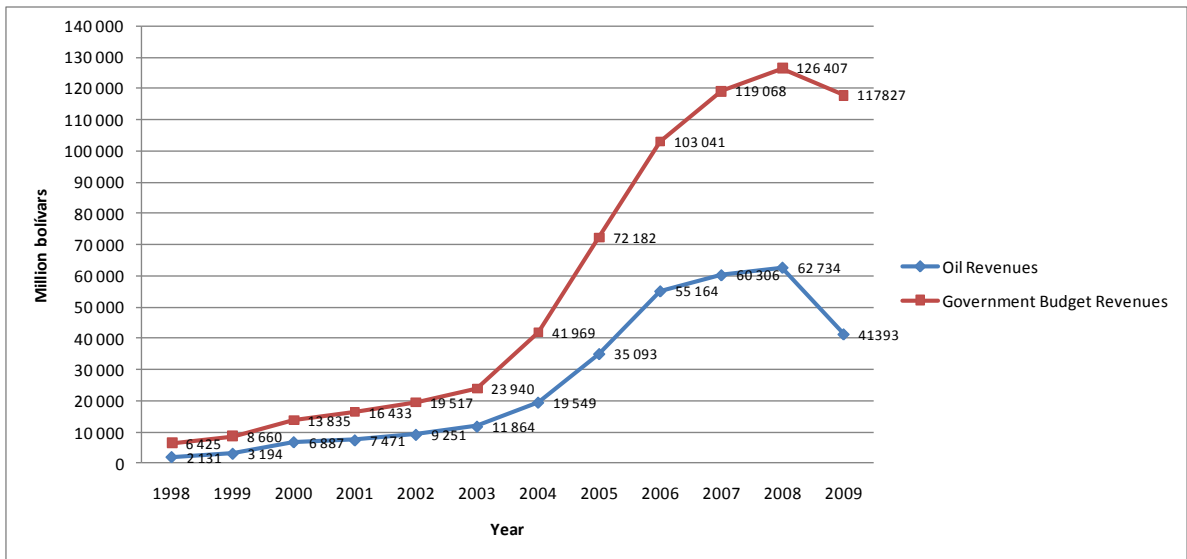
Source: Ministerio de Planifincación y Finanzas, Government Finance Statistics, 2010, own elaboration.

Spending of Oil Rent on Government Transfers

In 2008 the government of Venezuela earned 82,432.2 mil. Bolívares from oil revenues out of 166,098. 2 mil. Bolívares of total revenues. In the same time, the government paid 86,691 mil. Bolívares into the government transfers including welfare, social security, and government subsidies, which was more than half of the total expenditures for the year 2008. It means that a very large portion of the oil rent had to be spent on the government transfers, and the government would not be able to supply such amount of funds for these matters without the oil rent.

Income Tax

Income taxes represent a small portion for the government's total tax revenues. In 2009, the income tax revenues were 26,022.2 mil. Bolívares, while the total tax revenues were 94,292 mil. bolivars. The VAT revenues were 41,611 mil. Bolívares. (Ministerio de Planifincación y Finanzas, 2010) This fact corresponds to the politics of the rentier state where the state loses the extractive capacity.

It is interesting to note that the government gains much more funds from non-tax oil revenues than from tax oil revenues. For example, in 2008 the government gained 64,598 mil. Bolívares from non-tax oil revenues and only 17,834 mil. Bolívares from tax oil revenues. (Ministerio de Planifincación y Finanzas, 2010) It means that Venezuelan government gains revenue mostly from oil operations it owns because the oil industry is almost completely state-owned.

Government Budget Deficit/Surplus

The government budget deficit/surplus is a useful indicator informing about the extent of the government spending in comparison to its revenues. Figure 22 shows the budget deficit/surplus as a percentage of country's GDP. In the examined period, the budget deficit has not been dramatic, however, it increased to 5.1% of GDP in 2009. During the previous years, the government enjoyed budget surplus. The Venezuelan government gains a lot of revenues from oil every year and without oil revenues the deficit would be surely much bigger and the government would not be able to finance its social programs. In recent years, the operating surplus of the government-owned Petróleos de Venezuela (PDVSA) comprised about 35% of government's revenues. Transfer payments, mostly welfare, social security and subsidies, represented a high share of the government expenditures, about 40%. (Ministerio de Planifincación y Finanzas, 2010)

Figure 22: Government budget deficit/surplus as the percentage of GDP
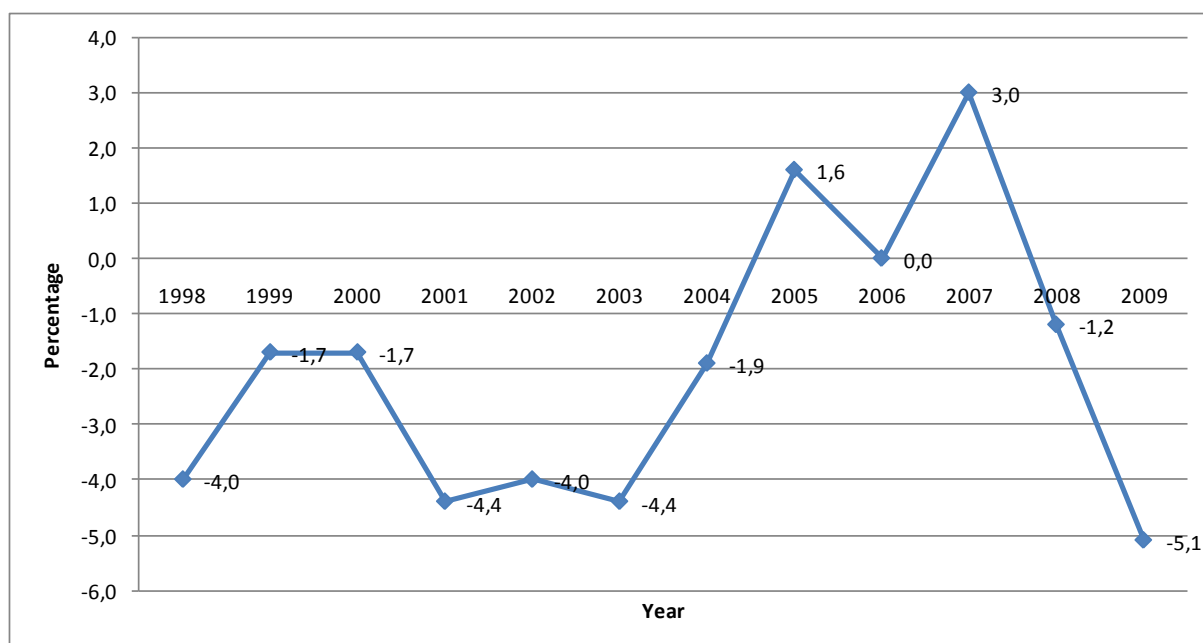
Source: Ministerio de Planifincación y Finanzas, Government Finance Statistics, 2010, own elaboration.

4.2.4. Income Distribution of Households

GNI per capita

GNI per capita gives an information about distribution of national income among the population of a country. "GNI per capita is the gross national income, converted to U.S. dollars, divided by the midyear population. GNI is the sum of value added by all resident producers plus any product taxes (less subsidies) not included in the valuation of output plus net receipts of primary income (compensation of employees and property income) from abroad." (World Bank Data, 2010) For comparison the GNI per capita in the Czech Republic was US$17,310 in 2009 and the GNI per capita in Venezuela was US$10,090 in 2009. (World Bank Data, 2010) Figure 23 shows the development of GNI per capita in Venezuela. In recent years GNI per capita was growing at a high rate reflecting the high growth of GDP.

Figure 23: GNI per capita (current US$)
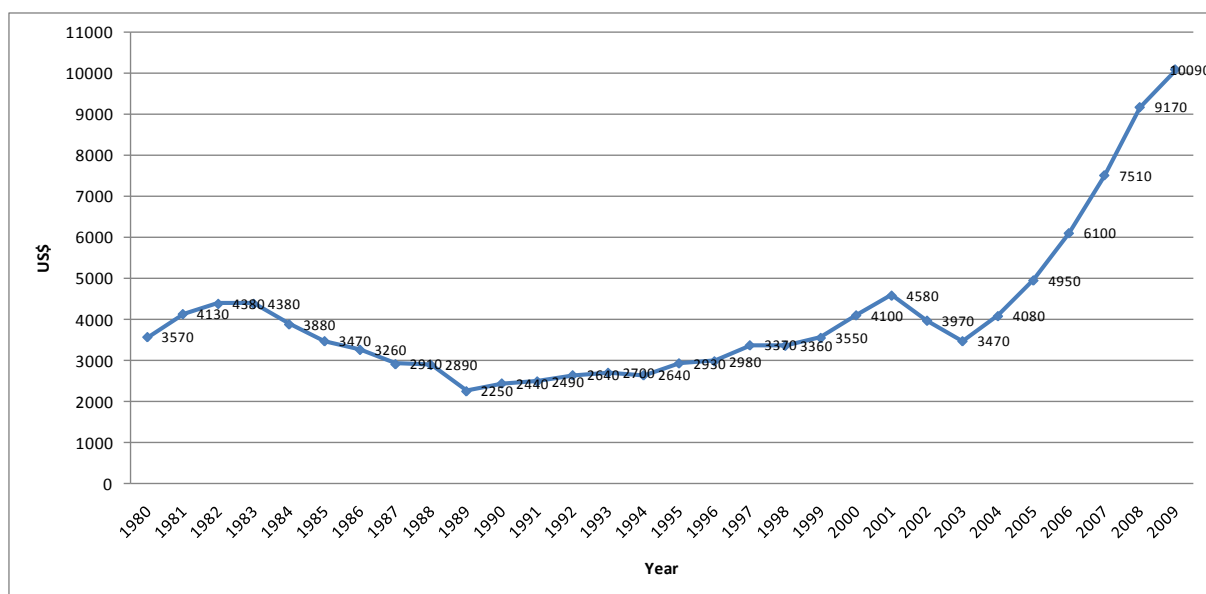
Source: World Bank Data, 2010, own elaboration.

GINI Index

The GINI index gives information about equality or inequality of income distribution among population of a country. "GINI index measures the extent to which the distribution of income among individuals or households within an economy deviates from a perfectly equal distribution. A GINI index of 0 represents perfect equality, while an index of 100 implies perfect inequality." (World Bank Data, 2010) In 2006 the GINI index of Venezuela was **43.0** (World Bank Data, 2010), which means quite high inequality of income. However, the rank is not among the worst. For comparison, Czech Republic had GINI index 26.0 in 2005. The United States had GINI index 45.0 in 2007 (World Bank Data, 2010), higher than Venezuela, which is quite interesting.

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Human Development Index (HDI)

The HDI measures development by combining indicators of life expectancy, educational attainment, and income. It consists of free dimensions; education, health and living standard, measuring both the social and economic development. See figure 24 below. HDI sets the value between 0 and 1, the value approaching 1 being better. (UN, 2010) The value of HDI for Venezuela was **0.696** in the year 2010 and the United Nations rank Venezuela on 75th position among 169 countries, in the category of high human development countries.

Figure 24: Components of HDI
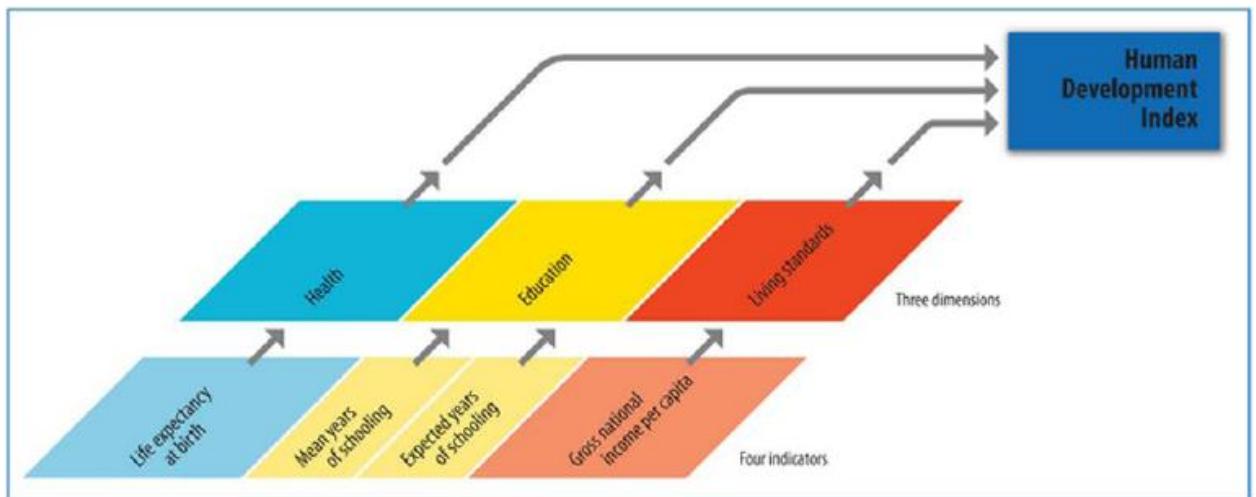
Source: United Nations, 2010.

4.3. Quantification of Oil Sector Impact on Venezuelan Economy

4.3.1. Specification of Econometric Model

The main purpose of the econometric model is to show to which extent the crude oil export effects GDP of Venezuela. Crude oil export is the main source of revenue in the oil industry. The export of oil derivatives has much smaller significance, which is why it is not included in the model. Also insertion of the derivative products into the model would be complicated. The data was gathered for 20 years for the period 1989 - 2009.

The assumption is that if the changes in the export of crude oil bring major changes in GDP, the economy should be considered as being oil dependent. On the other hand, if the result is the opposite, the economy should not be considered as oil dependent.

The structure of the recursive econometric model

$$y_{1t} = \gamma_{11}x_{1t} + \gamma_{12}x_{2t} + \gamma_{13}x_{3t} + \gamma_{14}x_{4t} + \gamma_{15}x_{5t} + u_{1t}$$

$$y_{2t} = \beta_{21}y_{1t} + \gamma_{21}x_{1t} + \gamma_{26}x_{6t} + \gamma_{27}x_{7t} + \gamma_{28}x_{8t} + \gamma_{29}x_{9t} + \gamma_{29}x_{10t} + u_{2t}$$

(all variables are in logarithmical form)

Variables

y_1 Crude oil export in constant mil. US$

y_2 GDP of Venezuela in constant mil. Bolívares

x_1 Unit vector

x_2 Crude oil production (1000 b/d)

x_3 Nominal crude oil prices in US$

x_4 World demand for crude oil (mil. b/d)

x_5 Proven reserves of crude oil in Venezuela (mil. of barrels)

x_6 Foreign direct investments in constant US$ (balance)

x_7 Gross fixed capital formation in mil. Bolívares, constant prices

x_8 Government budget in mil. Bolívares, constant prices, expressed in first differences

x_9 Labour force expressed in percentage change

x_{10} Population with tertiary education, in thousands

Economic assumptions of the model

The economic assumptions for the first equation are that the endogenous variable – crude oil export y_1 – is dependent on the following explanatory variables; the production of crude oil x_2, nominal crude oil prices x_3, the world demand for crude oil x_4, and reserves of crude oil i x_5. It is expected that if one of the explanatory variables increases, the export of crude oil increases as well.

The economic assumptions for the second equation are that the endogenous variable – GDP of Venezuela y_2 - depends on the explanatory variables as crude oil export y_1, foreign direct investments x_6, gross fixed capital formation x_7, government budget x_8, labor force x_9 and population with tertiary education x_{10}. Again it is expected that if one of the explanatory variables increases, the GDP of Venezuela increases as well.

4.3.2. Data Transformation

The data transformation includes two steps:

1. **transformation of data to logarithmical form**

   All variables are transformed in logarithmical form. It is convenient because the resulting parameters are in the same time the coefficients of elasticity.

2. **multicollineartiy check**

   In the first equation of the model, no strong multicollinearity was present; therefore data did not have to be transformed. Strong multicollinearity was present in the second equation. To get rid of the problem labor force (x_8) was expressed in the percentage change, and the government budget (x_9) was transformed to express the first differences. The transformed data table and correlation matrices without strong multicollinearity can be seen in Appendix 1 and 2.

4.3.3. Parameters Estimation and Statistical Verification

1.Equation – OLS Method

Dependent variable: y_1

	Coefficient	Std. Error	t-ratio	p-value	Stat. Significance	
const	-4,93284	2,13051	-2,3153	0,03420	**	S
l_x2	1,61699	0,400983	4,0326	0,00096	***	S
l_x3	0,819198	0,115487	7,0934	<0,00001	***	S
l_x4	-0,621967	1,0313	-0,6031	0,55490		I
l_x5	0,427461	0,135526	3,1541	0,00614	***	S

Parameters having at least one star are statistically significant (S), *** = 0.1 significance level, ** = 0.05 significance level, * = 0.025 significance level.

Parameter for the variable x_4 - world demand for crude oil - is not statistically significant for the model. In this equation R^2 equals 0.9775, which means that the function explains the examined relations from approx. 98%. The result of the Durbin – Watson test of the autocorrelation of residuals for the first equation is 2.28, which means that there is a weak autocorrelation among the residuals because the number is close to 2.0.

2.Equation – OLS Method

Dependent variable: y_2

	Coefficient	Std. Error	t-ratio	p-value	Stat. significance	
const	15,1018	2,12786	7,0972	0,00006	***	S
l_y1	0,23566	0,0935473	2,5192	0,03281	**	S
l_x6	-0,0645411	0,0185291	-3,4832	0,00690	***	S
l_x7	0,177381	0,0690625	2,5684	0,03027	**	S
l_x8	0,159737	0,0668411	2,3898	0,04057	**	S
l_x9	0,0366002	0,0171259	2,1371	0,06131	*	S
l_x10	-1,06912	0,327277	-3,2667	0,00973	***	S

The statistical verification of the second equation of the model revealed that all variables are statistically significant at least with 0.025 significance level. R^2 equals 0.9553, which means that the function explains the examined relations from approx. 95%. The result of the Durbin – Watson test of the autocorrelation of residuals for the second equation is 2.49, which means that there is a little bit stronger autocorrelation among the residuals.

Model with estimated parameters

$y_{1t} = -4.933 + 1.617\, x_{2t} + 0.812\, x_{3t} - 0.623\, x_{4t} + 0.427\, x_{5t} + u_{1t}$

$y_{2t} = 15.102 + 0.236\, y_{1t} - 0.064\, x_{6t} + 0.177\, x_{7t} + 0.160\, x_{8t} + 0.037\, x_{9t} - 1.069\, x_{10t} + u_{2t}$

(variables are in logarithmical form)

4.3.4. Economic Verification and Elasticity

Since the parameters were calculated in a logarithmical form, there is no need to calculate the coefficients of elasticity as the parameters are the coefficients of elasticity in the same time. It means that it is possible to compare the impact of each explanatory variable on the explained variable regardless of units.

1. Equation

γ_{12} = production elasticity = 1.617%

If the crude oil production increases by 1%, the crude oil export increases by 1.617%. The direction of the parameter γ_{12} confirms the economic hypothesis that if the production of crude oil increases, the export of crude oil increases as well. The strength of the parameter is quite big, the biggest in the whole equation, which means that the production of crude oil has the strongest impact on the export of crude oil.

γ_{13} = price elasticity = 0.812%

The parameter proves the economic hypothesis which states that the increase in oil price brings higher exports. If the nominal price of crude oil increases by 1%, the export of crude oil increases by 0.812%.

γ_{14} = demand elasticity = - 0.623%

This parameter does not confirm the economic hypothesis that higher demand for crude oil should cause higher exports. In the model world demand for crude oil increases by 1%, the export of crude oil decreases by 0.623%. This discrepancy is probably caused by the fact that world demand for crude oil does not have significant impact on export of crude oil in one country. The demand of major trading partners would probably have higher significance. However, the major trading partners for Venezuela have been

changing a lot as well as the amount of crude oil demanded; therefore, only the world demand was used as a variable, the parameter of which turned out to be insignificant.

γ_{15} = coefficient of elasticity for crude oil reserves = 0.427%

If crude oil reserves increase by 1%, the export of crude oil increases by 0.427%. This relation does not confirm any economic theory but it can include rather psychological aspect. If the exporters of crude oil realize that the crude oil reserves enlarge, they tend to increase production as well as exports.

2. Equation

β_{21} = oil export elasticity = 0.236%

This parameter is very important in this econometric model because it explains to which extent the export of crude oil affects GDP of Venezuela. It shows how important external revenues of crude oil are for Venezuelan economy. If the export of crude oil increases by 1%, GDP of Venezuela increases by 0.236%. The parameter β_{21} is the second highest in the equation.

γ_{26} = coefficient of elasticity for FDI = – 0.064%

According to the model, the foreign direct investment balance has a negative effect on GDP. If the balance of FDI increases by 1%, GDP decreases by 0.064%. The coefficient is very low. In the economic theory, if the net flow of FDI is positive, e.g. the state gains on FDI, GDP should increase. However, if the balance happens to be negative in some years, it can decrease the GDP.

γ_{27} = coefficient of elasticity for GFCF = 0.177%

If the gross fixed capital formation increases by 1%, GDP increases by 0.177%. This relation confirms the economic hypothesis that capital formation increases the value of GDP. The capital is one of the factors of production, so it has to increase GDP.

γ_{28} = coefficient of elasticity for labor force = 0.160%

In the model, the labour force has a positive effect on GDP. If the labour force increases by 1%, GDP increases by 0.037%. The labour is also one of the factors of production which in the theory increases GDP. In Venezuela, the labour force has a little bit lower effect on GDP than gross fixed capital formation.

γ_{29} = coefficient of elasticity for government budget = 0.037%

When the budget of the Venezuelan government increases by 1%, GDP increases by 0.037%. This relation is logical as the government spending causes GDP to increase. When the budget is higher, the government can spend more on various projects and increase GDP.

γ_{210} = coefficient of elasticity for population with tertiary education = − 1.069%

This coefficient does not correspond with the economic theory. More educated people should increase GDP. According to the model, 1% increase in people having tertiary education decreases GDP by 1.069%. Possible reasons for this discrepancy exist. One possibility is that the people with university education leave Venezuela. Other possibility is that the effect of education on GDP is delayed because people gained their education recently and there has not been enough time for projection of the effect in GDP.

4.3.5. Econometric Model Application

The constructed econometric model will serve for the simulation of the possible effects on the economy in case the oil price either increases or decreases. It is complicated to make assumptions about future oil prices because of the dramatic price changes in 2008-2009 and because they were not caused by economic fundamentals. (EIA, 2011) Nevertheless, the U.S. Energy Information Administration (EIA) published their projections for the future world oil prices development. The following table presents three possibilities of the oil price development in the future. The reference case alternative assumes that OPEC will maintain the organization's aggregate production at 40% of world oil supply. The high oil price case assumes that several non-OPEC producers will restrict the access to production or increase taxes on production, and that OPEC members will reduce their production under current levels. The low oil price case assumes that non-OPEC producers will grant greater access to oil production or decrease taxes on production, and that OPEC members will increase production above the current levels.

Table 2: World oil prices in three cases (US$)

Year	Reference case	Low oil price	High oil price
2015	95	52	145
2020	108	52	186
2025	115	52	196
2030	124	52	204
2035	133	51	210

Source: U.S. Energy Information Administration, 2010.

Using these future oil prices, it is possible to simulate the effect of a certain future oil price on GDP of Venezuela. This can be done by the substitution of a future world oil price for the 2008 world oil price in the first equation of the model. The year 2008 was chosen because in this year the world oil price as well as the value of GDP were the highest in selected time series. In that year, the theoretical value $\hat{y}_2$ (GDP) is 56,867.80 mil. Bolívares and the real value y_2 is 57,927 mil. Bolívares.

Table 3: Percentage change in the value of GDP in three cases of different oil prices (constant prices)

Year	Reference case	Low oil price	High oil price
2015	100%	89.09%	108.44%
2020	100%	86.93%	110.98%
2025	100%	85.89%	110.76%
2030	100%	84.66%	110.01%
2035	100%	83.22%	109.15%

Source: Own calculation.

The findings presented in table 3 and figure 25 show the estimated change in GDP in the selected years. It can be seen that if the world oil price would be US$210, GDP of Venezuela would reach 66,277.49 mil. Bolívares; the difference from the 2008 real GDP value would be 8,350.49 mil. Bolívares. Apart from that, GDP value would increase by 9.15% in comparison to the 2035 reference case. On the other hand, if the world oil price would be US$51, the value of GDP would reach only 50,533.53 mil. Bolívares; 7,393.47 mil. Bolívares less than in 2008. The percentage change from the 2035 reference case would be 16.78% decrease in GDP .

Figure 25: Values of GDP in three cases of different oil prices (mil. Bolívares, constant prices)
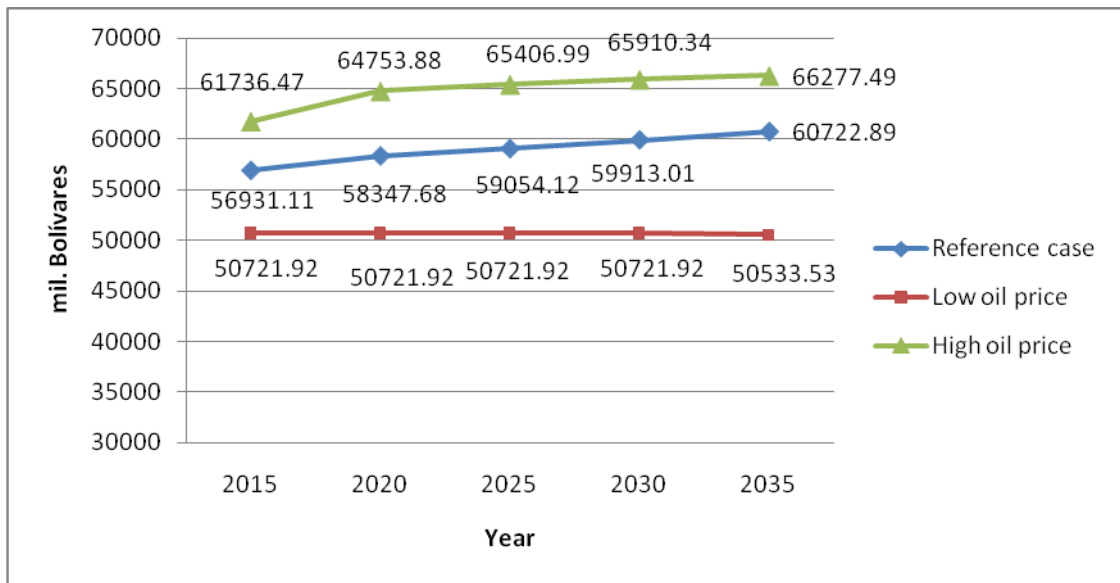
Source: Own calculation and elaboration.

4.4. Perspectives of Venezuelan Economy Development

In this section the findings from analytical and quantitative parts are summarized and the perspectives of the Venezuelan economy development are derived. However, it is also important to consider the current Venezuelan economic and social policy to be able to derive the perspectives more precisely because the policies of the government influence the development of the economy.

4.4.1. Current Economic and Social Policy of Venezuelan Government

The current Venezuelan president Hugo Chávez came to his office in 1999. His political program is called the "twenty-first century socialism", implying redistribution of wealth and state ownership. The government's official development plan for the year 2001 – 2007 had six interrelated objectives to achieve:

1. **sustainable and continuous level of economic growth**
2. **reducing economic volatility**
3. **creating social economy**
4. **fiscal sustainability**
5. **greater economic productivity**
6. **internalize oil production.**

The government wants to achieve **sustainable economic growth** by diversifying the economy, integrating production chains, guaranteeing food security, strengthening small and medium-sized businesses, incorporating and adopting new technologies and consolidating and rationalizing the public finance sector. The diversification of the economy is very important in fighting the Dutch Disease Venezuela suffers. There is a need to balance the sources of the country's wealth. The government intends to diversify the state-owned oil industry. One goal is to strengthen the vertical integration of the oil production by producing more petrochemical products for national consumption as well as for export. A part of the vertical integration effort is the production of own refinery pipes, which have been imported. Another aim is to create own shipbuilding industry and build

own tankers. Internalization of the oil production would mainly mean that Venezuela would produce more products related to oil, and not just export crude oil. The government hopes that higher industrialization of the oil sector would cause the industrialization in other sectors. An important goal is to diversify the agricultural sector. It has been partly achieved by the land reform program benefiting the peasants. The government wants agriculture to constitute a higher percentage of GNP.

The government wants to achieve sustainable economic growth also by prevention of capital flight and maintaining the sustainability of the country's currency. Another necessity is the improvement of the basic infrastructure.

Second objective is to **eliminate economic volatility,** which would help fighting the Dutch Disease. The volatility in exchange rates makes investments in Venezuela unattractive. The outcome is more imports and stronger dependency on oil industry. The government sees two possibilities how to counter the volatility. First, by maintaining a stable price of oil through strong OPEC and its price bands for oil; second, by a "Macro – Economic Stabilization Fund" (FEM). The idea is that when the price of oil rises above the average price of the past five years, the extra income will be deposited in the fund managed by the Central Bank of Venezuela. When the price for oil is lower than the average, the government can use the funds from the FEM. Another economic policies the government introduced for combating the volatility are currency controls and import substitution via subsidies and trade restrictions.

The **social economy creation** includes five interrelated programs. First, the redistribution of wealth, mainly through land reforms and social policies, and Micro-Credit program for poor to start own micro-enterprises. The social economy also encompasses promoting of cooperatives and industrial co-management, which means that workers participate on management of factories. The fourth part of the social economy creation is Endogenous Development Nuclei (NUDE), which implies that the resources, skills and materials come from inside the country and not from outside investors. The Government also started promoting Social Production Enterprises (EPS), that enhance the community involvement and enjoy benefits from the state.

The **fiscal sustainability** turned out to be crucial in times of low oil prices, which led to budget deficits and indebting. The government decided that in order to achieve fiscal sustainability the government's revenues have to increase by both higher oil and non-oil

revenues. Oil revenues should increase via high oil prices and higher industry taxes. Non-oil revenues are supposed to increase by enforcing strictly the existing tax laws. Also the goal is to increase the efficiency of state through tighter control over accounting of the state expenditures. Finally, the government wants to improve the public debt management by spreading out the repayment schedule. (Wilpert, 2007)

Governmental Plans with the Oil Industry

During the first years of his presidency, Chávez visited the leaders of OPEC and non-OPEC countries to convince them to adhere to production quotas in order to maintain the oil price between US$22 and US$28 per barrel. With this approach, Chávez got in a conflict with the management of PDVSA, which was producing as much oil as possible not adhering to OPEC quotas. The conflict led to Chávez Government's decision to transform the oil industry in the following four steps:

1. **"re-nationalization" of the oil industry**
2. **subordination of the oil industry to national interests**
3. **tax reform**
4. **OPEC reform**
5. **Latin American Integration via energy integration.**

The previous government of Rafael Caldera wanted to privatize PDVSA; however, the Chávez government made sure it remained in the complete state ownership by embedding it in the new constitution. It was also set that all oil related activity must support the development of the country.

The tax reform of 2001 was quite radical. Previously, the government required a royalty payment of 16.6% for every barrel of oil that PDVSA or a foreign company extracted. The new oil reform law doubled the royalty payments to 30% and lowered the income tax on oil extraction from 59% to 50%. The reason for this change was that it is easier to collect royalty payments than taxes on oil income because the government can more easily track the extraction of oil, than it can tract the amount of oil production profits, which include more variables.

OPEC reform started at OPEC summit in Caracas in 2000. The Chávez government objectives for the summit were to reestablish a dialogue between Venezuela and its partners in OPEC, recuperate the credibility of Venezuela in OPEC, strengthen OPEC, defend oil prices, reassume the leadership position within OPEC and consolidate relations between Venezuela and the Arab world.

Another Chávez's plan with regard to oil policy is to promote Latin American Integration through energy integration. His vision is to create a Latin America-wide oil company, a merger of main state-owned oil companies in Latin America. (Wilpert, 2007)

4.4.2. Evaluation of Results

Finally, it is possible to synthesize all the finding from analytical and quantitative parts, while considering the possible impacts of economic and social policies, and discuss the perspectives of Venezuelan economy development. A useful tool for the synthesis is the SWOT Analysis used for the identification of strengths, weaknesses, opportunities and threats of the Venezuelan economy.

Table 4: SWOT Analysis of Venezuelan economy

STRENGTHS	WEAKNESSES
- Extensive proven oil reserves, long depletion horizon - Decreasing share of petroleum activity in GDP → dependency on oil sector becomes lower - Growing GDP - Funds for diversification - Income taxes on households are low - Many good economic policies - Membership in OPEC - Fairly good HDI and GINI Index	- Low production and export of refined (petroleum) products - Low share of industry and agriculture in GDP - Low variability of exports - Low (or negative) balance of payment - Unstable FDI into the oil sector and its negative effect on economy - High share of oil revenues in governmental budget (proof of rentierism) - Crude oil export has a large influence on GPD - Some bad economic policies - No positive effect of education
OPPORTUNITIES	THREATS
- Economy diversification - Increase production of refined (petroleum) products - Higher demand of refined products in home economy - High oil prices in the future - Achieve the good economic policies objectives	- High inflation - High volume of food import - Unstable political regime (nationalization) - Low oil prices in the future - Dutch Disease, rentier multiplier - Government revenues not diversified - State can lose extractive capacity

Source: Own elaboration.

The analytical part mainly provided an overview of the Venezuelan economy with respect to oil industry. From the present situation of the economy, it is possible to derive some perspectives for its development in the future.

Venezuela has extensive proven oil reserves, which will be a source of revenue in the future. In this respect, Venezuela is the capital-surplus country. Even thought, Venezuela is on 11th position in the volume of oil production, the depletion horizon of oil reserves is long.

Most of the oil produced is exported in the form of crude oil. The production and consumption of the refined products in Venezuela is low. The output of the refined products has been decreasing whereas the home demand for the refined products has been increasing. The opportunity is to increase the production of the refined products to meet the increasing home demand as well as export more refined products. The production of more value added products would be beneficial also for other sectors of the economy.

The share of oil activity on GDP has been decreasing, which means that Venezuela is becoming less resource-dependent and has lower resource-to-GDP ratio, currently about 12%. This is according to the Central Bank of Venezuela. However, the OPEC data indicates that crude oil export has represented a share of between 20% – 30% of GDP during the recent years starting from 2002 with the exception of the year 2009, when it was only 16%. This indicates rather high resource-to-GDP ratio.

Venezuela has had a low positive or slightly negative balance of payment. In the rentier state theory this means the capital-deficient country. Without the oil export revenues, the balance of payment would be negative and the country would be indebted.

The Venezuelan trade is based on oil exports. The imports are more diversified and include mainly high value-added products, especially industrial like machinery and electronics. Venezuela also imports many food products, two-thirds of its food needs. This signalizes that industry and agriculture is underdeveloped and the economy requires diversification.

The foreign direct investments into the oil sector have been very unstable. This can be due to the fear of nationalization of the oil industry by the current regime and also due to high inflation. There should be constant and stable FDI into the oil sector otherwise the perspectives of the oil sector development are bad. FDI should enhance the oil derivatives production.

Venezuela pertains to countries with the high resource-to-revenue ratio because the oil revenues represent about half of the total budget revenues. This means that the country is the rentier state. The budget deficit/surplus depends on oil revenues. In the years 2004 - 2008, when the oil revenues were high, the government budget was in surplus, in other years it was in deficit. If the oil revenues shrank, the government would get indebted and would not have funds for its social programs financed mainly from the oil revenues. Therefore, the government should diversify its revenue sources.

The perspectives for increasing households' incomes are rather good considering the increasing GNI per capita, quite good GINI Index and HDI Index. It is also positive for households that the government gains revenues from the state-owned oil enterprises, so the income taxes from employees are lower. The government gains more than half of its total budget revenues from tax and non-tax oil revenues (82,432 mil. Bolívares in 2008). The minority of other revenue sources is the income tax and VAT (together 67,633 mil. Bolívares in 2008).

The quantitative part of the diploma thesis also provides a valuable basis for economic perspectives estimation. The econometric model revealed that if the export of crude oil increases by 1%, GDP of Venezuela increases by 0.236%. Thus, the crude oil export influences GDP to a large extent, and therefore changes in the crude oil export have effect on the entire economy. The model also revealed that the crude oil export variable affects GDP more than other examined variables like the gross fixed capital formation, the government budget, FDI or labour force.

If revenues for crude oil export decreased, it would have negative consequences for the economy. In this viewpoint, the perspectives for the economy are rather bad. Much depends on the price of oil in the future. In the scenario when the price of oil is high (US$210), GDP can reach 66,277.49 mil. Bolívares in the year 2035. This amount is 12.6% higher than the amount of GDP in 2008 and 9.15% higher than the 2035 reference case. This is a very good perspective. On the other hand, in the scenario when the price of oil is low (US$51), GDP in 2035 would be only 50,533.53 mil. Bolívares, 12.76% lower than the value of GDP in 2008 and 16.78% lower than the 2035 reference case. The perspectives for Venezuelan economy would be much worse in the second case.

The results of the analytical and quantitative parts can be confronted with the current policy objectives of the Venezuelan government. The main objective is to remove or at least reduce the dependency of Venezuelan economy on oil revenues. The majority of the objectives of Chávez's economic and social policy seem rational and helpful for the development of the Venezuelan economy. Therefore, the perspectives are good in this sense. The question is whether the government can achieve the objectives any time in the future. During the Chávez presidency, the oil price was very high and the government gained very high revenues from the oil industry. In theory, these revenues should allow the government to invest in development of non-oil economic activities.

The policies that should help the economy are mainly the diversification of the economy, support of small businesses, new technologies adoption, fighting exchange rates volatility and social economy creation. On the other hand, policies that are not helpful for the economy are the trade restrictions, subsidies, and mainly nationalization of the oil industry. Also attaining the fiscal sustainability by increasing the government revenues through higher oil revenues does not seem as a good step as the government already gains a large portion of its revenues from the oil sector.

5. CONCLUSION

From the economic point of view, the topic of the rentier states is very interesting. Even though the countries receive windfall revenues from their resources, of which other countries without significant resource reserves can only dream, many of the rentier countries have economic problems. It is a contradiction, which is worth of studying. The oil producing countries are those, to which is the rentier state theory most commonly applied. It seems logical that the oil revenues should serve as a financial injection to economy and should increase the prosperity, but in many cases the opposite is true. The reasons why this happens are explained in the literature overview of the diploma thesis. There are problems like the rentier multiplier or the Dutch Disease. The impacts of oil revenues on the oil producing and exporting countries are then demonstrated.

Venezuela pertains to the group of countries, economies of which are affected by oil revenues. Venezuela has also such a political regime, in which the management of the oil revenues is controversial and internationally observed. The effects of the oil revenues on Venezuelan economy were studied in detail in this diploma thesis. The objectives set at the beginning were achieved. The oil sector indicators and other economic indicators proved that Venezuelan economy has the characteristics of the rentier economy. It is mainly manifested on the fact that the oil revenues represent a substantial portion of the government revenues. The second objective was achieved by the construction of an econometric model and by quantification the relationship between crude oil export as the explanatory variable and GDP as the explained variable. The model revealed that a value change of crude oil export brings a major change to the value of GDP of Venezuela, which implies that the economy of Venezuela is resource-dependent. The rentier state theory also distinguishes the capital-surplus and capital-deficient countries. It was found out that Venezuela has the characteristic of the capital-surplus country because it has a low population/reserves ratio. However, the country has also low balance of payment, which is the feature of the capital-deficient countries. The analysis of the economic indicators also proved one of the hypotheses that concentration on the oil sector leads to a slowdown in industry and agriculture.

The main hypothesis that the economy of Venezuela depends on the revenues from oil industry have been proven. It was found out, as expected, that the revenues from oil are

an important part of GDP of Venezuela as well as of the government budget. It is important to note that data from the Central Bank of Venezuela, a source widely used in this diploma thesis, revealed a lower dependency of GDP on the oil revenues than other official and reliable international organizations (OPEC, CIA) declared. There is a doubt of the author that the Venezuelan official governmental and central bank data is utterly reliable. The model also proved the secondary hypothesis that the Venezuelan economy is export oriented with emphasis on oil and the oil exports are a very important source of revenues. Apart from that, the model was utilized for the simulation of future effects of different oil prices on GDP value. Three different scenarios of oil price development were used and the impact on GPD was counted showing the possible perspectives for the economy as a whole.

Based on the above mentioned findings the perspectives of the Venezuelan economy development were discussed. Because Venezuela was proved to be the rentier state with the problem of the Dutch Disease, which works as a vicious circle, its perspectives for the economic development are rather pessimistic. The author believes that the only way out from the vicious circle is the economic diversification. Some economic policies of the current government have diversification as the goal and are beneficial for the economy; other policies rather undermine the economic diversification.

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APPENDIX 1

Source data table

Year	y1	x2	x3	x4	x5	y2	x6	x7	x8	x9	x10
1989	5300	1747,4	17,31	66,0	59,041	31326	112,88	4437	3,544	-106,24	1876
1990	9643	2135,2	22,26	66,2	60,054	33352	311,68	4171	0,846	130,07	1892
1991	10133	2286,2	18,62	66,9	62,649	36597	1578,3	5653	1,201	173,20	1915
1992	8842	2345,6	18,44	67,5	63,330	38815	490,64	7310	1,744	-94,17	1949
1993	8252	2326,0	16,33	67,7	64,448	38922	282,67	6883	2,159	104,11	1992
1994	7546	2367,9	15,53	68,9	64,877	38007	499,08	5638	2,401	230,48	2041
1995	9214	2378,5	16,86	70,1	66,329	39509	648,88	5683	2,531	506,37	2094
1996	9123	2381,0	20,29	71,9	72,667	39431	1013	5326	2,423	1175,25	2146
1997	13107	2411,0	18,68	73,1	74,921	41943	4481,2	10686	2,366	4631,06	2198
1998	10098	3120,0	12,28	73,5	76,108	42066	4192,6	11275	2,268	-115,34	2249
1999	13047	2800,4	17,48	75,4	76,852	39555	2290	9521	2,175	1066,67	2299
2000	20563	2891,0	27,60	76,2	77,685	41013	3630,1	9771	2,170	4236,02	2350
2001	18562	2791,9	23,12	77,3	77,783	42405	3410,2	11118	2,124	4703,97	2401
2002	15291	2782,0	24,36	77,9	77,154	38650	587,97	9077	2,040	843,93	2451
2003	13904	2643,0	28,10	79,3	77,140	35653	1512,2	5716	1,999	5303,50	2501
2004	21925	3009,4	36,05	82,4	80,582	42172	1106,7	8559	1,845	14851,32	2548
2005	30183	3128,0	50,64	84,0	80,012	46524	2007,7	11847	1,660	26491,06	2591
2006	40539	3035,6	61,08	85,1	87,324	51117	-430,9	15000	1,370	34762,70	2627
2007	45240	2981,9	69,08	86,7	99,377	55284	882,66	18806	1,129	24389,10	2657
2008	67985	2957,5	94,45	86,1	172,323	57927	266,97	18364	0,932	2936,36	2682
2009	50001	2878,1	61,06	85,0	211,173	56023	-2864	17055	0,850	13087,80	2705

Source: OPEC Annual Statistical Bulletins, International Energy Agency, Banco Central de Venezuela, World Bank Data (World Databank)

APPENDIX 2

Correlation matrix for the first equation

l_x2	l_x3	l_x4	l_x5	
1,0000	0,5626	0,8431	0,5529	**l_x2**
	1,0000	0,8577	0,7727	**l_x3**
		1,0000	0,7494	**l_x4**
			1,0000	**l_x5**

Correlation matrix for the second equation

l_y1	l_x6	l_x7	l_x8	l_x9	
1,0000	0,2072	0,8795	-0,6540	0,7841	**l_y1**
	1,0000	0,3803	0,1266	0,5144	**l_x6**
		1,0000	-0,4313	0,7470	**l_x7**
			1,0000	-0,1606	**l_x8**
				1,0000	**l_x9**

l_x10	
0,8955	**l_y1**
0,3735	**l_x6**
0,8255	**l_x7**
-0,3572	**l_x8**
0,8891	**l_x9**
1,0000	**l_x10**