UiT
THE ARCTIC UNIVERSITY OF NORWAY

The Faculty of Biosciences, Fisheries and Economics
School of Business and Economics (BFE)

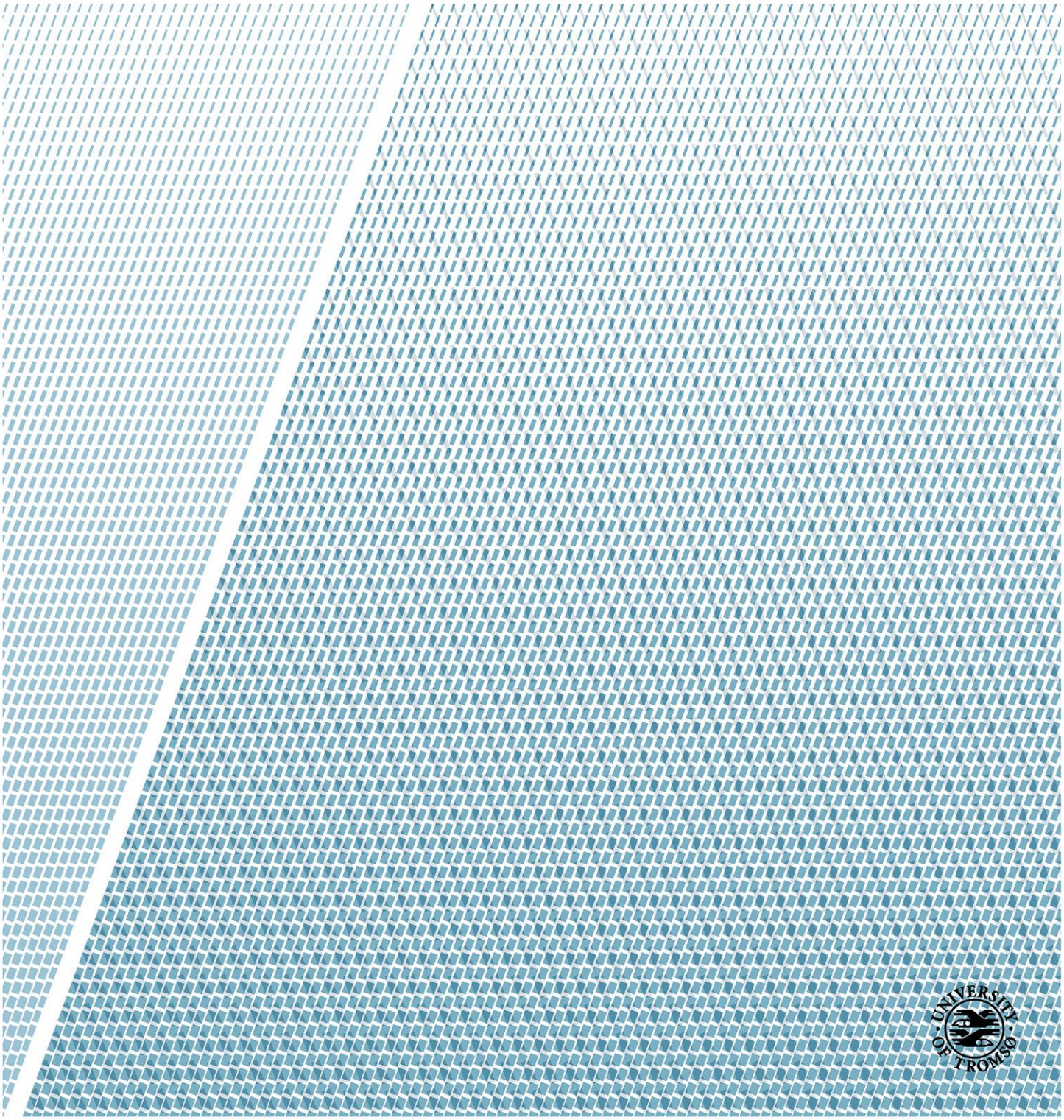
Norway the odd country

The fear of Dutch disease, a democratic problem

—

Joseph-Annaelle Mbanmbaane

Master thesis in Economics September 2015



Norway the odd country

The fear of Dutch disease, a democratic problem

Joseph-Annaelle Mbanmbaane

Master thesis in Economics September 2015

Thesis Submitted for the Degree of Master in Economics

The Faculty of Biosciences, Fisheries and Economics

UiT the Arctic University of Norway

Fall 2015

Supervised by

Associate-Professor Geir Finne

&

Professor Jan Yngve Sand

Acknowledgements.

The successful completion of this thesis would be difficult, if not impossible had it not been for the commitment and devotion of my supervisor, Associate- professor Geir Finne. I express my heartfelt gratitude to him for his tireless effort and his invaluable guidance, kindness, patience and willingness to respond so helpfully and promptly in the drafting process. I specifically convey my gratitude for his efforts in grooming me into a scholar.

My special tribute also goes to my co-supervisor Professor Jan Yngve Sand who welcomed my critical view about the current economic system, for his constant positive and constructive criticisms which enabled me to successfully complete this thesis.

I also thank Professor Ola Flåten who has kindly provided me his article. I express my gratitude to Mr. Magnus Haug and Mr. Einar Fagertum from the UiT IT department for technichal support. I am furthermore grateful to the academic and administrative staff of my faculty particularly and the UiT more generally, whose smiles, greetings or information have been priceless for me. Special thanks to all my classmates and colleagues in the academic struggle.

As for my family and friends, I cannot start listing your names, because there a real risk to forget somebody; and that risk I am not ready to take it. One thing is sure, I owe you a lot, and all I have in return is just, “thank you”.

Abstract.

The impressive increase of Norwegian national wealth since the 1970s is mainly attributable to endowment in natural resource and the well-working of institutions. This work highlights how in addition of the traditional man-made capital, human capital, and natural capital, the Norwegian model, relies greatly on a particular type capital that is not explicitly enough mentioned in economics, namely the "institutional capital". The "institutional capital" can without hesitation be included among the inputs used to create value in Norway because the Norwegian institutions do not just constitute a resource but also are the source of its economic solidity. The great role played by the institution has resulted in an enormous fortune kept in a sovereign fund (the Government Pension Fund). This work second finding is that the increase of the national wealth does not guarantee the end of economic problems; the origin of the wealth conditions considerably the way it has to be allocated to the population. The case of the Norwegian oil-rent allocation has been a good illustration of this fact, as a free inflow of the oil-rent into the economy (that is for instance, an important allocation of the oil-rent to the provision of more welfare services) might bring with it the Dutch disease. Thus, the fear of the Dutch disease has forced politicians to embark in "fiscal consolidations" measures, which they delusorily justify by forecasting future potential economic gloom in Norway. This strategy of "story telling", which is nothing but what is known as the Government House Ethics (Sidgwick), violates the principle of transparency. Though the politicians' choice has a real economic efficiency, this choice may impair the "institutional capital", which highly determines the Norwegian economic model.

Keywords: Resource allocation, Welfare, Dutch disease, Transparency, Government House Ethics, Democratic Institution.

Table of contents.

Tables

Figures

Chapter I. INTRODUCTION

The western economic system has undergone a crisis since the end of 2008. But before that crisis, economic growth in the worst hit countries had been very low. In addition, these countries are, for the most part, highly indebted due to the accumulation of public deficit over years. Thus, the economic slowdown in these countries has on the one hand led to high unemployment, and on the hand has worsened the stance of public budget due to the drop in collected taxes and higher demand for welfare services like unemployment benefits for instance. The government of these countries have thus adopted fiscal consolidation measures in order to bring back their budget in a sustainable position. They have essentially lost the political freedom to the economic system which has been dominant. In other words, since then it is the primacy of the economic system that has been determining the budgetary policy there. These countries seem to be affected by what may be called the "democratic indebtedness habit", i.e. the habit of overspending in up-turn and/or accumulating debt, followed by their governments engaging in fiscal consolidation measures in down-turn due to a large debt. For instance, while the European Union recommends a guideline with a public debt that should not exceed sixty percent of the GDP, most of the pioneer E.U. countries (with some exceptions, such as Germany, Denmark, the Netherlands) have crossed the threshold of hundred percent of the GDP, as the figure above shows. As a result, a substantial part of the citizens in these countries go through unemployment and the rationing of welfare services at the same time. Accordingly, the mobile part of the labour force from these countries move abroad where a more favourable economic situation is assumed to provide both employment and social welfare. For these economic migrants, Scandinavian countries are among the greatly prized destinations due to the echo of the Nordic model worldwide. I belong to that mobile part of labour and I left France for the reasons just mentioned. As a graduate in economics, studying the economic models of countries referred at as the wealthiest in the world, has always been my dream. Thus, though getting a job was my first motivation for moving to Norway, I ended

Borrowing burden Source: Financial Times August 11th (Moore, 2015, s. 24).

up realizing my dream by taking my Norwegian experience as an opportunity for an empirical research field.

Once in Norway, the first observation is that unlike the highly indebted western countries, Norway does not have any deficit problem of this kind and has performed economically well during the western recession of the last decade (see the figure on the previous page). Norway "is a capitalist country but it is dominated by state-owned enterprises; it is an oil giant but it eschews conspicuous consumption. For decades this unusual economic model has served Norway well: in 1970 it was in Europe's middle ranks as measured by income per head. Nowadays, Norwegians are richer than everyone in Europe except the Luxembourgers". (Ryder, 2015). This is unusual for a natural resource-based country, considering the phenomenon of resource-curse, that is, the economic and institutional problems faced by (natural) resource-rich countries once they are in possession of their resource-rent. Thus, Norway, that started the exploitation of oil in the 1970s, has managed to escape the resource-curse seemingly thanks to the establishment of an "oil fund", where the revenues of the oil exploitation are transferred. A reason, put forward to explain the Norwegian economic success story in the literature on resource-curse, is the good quality of Norwegian institutions. Norway appears thus as a combination of efficient economic performance and a good quality of democratic institutions. Therefore, unlike the indebted democratic countries that have to engage in fiscal consolidation policies in order to bring their budget back to a sustainable level, theoretically, there would not be any reason to social welfare rationing in Norway. Though common sense would expect the wealth made of the oil-rent, among others, to help solve social problems more easily, social services (or welfare) rationing is also present in Norway as in some countries that register high levels of public debt. Indeed, while the indebted countries can simply justify their fiscal consolidation measures by their government budget deficits, the Norwegian politicians cannot use the same argument considering the sovereign fund (i.e. the oil fund). Considering the growth of the Norwegian wealth (i.e. the GDP including the oil fund) combined with low unemployment rate, the Norwegian economic situation may recall, to a certain extent, the French "Trente Glorieuses", which means the Norwegian politicians have more political freedom

Source: The Economist, October 10th (Ryder, 2015, s. 68).

than most other politicians. Yet, against all expectations, some reforms that imply the cuts of some social benefits are enacted by the politicians with the support of experts from the most forceful institutional triangle[1] (i.e. the Norwegian Finance Ministry, Statistics Agency, and Central Bank). This Norwegian paradox has enhanced my interest in pursuing an inquiry of the Norwegian economic model, with a focus on the distribution of the national wealth. About this, the paradoxical behavior of the Norwegian politicians seem to be justified by the fear of the Dutch disease, which is the adverse effects of a boom in a sector (here the energy sector) on the traditional sectors (generally the manufacturing sector and/or the agriculture sector). Referring to the literature on the Dutch disease, the "favorable shock" in the Norwegian oil sector has entailed, besides the oil revenues, structural changes that can either impair or enhance the creation of value in other Norwegian key sectors. The evolution of these structural changes greatly depends on the ways the oil revenues are allocated (Brahmbhatt, Canuto, & Vostroknutova, 2010).

Moreover, this inquiry shows how the difficulties in allocating the oil-rent can cause problems beyond the economic structure. The focus on the prevention of Dutch disease seems to have resulted in some democratic shortcomings like the issues of transparency and equity. Accordingly, the challenging trade-off faced by Norwegian politicians about the allocation of the Norwegian oil-rent has led them to overlook the principle of transparency, which may jeopardize the well-working of Norwegian institutions (and more generally of the political structure). Indeed, the Norwegian political system faced with an unprecedented economic freedom fears the great responsibility that is entailed that is why the politicians tend to follow the advice from the three strongest Norwegian institutions (i.e. the Norwegian Finance Ministry, Statistics Agency, and Central Bank), which leads to the primacy of the economic system. In Democracy, the outsiders rule over the insiders and the experts. The best reason for this is that even experts and insiders are outsiders in most issues and are therefore not experts in trade-off between various issues and values. Norway seems to owe its economic solidity to its institutions and the trust of the citizens to these institutions. One can then state that the Norwegian wealth comes out from natural capital, man-made capital, human capital, and more importantly from institutional capital. Politicians' choice to slightly sacrifice transparency, in order to skirt economic challenges brought about by the allocation of the Norwegian oil-rent, may impair this institutional capital. The purpose of this work is to analyze this Norwegian

[1] Later on in the course of this work, I refer to this 'most forceful institutional triangle' as the 'triangular guild'.

Paradox through the trade-off between the economic long run efficiency (i.e. the Dutch disease prevention) and the potential danger to the political institution, which is associated with the oil-rent allocation method chosen by the Norwegian authorities. In brief, the work attempts to give find answers to the following questions: How is the Norwegian gigantic oil wealth allocated and why? Are politicians' arguments concerning this allocation convincing? What are the consequences of politicians' oil-rent allocation strategy for the Norwegian model?

To proceed, the second chapter provides a presentation of the Norwegian oil fund as well as its nexus with the government budget. The third chapter explains the economic phenomenon of Dutch disease, one of the main factors that influence the allocation strategy chosen for the Norwegian oil-rent (that is the Fiscal Rule). The fourth chapter provides an explanation of why the scope of this paper is beyond the boundary of the mainstream economy theory, therefore why it is necessary to the term resort to political economy and to a certain extent to some aspects of philosophy. The fifth chapter clarifies the criteria defined in the Fiscal (or Budgetary) Rule, which is the allocative method politically chosen for the oil-rent and which has the quality to hedge Norway against the perceived Dutch disease threat. This fifth chapter illustrates via some examples how politicians tend to underrate the weight of the oil sector and overstate the future economic challenges in order to stick to the Fiscal Rule. Finally, this fifth chapter enables us to put forward the tragic outcomes and equity shortcomings (regarding the welfare of the present generation of citizens) brought about by the implementation of the Fiscal Rule. The sixth chapter then addresses the behavior of politicians backed by the most forceful institutional triangle (the Norwegian Finance Ministry, Statistics Agency, and Central Bank), which brings to the light some patterns of 'hyper-democracy' that may be detrimental to the Norwegian institutional capital. This part of the analysis has been difficult to write because it deals with negative distortions of what seem to me to be a very good institutional system. I feel convinced that there is no bad intentions behind the distortions but rather too much focus on uncertainty in terms of better 'said than sorry' ("føre var prinsippet" in Norwegian), which in reality shifts more of the burden of uncertainty onto the present generation than seems warranted. The Norwegian authorities have essentially argued for the primacy of the economic system, which is in countries with severe economic problems but not for a country which seems to have the more affluent public sector in the world. Eventually the seventh chapter concludes this work.

Chapter II.THE NORWEGIAN PETROLEUM REVENUES

Before getting into the analysis of the allocation of the Norwegian oil-rent, it is well-worth presenting what that oil-rent is made of, and this is the purpose of this chapter.

II.1. THE NORWEGIAN OIL REVENUES

The Norwegian oil-rent or Government petroleum revenues (often referred to as the government's net cash flow from petroleum activities) consists of three main elements: (i) taxes and charges from petroleum activities; (ii) operating profit in the state's direct financial interest (SDFI); and (iii) return on stakes in Statoil.

II.1.1. Taxes and fees

Taxes and fees are essentially taxes on the profits of undertakings engaged in the extraction of petroleum. Oil companies pay for the first general company tax equivalent to 28 percent of the profits. In addition, they pay a *special tax* that is based on the very good earnings potential of the business, i.e. the possibility of so-called economic rent.[2] This special tax is assessed by the same basis as ordinary income tax, except for deductions for research grants and losses in other businesses on the shelf. The special tax is currently 50 percent, so that the *formal marginal tax rate* is 78 percent. In addition there are three other types of taxes namely, the *tax on excess pay*, the *land tax* and the *CO2 tax*. These are *indirect taxes* that are dependent on the amount of petroleum extracted.

II.1.2. State's Direct Financial Interest (SDFI) and Return on Stakes in Statoil

Besides taxes and fees, the Norwegian government directly owns the exploration and production licenses for petroleum and natural gas on the Norwegian continental shelf (via Petoro 80%, Statoil 15% and Norsk Hydro 5%). State's Direct Financial Interest (SDFI) – in Norwegian Statens Direkte Økonomiske Engasjement (SDØE) – was created in 1985 and is managed by the public corporation Petoro AS since 2001. State direct ownership in Statoil and SDFI provides a significant revenue through dividends and sale of shares.

[2] Economic rent refers to the excess use of natural resources when these resources are in limited quantities.

The following table shows these main components of the Norwegian oil revenues for 2010, 2010 (The Norwegian Petroleum Directorate, 2012).

Table 1. The net government cash flow from petroleum activities in 2010 (bill. NOK).

Direct taxes	155.6
Environmental taxes, area fee and other	3.6
SDFI	104.1
Statoil dividend	12.8*
Total:	276.0
*Dividend for 2009 paid in 2010	

II.2. THE GOVERNMENT PENSION FUND GLOBAL (GPFG) AND THE RETURN FROM THE MANAGEMENT.

State's total net cash flow from petroleum activities along with the return of the Fund's assets are entirely transferred into the Government Pension Fund Global (GPFG) – in Norwegian Statens pensjonsfond utland (SPU). Formerly called the *oil fund* (in Norwegian, oljefondet), the GPFG was established on June 22, 1990 by the Norwegian Parliament in order to manage the Norwegian financial asset stemming directly from petroleum. In other words, the Norwegian oil-rent is managed through the Government Pension Fund Global, that is, a sovereign fund. As such the oil revenues are invested worldwide in shares, bonds, real estates and other securities and consequently generate returns.

II.2.1. The Repurchase and Agreements and Reverse Repurchase Agreements (Repos)

In addition, there are liabilities relating to the Government Pension Fund Global (GPFG) that are Repurchase agreements and reverse repurchase agreements (repos) in securities. They are

used instruments in the management of the Government Pension Fund Global. Fund sells a portfolio of securities with related agreement to acquire the portfolio return at a future date. For accounting purposes, "the portfolio remains on the asset side of the fund's balance sheet, as does the cash received for the sale. The corresponding sales value is then entered as a loan from the buyer on the liability side of the balance sheet. The reverse situation is called a re-sale agreement or a reversed repo"; (http://www.ssb.no/en/offentlig-sektor/statistikker/offogjeld/aar/2015-06-08). The European System of Accounts (ESA) requires repurchase agreements to be covered by balance sheet category loans. Liabilities related to repos in the GPFG are included in the official calculation of Norway's gross debt. As repurchase agreements blow up both sides of the balance, the calculated gross debt gives, according to ESA, a misleading picture of the financial situation of the public sector in Norway.

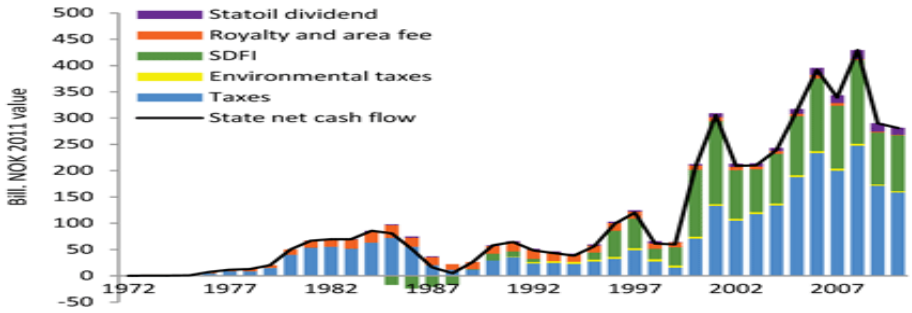
II.2.2. The Government Budget Surplus

The last component of the others components of the GPFG is the Norwegian Government budget surplus. The parliament has decided, via a guideline called the Budgetary Rule, the transfer of a portion of the Fund's income to the state budget's revenue side. That transfer aims at filling the non-oil budget deficit. However, once the transfer is proceeded and the budget is in excess, that excess is returned back into the Government Pension Fund Global (i.e. the oil fund). The first net allocation to the fund was made in 1996 on the basis of a surplus in the government accounts for 1995.

To summarize, the Norwegian oil-rent is made of the yearly government's net cash flow from petroleum activities, the yearly return of the oil fund's assets, as well as the Government budget excess:

Net cash flow from the petroleum activities
– Non-oil deficit in the national budget
+ Return on the fund's investments
+Government budget excess
= Revenues for the Government Pension Fund – Global

Thus computed, the followings graphs and table illustrates the impressive growth of the Norwegian oil-rent that is managed via the GPFG.



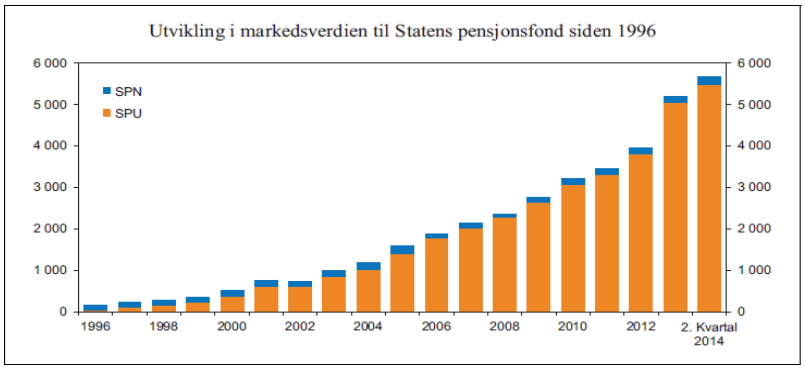


Figure 1 Development in the market value of Government Pension Fund since 1996 (billions kroner).[3].[4]

Summing up this chapter, Norway has chosen to manage its oil revenues via a sovereign fund, called the Government Pension Fund Global (GPFG). The reason for this choice may certainly be the willingness of the present generation of citizens to save for the future generation of citizens. However, there may certainly be an additional reason; namely, the fear to incur the Dutch disease that tends to hit any economy that suddenly receives an inflow of foreign currencies as do, for example, natural resource-rich countries when they sell their commodities. The subsequent chapter, firstly, explains theoretically and illustrates empirically what the Dutch disease is, and then determines whether or not the choice of isolating the oil revenues in the GPFG has so far been an effective preventive strategy against the Dutch disease in Norway.

[3] Sources: Norges Bank, Folketrygdfondet and Ministry of Finance; (Solberg & Finansdepartementet, 2014, s. 167).

[4] Up to and including 2005, a significant portion of the capital of SPN invested as an account to the Treasury. In December 2006, account loan scheme discontinued. This meant that the state fulfilled sight deposits at a value of 101.8 billion. Kroner, and a corresponding amount of the Fund's capital was repaid to the state.

Chapter III. UNDERSTANDING THE DUTCH DISEASE

A number of articles in natural resource economics deal with the resource-curse phenomenon, that is, a trend for most (natural) resource-rich countries to register a lower growth than (natural) resource-poor countries. A certain number of factors, among others the Dutch disease, contributes to that phenomenon of resource-curse. The Dutch disease however does not remain a problem attributable only to a boom in extractive undertakings and more generally to natural resource related activities. Many other factors such as "poor management in some sectors of industry, […] international aid" from capital-rich countries to capital-poor countries, or any sudden "influx of foreign currency" can cause shrinkage of traditional sectors like manufacturing or agriculture sectors (i.e. the Dutch disease); (Afandiyev, 2013). It is well worth mentioning that though empirical papers on the Dutch disease applies to developed countries as well as developing countries, *the generic concept of resource-curse* fits better to developing countries while the *Dutch disease*, which is a more specific term, fits better to developed countries. In fact, developing countries that incur the Dutch disease face at the same time many others challenges that result in economic slowdown in a non-booming sector. Thus, it is actually difficult to isolate the Dutch disease effects and proceed to a study the findings of which are solely attributable to the Dutch disease. On the other hand, developed countries rely on age-old institutions, which makes it easy to dissociate structural changes inferable to the Dutch disease. That is why "most of the literature on the `Dutch disease´ refers to developed countries"; (Benjamin, Devarajan, & Weiner, 1989).

Writings on the Dutch disease related problems date back to Cairnes (1859), who set forth economic slowdown in some tradable sectors of the economy subsequent to the Australian gold rushes. Later on, Maddock and McLean (1984) substantiated Cairnes' observations by emphasizing how some non-tradable sectors of the economy expanded while some tradable sectors contracted. Meanwhile the interest for the Dutch disease decreased until the mining and oil shocks of the 70s, when the Dutch disease phenomenon regained interest, hence the development of a literature and models about it (Nowak & Grenier, 1995). The Dutch disease is a concept that appears for the first time on November 26, 1977 in *The Economist* and depicts the nexus between the economic development in the extractive sector and the economic decline in the manufacturing sector that occurred after the discovery and exploitation of natural gas field, which brought large income, in the Netherlands in 1959. More generally, the Dutch disease qualifies economic structural changes caused by a sudden expansion in a tradable sector

of the economy that has adverse effects on other tradable sectors of the economy. There are various types of purely economic models of Dutch disease, and four instances of them are presented next.

The first type of model is described by Corden and Neary (1982) and Neary and Van Wijnbergen (1986), who stress the time dimension. They describe the effects of the boom in a tradable sector in the short run (when only the labor factor of production is perfectly mobile between the three sectors they consider), then in a medium run (when the capital factor of production becomes also mobile but between only two of the three considered sectors), and eventually in the long run (when both labor and capital become perfectly mobile between the three considered sectors). Despite their interesting findings, Corden and Neary's (1984) then Neary and Van Wijnbergen's (1986) model has been questioned because their time horizon would hardly match the hypothesis made on the mobility of production factors.

The second type of Dutch disease model is developed by Benjamin, Devarajan and Weiner (1989). They focus on cases when there is "imperfect substitutability between the non-tradable sector and the tradable lagging (non-booming) sector". Their model fits better developing countries, where the lagging sector (that is for instance the manufactures sector) is mostly an importing (rather than exporting) sector. It follows then that the results got from Corden and Neary (1984) and Neary and Van Wijnbergen (1986) model "can be reversed" since the appreciation of a currency tends to benefit importing (tradable) sector. In addition, they find out that some tradable sectors can escape the adverse effects of a (tradable) booming sector thanks to the differentiation of their product. Thus, their findings are, among others that not all the other tradable sectors would suffer from a sudden boom in a tradable sector. The criticism addressed towards Benjamin, Devarajan and Weiner's (1989) model relies on the fact that taking account of product differentiation, indirectly, implies from the premises that sectors that output differentiated commodities do not really participate in international competition anymore. This, therefore, weakens their model since international competition (via sectors competitiveness) is one of the key aspects of in Dutch disease models.

The third variety of Dutch disease model is put forward by Jean-Jacques Nowak and considers the intensity of the relationships between sectors. Such relationships may favor the return to capital (i.e. the rentals) at the expense of the return to labor (the real wage) (Nowak & Grenier, 1995).

The fourth instance of contribution to the Dutch disease model is by Egil Matsen and Ragnar Torvik (2003), who realize a positive analysis on the use of revenues made from the natural booming sector. Considering the fact that the Dutch disease emanates from the management made of these revenues, Egil Matsen and Ragnar Torvik work firstly highlights the impossibility to do without the Dutch disease and that "some Dutch disease is always optimal"; (Matsen & Torvik, 2003, s. 3). Their article provides the "optimal spending path of the resource wealth"; (Matsen & Torvik, 2003, s. 1). They indeed recommend the allocation of large transfers of the resource-rent to the present generation of citizens, when the use of this resource-rent positively affect the growth of learning by doing- LBD (their proxy for productivity). Inversely, they recommend the allocation of large transfers of the resource-rent to future generation of citizens when the use of this resource-rent negatively affects the growth of LBD. They find in sum that "the higher the share of non-traded goods in consumption", the weaker the positive effect of the use of the resource-rent on the growth of LBD and the stronger the negative effect on the growth of LBD. It follows in that case that "the more likely it is that the optimal spending path of the resource wealth is increasing over time". (Matsen & Torvik, 2003, s. 3).

This chapter relies firstly on Corden and Neary (1984) and Neary and Van Wijnbergen's (1986) model since it appears as the standard theoretical model of the Dutch disease, considering the fact that the other models emerges from theirs. Afterwards, the second part presents two empirical cases of the Dutch disease; namely one that results from the boom in an extractive sector (in the Netherlands) and another the case of Norway, that is, where Norway stands relative to the Dutch disease.

III.1. THE PURELY ECONOMIC THEORY ON THE DUTCH DISEASE.

Among the various papers on the Dutch disease, a theoretical model developed in 1982 by the economists Corden and Neary appears as a reference model in the Dutch disease literature. The framework of multi-sector models inspires Corden and Neary in the design of their Dutch disease model (Corden & Neary, Booming Sector and De-Industrialization in a Small Open Economy, 1982). More precisely, they consider the case of a small open economy made of three main sectors, namely, the energy sector (that is generally termed the booming sector), the

manufactures sector (generally termed the lagging sector) and the services sector. The services sector is also known as the sector of non-tradable commodities as opposed to the two other (i.e. the booming and the lagging) sectors that output (internationally) tradable commodities. The booming and lagging sectors are equally referred to as exposed sectors. The price of the two tradable commodities considered are therefore set on international markets and are hence held constant in the model. On the other hand, the price of the non-tradable good (i.e. the price of services) results from the confrontation between the domestic demand and supply of services. The price of the non-tradable commodity is then supposed to vary in the model. The prices are considered relative (that is, the price of one sector commodity is expressed relative to the price of the commodity of another sector). Accordingly, in this framework the price of services (i.e. the non-tradable good) is expressed relative to the prices of the two tradable commodities (i.e. energy and manufactures). Therefore, in other words the price of services represents the exchange rate. The real wage that stands for the price of labor is flexible. As additional premises, the basic model considers that the three commodities are used for final consumption; the production function is of the Hicks-neutral technology type that is of the following form: $Y = A \cdot \mathrm{F}(K, L)$, where Y denotes the output or production, A denotes the technology, and F any type of CES function. The consideration of a Hicks-neutral technology implies that the effect of boom is similar to the effect of rise in the output price. Two inputs are used namely the labor (L), also considered the "perfectly mobile" factor, as opposed to the capital (K) that represents the "specific factors" (Corden & Neary, 1982, s. 827). Corden and Neary's (1982) model focuses on "the de-industrialization aspect of the Dutch disease". Their article is complemented by the Neary and Van Wijnbergen's (1986) contribution that sets forth the two main effects that enable to detect the onset of the Dutch disease, namely the resource movement effect and the spending effects (Rudd, 1996).

The resource movement effect

The resource movement effect "describes the movement of mobile factors into the oil sector, bidding up their wages, and causing other sectors to contract" (Benjamin, Devarajan, & Weiner, 1989, s. 73). To gain the insight into the resource movement effect only (and so ignore the

spending effect), "the income-elasticity[5] of demand for services" is assumed zero. Then the dynamic goes as follows. First, the boom in the energy sector withdraws the labor from the lagging and services sectors. This resource movement effect corresponds to the *direct de-industrialization* in favor of the booming sector. Next, the boom in the energy sector brings about the inflow of foreign currencies. This leads to the appreciation of the domestic currency as the demand for domestic currency becomes larger than the supply for the domestic currency. As a result, the exports from the lagging sector decrease since they become more expensive relative to the world market price. Hence, the lagging sector becomes less competitive and the demand for its commodities falls. The production of the lagging sector has then to be reduced in order to adjust to the decreased demand. This implies the cut of labor demand that translates into layoffs and thus the increase of unemployment. It is the *indirect-deindustrialization*.

The spending effect

The spending effect "refers to the use of the increased revenues" generated by the booming sector (Benjamin, Devarajan, & Weiner, 1989, s. 73). Just as in the preceding part, the resource movement effect is overlooked here by assuming that "the energy sector does not use any labor" in order to focus only on the spending effect. Then the mechanism works as follows. The boom in the energy sector entails new processes that boost the consumption of tradable and non-tradable commodities inside the considered small open economy. This causes the rise of prices and wages in the non-tradable sector relative to those of the tradable sector. It is the *real appreciation* of relative price (or the exchange rate). The latter spills over the lagging sector and generates less competitiveness as just mentioned in the part devoted to the resource movement effect; (Corden & Neary, 1982, s. 827).

Currency real appreciation

When defining the resource movement effect and the spending effect, the concept of currency appreciation appeared redundantly. It is actually an essential aspect when analysing the Dutch disease issue. Therefore, a clarification of this concept will, to an extent, ease the understanding of Corden and Neary's model. The export of any commodity of tradable sectors leads to the

[5] $\varepsilon_I = \frac{\%\text{ change in demande}}{\%\text{ change in income}} = \frac{\frac{\Delta X_s}{X_s}}{\frac{\Delta Y}{Y}} \approx \frac{d \ln X_s}{d \ln Y} = 0$ that is the demand for services remains constant whatever the changes in the income.

inflow of foreign currencies into the domestic economy. The inflow of foreign currencies has two possible uses. On the one hand, the foreign currencies can be used directly for imports. In that case, the inflow of foreign currencies affects neither the internal money supply nor the demand for domestic goods. On the other hand, the inflow of foreign currencies can be converted into the local currency and used for the demand of goods produced domestically. Therefore, two cases are to consider; namely, if the exchange rate is fixed or flexible. If the exchange rate is fixed, the conversion of the inflow of foreign currencies generates an increase of the domestic money supply, which boosts the domestic demand, raises domestic prices and thus causes the real appreciation of the exchange rate. If the exchange rate is flexible, the increase of the supply of foreign currencies entails the rise of the domestic currency value, which is also nothing else but the real appreciation of the exchange rate. Thus with the domestic currency becoming stronger, the imports from abroad become easily affordable while the exports become more expensive, which can cause a deficit of the balance sheets, and then impacts negatively the balance of payment and entails the rise of unemployment. In summary, the boom in a sector brings an inflow of foreign currencies that leads to the domestic currency appreciation, loss of international competitiveness, and unemployment.

A real appreciation corresponds to a rise in the real exchange rate that is the relative price of a currency. In Corden & Neary model the price of services output represent the domestic currency as it is the outcome from the confrontation between the demand and supply for services output. On the other hand, the price of the outputs in the lagging and the booming (tradable/ exposed) sectors are set on international markets. Thus the price of output from these tradable sectors represent foreign currencies. The real exchange rate is then illustrated by the ratio between the price of output from the services (non-tradable) sector (p_S) and the price of output from the tradable sectors (p_T). In other words, the real exchange rate here is the "relative price of services"; (Corden & Neary, 1982, ss. 829, 827): $\text{Real Echange Rate} = \frac{p_S}{p_T}$. The real appreciation is thus caused by a rise in the output price from the services sector, as the price from the tradable sectors is held constant in this model. Appreciation occurs twice in Corden & Neary Model. Firstly due to resource movement effect, the price of output from the services sector has to rise so that the demand for services output adjusts to the supply for services output that has fallen. Next, the spending effect leads to an excess demand for services output, which also drives the price up so that the demand equals the supply.

Corden and Neary model goes through three scenarios in the course of time that are firstly when only the labor (L) is mobile between the three sectors, next when the capital (K) also becomes mobile but only between the services sector and the lagging (energy) sector, and finally when both capital (K) and labor (L) are mobile between the three sectors. The presentation of the three scenarios that follow conclude on whether over time the consequences of the resource movement and spending effects are reversible or not.

III.1.1. The Model with Labor as the Only Mobile Factor:

This first scenario corresponds to the resource movement effect and the spending effect of the booming sector in a short run.

III.1.1.A. *Effects of the boom on the outputs:*

III.1.1.A.a. Energy sector output, X_E

Without any doubt, the resource movement and the spending effects both bring the output in the energy sector up ($X_E \nearrow$); (Corden & Neary, 1982, s. 830).

III.1.1.A.b. Services sector output, X_S

The resource movement effect does not induce great changes in the output of services but it tends to lower it slightly ($X_S \searrow$) while the spending effect causes the rise of services output ($X_S \nearrow$); (Corden & Neary, 1982, ss. 830-31). Additional information about the value of the economic parameters are then necessary in order to determine which of the two effects dominates; see equation A 18 in the Appendix 1: $A(\hat{w} - \hat{p}_S) = \left[-\eta\theta_E (I - \xi_S) + \xi_E \varepsilon_S \right] \pi$.

III.1.1.A.c. Manufacturing sector output, X_M

The output in the manufactures sector goes down twice ($X_M \searrow$): the first fall is the result of the direct de-industrialization caused by the first resource movement effect (that drains labor into the booming sector); the second drop is due to the indirect de-industrialization caused by

the spending effect that makes the manufacturing sector less competitive in the world market. (Corden & Neary, 1982, s. 831).

III.1.1.B. *Effects of the boom on the real wage.*

The resource movement effect entails the rise of the real wage. Under the spending effect, the move of the real wage is undetermined as it can either rise or fall. In that case, it is hard to predict whether the effect of the boom on the real wage is a rise or fall once both effects (i.e. the resource movement and the spending) are considered. However, a fall in the real wage should be expected if the spending effect dominates the resource movement effect, and services occupy a great share in the consumption basket of the "wage-earners"; (Corden & Neary, 1982, s. 831). See equation (A19) in the Appendix 1:

$$A(\hat{w}-\alpha_S \hat{p}_S)=\left\{\eta\theta_E(\xi_S-\alpha_S)+\xi_E\left[\phi_S(I-\alpha_S)+\varepsilon_S\right]\right\}\pi$$

III.1.1.C. *Effects of the boom on the return to the specific factors (or the capital) of the three sectors.*

In Corden and Neary's model, a common proxy for the measure of the returns to the specific factors in the three sectors is "the profitability of each sector". The measurement of the concept of profitability used here is further explained in Appendix 3. As this part only deals with the short run effect of the boom in the energy, the analysis now focuses on the concept of absolute profitability. The consideration of the relative profitability fits better with a longer run; hence, it is used in the next scenarios.

III.1.1.C.a. Effects of the boom on the profitability (i.e. the return to the specific factor) of the energy sector

The profitability (that is, the return to the specific factor) in the energy sector rises under the resource movement effect but falls under the spending effect. The return to specific factor in any sector depends on the general profitability and therefore on the sales in the considered

sector. As the price in the energy sector is set in the world market, the return to the specific factor in the energy sector will be less than the return to the specific factor in the non-tradable (services) sector. The latter actually benefits from the spending effect, unlike the return to the specific factor in the booming (and exposed) sector[6] (Corden & Neary, 1982, s. 832); see equation A 20 in the Appendix 1:

$$\theta_{KE} A\hat{r}_E = \left[-\eta \xi_S \theta_{LE} \theta_E + \phi_S \left(I - \theta_{LE} \xi_E - \xi_S \right) + \varepsilon_S \left(I - \theta_{LE} \xi_E \right) \right] \pi$$

III.1.1.C.b. Effects of the boom on the profitability (i.e. the return to the specific factor) in the services sector

The spending effect (i.e., the increase of services consumption) drags profitability in the services sector up while under the resource movement effect profitability may fall (because of the rise in the wage is measured in terms of all goods and real appreciation). Therefore, the final effect of the boom on the profitability of the services sector cannot be determined without additional information on which of the two effects dominates. (Corden & Neary, 1982, ss. 831-832).

III.1.1.C.c. Effects of the boom on the profitability (i.e. the return to the specific factor) in the manufactures sector

The resource movement effect removes labor from the manufactures sector that does not really benefit from the spending effect, as it is an exposed sector (its price is set on the world market). Therefore, the profitability (in absolute value) in the manufactures (lagging) sector is expected to fall (Corden & Neary, 1982, s. 831). However were the relative profitability considered here, the mentioned fall may have been less pronounced depending on "factor intensities[7] in terms of the value shares" in the output. Thus, in the short run, the effect of boom in the manufacturing sector is de-industrialization. In addition the real appreciation caused by the spending effect

[6] This is «more likely the greater the rise in the wage rate, which means in turn the smaller is the compensated price-elasticity of demand for services and the larger is its income-elasticity of demand»; (Corden & Neary, 1982, s. 832).
[7] Factor intensity=(Capital/Labor) Ratio.

renders the manufacturing sector less competitive. Hence a boom in the energy sector translates by "a fall in manufacturing output and employment, a worsening of the balance of trade in the manufacturing, and a fall in the real return to factor specific to manufacturing sector (though not necessarily in their return relative to those of factors specific to other sectors)"; (Corden & Neary, 1982, s. 841).

III.1.2. Model with Capital Mobile between Two Sectors.

This scenario addresses the effects, in the medium term, of the boom in the energy sector. In this scenario, the labor (i.e. the perfectly mobile factor) continues to be mobile between the three sectors: (i) the energy (or booming) sector, (ii) the manufactures (or lagging) sector, and (iii) the services sector. The difference with the former scenario resides in the fact that the capital (that stands for the specific factors) becomes also mobile but only between the manufacturing and the services sectors. The implication is that the sector relationships, in term of factor-intensities, now matters. More specifically, the resource movement effect and the spending effect will affect differently the sectors depending on whether it is the manufactures sector that is more or less capital-intensive than the booming and services sectors, or vice-versa. It is assumed that the manufactures sector is more capital intensive than the services sector. (Corden & Neary, 1982, s. 833). Appendix 2 is a support for a better understanding of this part.

III.1.2.A. *Effect of the boom on the output*

III.1.2.A.a. Energy sector output, X_E

The boom in the energy sector entails the resource movement effect that translates into the move of labor from the services then the manufacture sectors to the energy sector. The output of the energy sector is thereby adjusted upwards.

III.1.2.A.b. The output in "the two mobile capital sectors": X_M and X_S

.

Referring to "the Rybczynski theorem[8]" (Corden & Neary, 1982, s. 833), under the resource movement effect, the output of the capital-intensive sector will rise while the output of the labor-intensive sector will fall. As it is assumed that the manufactures sector is capital-intensive and the services sector labor-intensive, then the services sector will be the one to suffer more from the labor drained by the booming (energy) sector: $X_S \searrow$. The manufactures sector however will not experience de-industrialization but rather "pro-industrialization": $X_M \nearrow$ in the medium run; (Corden & Neary, 1982, ss. 833-34).

When then the spending effect takes place, the demand for services rises, which drives up the output in the services sector "and thus squeezes manufacturing output, irrespective of the relative factor-intensities of the two sectors". (Corden & Neary, 1982, s. 834).

III.1.2.B. *Effects of boom on the real wage rate.*

The resource movement that operates in the advantage of the booming sector drives the real wage up. This trend is then enhanced by the spending effect that also brings the relative price up; (Corden & Neary, 1982, s. 834).

III.1.2.C. *Effects of the boom on return to the specific factors in the three sectors.*

Recall that as mentioned in the first scenario, a common proxy for the measurement of the returns to the specific factors in the three sectors is "the profitability of each sector". Unlike the previous scenario where the concept of absolute profitability was used, this section resorts to the concept of relative profitability that matches best with a "somewhat longer time horizon" (Corden & Neary, 1982, s. 833). The relative profitability is the profitability of one sector

[8] See Appendix 2.2., for explanation.

relative to the profitability of another sector. As the capital is mobile between the manufactures and the services sector in this scenario, then it is simply assumed that the two sectors use the same specific factor (i.e., capital). Accordingly, there is one return to capital or return to specific factor (measured by the profitability) for the two sectors, r_{MS}, relative to the return-to-specific factor of the energy sector, r_E.

III.1.2.C.a. Effects of the boom on the profitability (i.e. the return to the specific factor) in the energy sector

The energy sector registers an increasing profitability: $r_E \nearrow$ as long as the boom lasts.

III.1.2.C.b. Effects of the boom on the profitability (i.e., the return to the specific factor) in the manufactures and services sectors

The profitability of the two sectors relative to the energy (booming) sector, r_{MS} , decreases first under the resource movement effect then a second time under the spending effect, when one assumes that the manufactures sector is more capital-intensive than the services sector. On the other hand, when the services sector is presumed more capital-intensive than the manufacturing sector, the common relative profitability, r_{MS}, first falls under the resource movement effect, then rises under the spending effect. More information is required in order to know which of the two effects dominates. The dynamic is summarized as follows; see Table 1, (Corden & Neary, 1982, s. 835):

Table 2. Resource Movement and Spending Effects When Capital is Mobile Between Manufacturing and Services.

	Resource movement effect	Spending effect
$k_M > k_S$	$X_S \downarrow, X_M \uparrow, p_S \uparrow \Rightarrow w \uparrow, r_{MS} \downarrow$	$X_S \uparrow, X_M \downarrow, p_S \uparrow \Rightarrow w \uparrow, r_{MS} \downarrow$
$k_M < k_S$	$X_S \uparrow, X_M \downarrow, p_S \downarrow \Rightarrow w \uparrow, r_{MS} \downarrow$	$X_S \uparrow, X_M \downarrow, p_S \uparrow \Rightarrow w \downarrow, r_{MS} \uparrow$

k_i : Capital-labor ratio in sector i. r_{MS} : Rental on capital used in manufacturing and services.

This second scenario depicts the mechanism of the boom effect in a medium run by allowing the mobility of the specific factor (i.e., the capital) between the services and manufactures sectors. The findings of this scenario are that some of the outcomes of the previous scenario would be reversible. This is the case, for instance, when one considers rather the concept relative profitability than absolute profitability, and whether the manufactures sector is more capital-intensive, so on so forth. In that case, the boom in the energy sector can even result in pro-industrialization.

III.1.3. The Model with Complete Capital Mobility.

This third scenario addresses the long-term effects of the boom in the energy sector, that is, why it allows the mobility of the two factors (i.e. capital and labor) among the three sectors. This scenario differs quite a lot from the two first. The basic premise here is that the manufactures sector would be more capital-intensive than the services sector but less capital intensive than the energy sector (Corden & Neary, 1982, s. 835).

III.1.3.A. *The effect of the boom on both (factors and commodities) prices*

The prices are just affected by the resource movement effect. The spending effect does not play any role here because the variation of prices is "independent of the magnitude of the income-elasticity of demand for services" (Corden & Neary, 1982, s. 836). The prices change through the dynamic of market mechanism. The main feature of this scenario regarding price change is that "the expansion of the relatively capital-intensive sector pushes down the real wage" and therefore a fall in the relative price of services (that is, a depreciation). This fall in the real wage will change the allocation of factor inputs by the "substitution of labor for capital" (Corden & Neary, 1982, s. 838).

III.1.3.A.a. The effect of the boom on factor prices.

To gain the insight into factor prices, Corden & Neary look at the factor-intensity between the energy sector and the manufactures sector. Thus, "real wages rise if and only if manufacturing is capital-intensive relative to the energy sector", in other words if $k_M > k_E$ (Corden & Neary, 1982, s. 837).

III.1.3.A.b. The effect of boom on the price of services.

To gain the insight into the price of services, Corden &Neary compare the factor-intensity between the manufactures sector and the services sector. "The price of services rises if and only if manufacturing […] capital-labor ratio is either greater than or less than that in both other sectors" that is if $k_M > k_E > k_S$ or if $k_M < k_S < k_E$; (Corden & Neary, 1982, s. 837).

III.1.3.B. *The effect of the boom on outputs.*

Unlike prices, the outputs in the three sectors are affected not only by the resource movement effect, but also by the spending effect.

III.1.3.B.a. In the manufactures sector.

The boom "raises the return of the factor used intensively by the energy sector relative to the manufacturing sector"; (Corden & Neary, 1982, s. 838). As it is presumed that the energy sector is more capital-intensive than the manufactures sector, the resource movement effect induces a drop in the manufactures sector, and consequently induces "direct de-industrialization"; (Corden & Neary, 1982, s. 838). This, indeed, happens if one assumes that the services sector does not change its production while the capital intensity dampens in the manufactures and the energy sector. This is one of six possible findings concerning this scenario.

III.1.3.B.b. In the services sector.

The output of the services sector rises on the one hand because of the fall of services relative price and on the other hand because of "national income rise" brought by the boom proceeds. All that has been said can be summarized in the following table:

Table 3: Effects of the Boom on Prices When Capital is Mobile between All Three Sectors.[9]

	$k_M > k_S$	$k_M < k_S$
$k_M > k_E$	$p_S \uparrow, w \uparrow$	$p_S \uparrow, w \uparrow$
$k_M < k_E$	$p_S \uparrow, w \downarrow$ *[10]	$p_S \uparrow, w \downarrow$

In bulk, Corden and Neary's model highlights how the boom in a sector of the economy can weaken other sectors and turn the benefits brought by the booming sector into the cause of economic slowdown. However, when considering the medium run – that is, when capital becomes mobile between the manufacturing and services sectors – Corden and Neary discover that the negative impacts of the resource movement and the spending effects are reversible (Corden & Neary, 1982, ss. 826-841). The government intervention through, for instance, investment in education and infrastructure or protectionism may help boost the competitiveness of the lagging (manufactures) sector so that the whole economy is not in crisis when the booming sector is in crisis. In a longer period, their findings are more complex since the hypotheses to take into account increase substantially. In addition, in the long run many others factors than the sole booming effect of the energy sector may affect the economic variables or cause economic structural changes.

Corden and Neary's model enables to explain the Dutch disease (DD) occurrence to a certain extent; that is, on the one hand the induced de-industrialization via the resource movement effect, and on the other hand, the relative price appreciation that can lead to the deficit of the balance sheets via the spending effect. However their model neglects the political aspect that plays a substantial role in the case of the Netherlands' Dutch disease namely, the management by the government of the wealth generated by the booming sector. Thus, according to Corden (1984) (in Jean-Philippe Stijns, 2002: 10), "the true DD in the Netherlands was not the adverse effects on manufacturing of real appreciation but rather the use of the booming sector revenues for social services levels which are not sustainable", and "which has been politically difficult to reduce". The Paradox of Plenty or the Dutch disease would, thus, take place when the wealth

[9] "Factor price equalization is an economic theory, by Paul A. Samuelson (1948), which states that the prices of identical factors of production, such as the wage rate, or the return to capital, will be equalized across countries as a result of international trade in commodities". (Oluwatosin, 2013).
[10] The case illustrated.

generated by the booming sector has been slackly let to inflow[i] the economy and has not been sufficiently saved.

The part that follows contains an empirical illustration of the Dutch disease through the Netherlands which underwent the Dutch disease owing to a boom in the energy (specifically the gas) sector. This case of the Netherlands experience of the Dutch disease will afterwards facilitate the determination of Norway situation. In other words, it will make it easier to find out where Norway stands as for Dutch disease, once the analysis of the Netherlands is done.

III.2. THE NETHERLANDS' EXPERIENCE OF THE DUTCH DISEASE

The Dutch disease occurs in the Netherlands in the 1970s, that is, during the period of the Keynesian deficit norms[11] that started around 1957 (the period of boom in the natural gas exploitation sector), and it tapers roughly around 1982 (see the Table below). In the same period (i.e. 1970–l980), the gas price (that mirrors the oil price) was increasing. Thus, the Dutch government used the Dutch gas-rent to cover the growing expenditures caused by the Dutch disease.

Table 4: Fiscal policy in the Netherlands since 1957: Official principles

1957-1979	**II. Keynesian deficit norms**
1957-1960	Anti-cyclical deficit norm.
1960-1979	Trend-based deficit norm to match the surplus of private saving.
1975-1979	Increase in tax burden maximised at 1% of national income per year.
1980 to the present day	**III. Norms for reducing deficit and debt**
1980-1982	A maximum actual deficit.
1983-1994	A time path approach for reducing the actual deficit.
1993-	European norms for actual deficit and debt.
1994-	Trend-based budgeting with expenditure ceilings and a focus on reducing government debt have been embedded since 2000 in a forward-looking view on public finance. Incentives and cost-benefit analysis become major official tools for controlling and managing public expenditure.

Before exploring the policies by the Dutch government, this section sets out the indexes that lead to the statement that the Netherlands have indeed experienced (through the resource movement effect and the spending effect) the Dutch disease.

[11] There are three main periods of fiscal policy reforms by the Dutch government: the balanced budget period (from 1814 to 1956), then Keynesian deficit norms period (from 1957 to 1979), and the norms for reducing deficit and debt period (since 1980).

III.2.1. The resource movement effect and the spending effect in the Netherlands.

III.2.1.A. *The mechanism of resource movement effect in the Netherlands.*

The resource movement effect that manifests by "the competition for factors of production" between sectors has not been very striking "in the Netherlands where the natural gas sector does not employ a large number of people". About this, "Kremers (1986) notes that the labor requirement of the gas industry in Holland has 'never put pressure on other sectors' (p. 101) in terms of increased wages", at least directly. In an indirect way, the Dutch gas industry seems to have attracted labor from other sectors if we consider the fact that the Dutch government resorted to "productivity tables from many sectors of the economy in establishing certain industry-wide wages". However, the adjustment of wages to the rise in productivity does not stay inside the gas sector only, but ripples to "the wages in the economy". Thus in the 1990s the manufacturing employment registered "82% of 1975 figures (International Financial Statistics Yearbook 1995)", which is certainly a slight drop; (Rudd, 1996). As a conclusion to this part, the direct de-industrialization that would have been caused by an upward bid of gas sector wage was minor in the Netherlands.

III.2.1.B. *The mechanism of spending effect in the Netherlands.*

The Dutch manufacturing sector was hardly hit by the indirect de-industrialization, that is, the loss of labor due to the appreciation of the Dutch currency (i.e. the Guilder) that deteriorated the competitiveness of the manufacturing sector. Indeed, "the price of gas used to be linked to the oil price" (Beetsma, Giuliodori, Walschot, & Wierts, 2012). Accordingly, the first oil shock of 1973 stretched the gas proceeds, the balance of payment surpluses, and certainly the inflow of foreign currencies, causing thereby the appreciation of the Dutch Guilder. The Dutch manufacturing output became more expensive relative to the world market price. This loss of the Dutch manufacturing sector competitiveness resulted in the reduction of its supply that led to labor cuts and hence an increase of unemployment. The latter, combined with inflation and high level of wages, brought stagnation to the Dutch economy. The stagnation turned to

stagflation[12] around 1975. The economic growth moved "from about 5% in the 1960s and early 1970s to an average of about 2% after 1975.

In sum, the spending effect weighed more than the resource movement effect during the Netherlands Dutch disease. However, a third factor – the management of the gas-rent by the government – played an important role in the Netherlands' Dutch disease. The subsequent section deals with the contribution of that factor which is rather political.

III.2.1.C. *The role of the Netherlands government expenditure in the Dutch disease experience.*

The government expenditures rised considerably as soon as the gas revenues began to accrue. In fact "a large portion of the revenue accrues to the government either through direct ownership of natural gas facilities or through a tax on private natural gas companies' earnings" (Rudd, 1996). In the years that followed the Second World War (around 1957), the government budget was included in the Dutch national accounts and the Dutch government undertook the Keynesian deficit norms. "The underlying principle was to better manage the national economy by the size of the government deficit" (Tanzi, 2008). The high but temporary revenues from the natural gas exploitation were used to relax the government budgetary constraints. For example, the Dutch public expenditure increased from "about 30% of GDP in 1950 to 60% in 1983" (Frits Bos, 2006a)"; from 1959 to the 1990s, the Dutch "nominal government expenditures have risen by over 3500% (International Financial Statistics Yearbook 1995)"; (Rudd, 1996). The following graphs and table summarize well the economic changes registered in the Netherlands since the revenues of the natural gas exploitation started to flow:

[12] Stagflation is a combination of inflation and stagnation (or immobilism that is a long period during which the growth of the GDP slows, falling under 2-3%, and the unemployment rises).

Table 5. Fiscal policy in the Netherlands since 1957: keys statistics (per cent of GDP.

	Public Debt	Public expenditure	Taxes and social security contributions	Other revenue	Public balance
1957	90	33	28	6	0
1973	42	45	39	7	1
1979	43	54	43	9	-2
1983	60	60	44	11	-5
1993	77	57	45	9	-3
2007	47	46	40	6	0

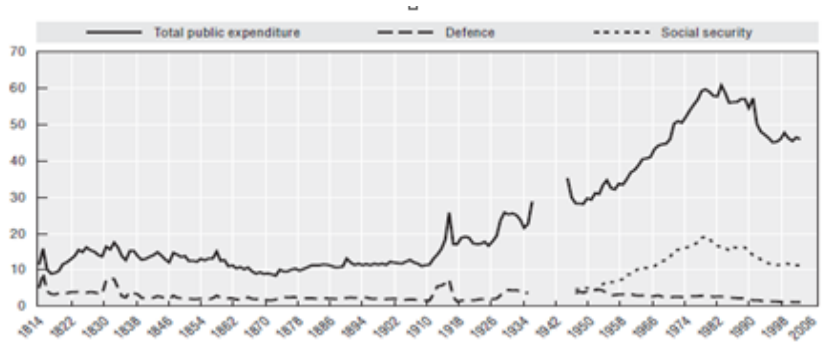


Figure 2.Dutch public expenditure as percentage of GDP since 1814.

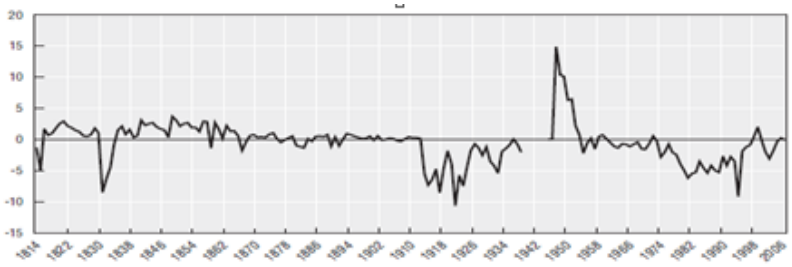


Figure 3. Government balance as a percentage of GDP since 1814.

.

From around 1957–1973, the Dutch public debt decreased probably thanks to the revenues of the natural gas exploitation and the increase in taxes and social security contributions. The period 1973–1993 was characterized by the increase in the Dutch public debt, in taxes and social security contributions and other revenues (1973–1983). In the whole period, that is, 1957–1993, the Dutch public expenditure has just been growing, from 33% to 57% of the GDP. In bulk the Keynesian deficit norms implied the use of the gas-rent in order to support the

conjuncture and to provide more welfare (social security) in the Netherlands. All this spotlights that the Dutch gas-rent has been allocated to abate the effects of the Dutch disease that is economic downturn. The period 1970s–1980s was challenging for "the Dutch government, due to the drastically increased size […] of Dutch public finance, unexpected economic setbacks and substantial fluctuations in natural gas revenues". The stagflation increased the public expenditure owing, for instance, "to unemployment benefits and government salaries, while tax revenues reduced". Thus the Dutch government budget, which was in excess or balanced since the flow of the gas-rent, started to record deficit (i.e., 3% of the GDP) since 1975. Overall, the retrospective look at the Dutch economy subsequent to the exploitation of natural gas reveals that the Dutch disease that occurred there was mainly favored by the way the gas-rent was allocated. In fact, when the booming sector began to slow down (as the gas price entered a declining path) from the 1980s, the government couldn't continue anymore with expansionist policy in order to lessen the increase of unemployment caused by the Dutch disease. Thus, the Dutch gas adventure turned to a curse, the Dutch disease.

III.2.2. The remedy against the Dutch disease.

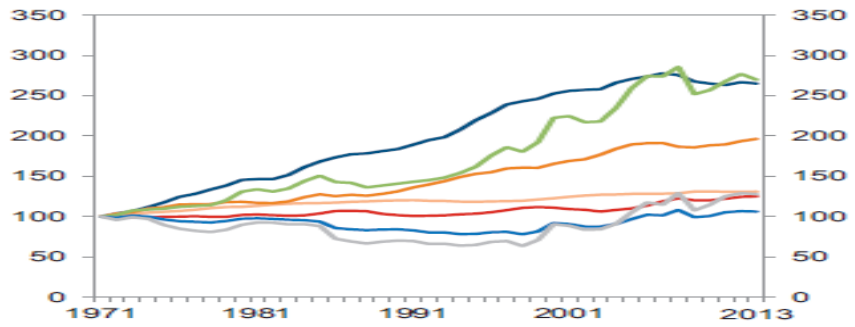
Later on, it became a necessity for the Dutch government to cut its expenditure in order to "improve the balance of payments position". The collaboration of the Dutch government with independent organizations such the Central Planning Bureau (CPB), Statistics Netherlands, the Netherlands Court of Audit, and the National advisory Group on Budgetary Principles brought about the adequate policy that led The Netherlands, since the 1980s, to economic recovery. For instance, "the introduction in 1994 of the trend-based budgeting[13] with expenditure ceilings from the whole term of government, and one decision-making moment a year, turned out to be effective solutions"; (Bos, 2008).

The presentation of the Netherlands experience of the Dutch disease, just done, enables us to easily check whether Norway has experienced some features of the Dutch disease. The attention is drawn at the evolution of some economic variables such as the labor force (or labor demand) in the oil industry relative to the other industries and services, the Norwegian currency value (inflation and exchange rate), the Norwegian balance sheet and balance of payment, government budget, and economic growth…

[13] Trend-based budgeting: See Appendix 4.

III.3. HAS NORWAY INCURRED THE DUTCH DISEASE?

As the case-study of the Netherlands economy has enabled to explain, the Dutch disease is an economic crisis that results not only from structural changes in the production due to the focus on a booming sector, but also from the excessive use of the booming sector revenues. Indeed when an economy relies mainly on a booming sector and the latter revenues are not run in a way that enables to cross out the adverse effects, situations like the one experienced by The Netherlands may occur. Norway records a boom in its petroleum sector since the early 1970s. This section audits whether Norway has showed any symptoms of the Dutch disease since the oil-rent started to flow. The analysis is proceeded by the observation of the evolution of the GDP, the total factor productivity- TFP, the changes in labor per sector (for the resource movement effect), the wage rate and domestic price (for the spending effect). Appendix 10 provides main economic statistics on Norway for more information.



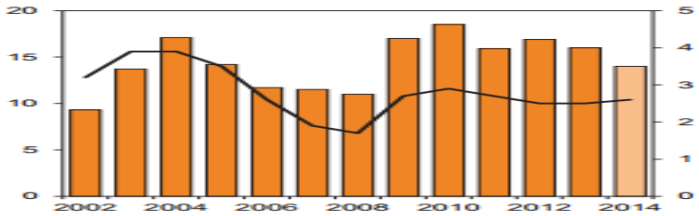
Legend: **Gross product, all industries**; **Real disposable income**; **Total factor productivity, market-oriented mainland industries**; **Contribution of capital intensity**; **Hours worked in all**; **Production price in terms of price in domestic markets**; **Export price in all, in relation to the import price**.

Figure 4. Growth in real disposable income, gross product, and man-hours in all per capita, as well as terms of trade gains and total factor productivity and capital per hour worked in the market- oriented mainland industries. Index 1971 = 100.[14]

Figure 4 provides some economic key variables whom evolution since the start of oil exploitation does not suggest any obvious feature of the Dutch disease: the gross product, the

[14] Source: Statistics Norway. (Statens Forvaltningstjeneste, NOU 2015: 1 Produktivitet – grunnlag for vekst og velferd, 2015, s. 83).

real disposable income, the total factor productivity all display a steady increasing trend (with a slight fall in 2008s) since 1971. The price in what we can refer to as non-exposed or non-tradable sector has been held almost constant over the considered period. In addition, as shows the following figure 7, unemployment in Norway is among the lowest of the OECD countries.

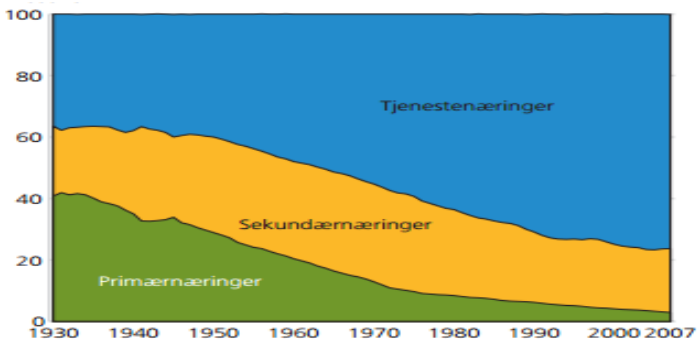


Legend: **Measures for jobseekers (left axis)**; **registered unemployment (right axis).**

Figure 5. Measures for job seekers and unemployment. 1000 people and percent; (Finansdepartement D. K., 2013-2014, s. 103).

III.3.1. The resource movement effect and direct de-industrialization.

The following figure displays the evolution of labor in the primary, secondary and tertiary sectors in Norway since 1930. To investigate the occurrence of resource movement effect, we resort to the following fig. 6 that displays the move of labor over the period 1970-2007. Referring to Corden & Neary model, the primary sector can be considered the lagging tradable sector, the secondary sector can be assumed the booming tradable sector as it include the Norwegian energy sector, and the tertiary sector the services (non-tradable) sector.



Legend: **Primærnæringer = Primary industries (agriculture, forestry, fishing and aquaculture)**; **Sekundærnæringer = Secondary industries (oil production, mining, manufacturing, construction and gas and water supply)**; **Tjenesteytenæringer = Services industries**.

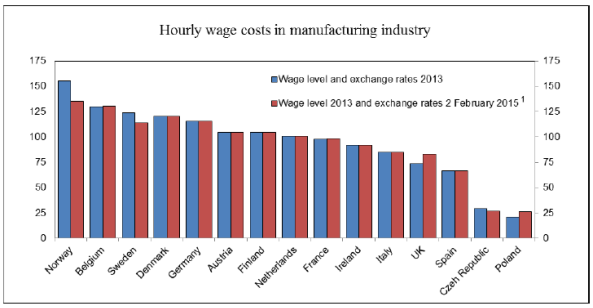
Figure 6. Employees in industry groups. 1930-2007; (Hansen & Skoglund, 2008, s. 44).

Since the 1970s, one cannot assert that the secondary sector that includes the oil industry has absorbed a substantial part of labor from the primary lagging sector. In fact, the primary sector starts losing labor since the 1935s and the fall becomes quite steeper in the period 1945s-1970. The fall in the labor from the primary sector (though it continues) has rather slowed down since the start of oil exploitation in the 1970s. Thus the boom in the oil industry (or more generally in the secondary sector) has not generated an obvious direct deindustrialization, as the share of labor in the secondary sector has rather slightly decreased after the 1970s. However, this fig. 6 displays some features of indirect deindustrialization: indeed, the tertiary is the sector that has been benefiting from the fall in labor from the primary lagging sector and the secondary booming sector, since the boom of the 1970s in the Norwegian energy sector. This explains by the spending effect that is the object of the subsequent subsection.

III.3.2. The monitored spending effect and indirect de-industrialization.

As observed in the previous subsection, the boom in secondary sector (the proxy of the booming sector) has not really distorted the Norwegian sectorial structure. In other words, the direct-deindustrialization has been negligible in Norway due to a very weak noticed resource movement effect. This subsection pursuits the analysis by investigating this time the spending effect.

The analysis of the wage rate level in Norway can be used as an indicator for the spending effect, hence the following figure.



[15]

Figure 7. Hourly wage costs in manufacturing industry. Norway relative to our EU20 trading partners. Common currency. 2013. Trading partners = 100[16].

Figure 7 provides a comparison of the Norwegian hourly wage costs to some European countries. Thus Norway has the highest hourly wage rate, which can be interpreted as an externality of natural resource (including oil-rent). Though this fig.7 is just for 2013, the Norwegian position regarding wage level is not something that happened suddenly but is to link to the inflow of oil revenues that dates back to 1970s. High wages incontestably play a great role in setting off the spending effect. This spending effect is certainly behind the slight indirect-deindustrialization noticed in the previous figure (fig. 6), where a share of labour from the primary and the secondary sector has been channelled into the tertiary sector. Thus, this indirect deindustrialization has not brought high unemployment in Norway, but has enhanced the size of labor in the tertiary sector. Indeed the growth of labor in the tertiary sector (that assumedly stands for the services sector) since the start of oil exploitation in Norway is attributable to the increase of output from tertiary sector, which is driven by the increase in demand for tertiary goods. This increase in the demand for tertiary goods comes from the inflow of oil revenues that spreads, among others, to wages that raises the purchasing power of Norwegian citizens:

$$\text{Wage}_{\text{Secondary Sector}} \Rightarrow\uparrow \text{PurchasingPower} \Rightarrow\uparrow \text{Demand}_{\text{Tertiary Goods}} \Rightarrow\uparrow \text{Labor}_{\text{Tertiary Sector.}} \cdot$$

It is worth emphasizing that this indirect de-industrialization is quite modest probably due to a moderate spending effect. Indeed, though the Norwegian wage rate is certainly among the highest of the OECD countries, Norway is among the OECD countries that have the highest

[15] Using exchange rates from 2 February 2015, with the wage level in national currency in 2013 remaining fixed. Sources: The Norwegian Technical Calculation Committee for Wage Settlements and the Ministry of Finance. (Statens Forvaltningstjeneste, NOU 2015: 1 Productivity – Underpinning Growth and Welfare, 2015, s. 6).

[16] Source: (Statens Forvaltningstjeneste, NOU 2015: 1 Produktivitet – grunnlag for vekst og velferd, 2015, s. 55).

levels of tax with a reasonable government expenditure relative to the national wealth. Thus, the spending effect is somehow quite closely monitored in Norway via high tax and reasonable provision of social welfare services. The oil-rent of for its great part blocked in a sovereign fund, the GPFG.

Norway has seemingly managed to avoid most of the obvious features of the Dutch disease thanks to a neutralization of its oil-rent. The direct deindustrialization has been negligible due to an insignificant resource movement effect and the indirect deindustrialization slight due to a mastered spending effect.

III.3.3. The monitored exchange rate of the Norwegian currency.

The increase of demand for tertiary goods has an additional outcome that is the rise of price of tertiary goods so that the supply of tertiary goods adjusts to this large demand for tertiary goods. Referring to Corden & Neary model (in Chapter 3), by assumption, the tertiary sector is the protected sector (and thus the price of output from the tertiary represents the Norwegian domestic currency) while the primary and secondary represent by hypothesis the tradable or internationally exposed sectors (and thus the prices of their outputs denotes foreign currencies).Then the relative price of tertiary output to the price of output from the (aggregated) tradable sectors corresponds to the exchange rate of the Norwegian currency (the Norwegian Crown- NOK):

$$\text{Exchange Rate}_{NOK} = \frac{\text{Price}_{\text{Tertiary Sector}}}{\text{Price}_{\text{Tradable Sector}}}$$

$$\uparrow \text{Demand}_{\text{Tertiary Goods}} \Rightarrow \frac{\uparrow \text{Price}_{\text{Tertiary Sector}}}{\text{Price}_{\text{Tradable Sector}}} \Rightarrow \uparrow \text{Exchange Rate}_{NOK} \Leftrightarrow \text{Currency Appreciation}$$

The neutralization of the oil revenues in the sovereign pension fund (i.e. the GPFG), maintains the purchasing power of the present generation of Norwegian citizens in a quite lower level than what it would have been if the oil revenues would have been let to freely inflow inside the Norwegian economy. This brakes the demand for goods from the tertiary sector and as a result

keeps the value of the Norwegian Crown (i.e. the currency) in a reasonably low level, which is observable in the following figure.

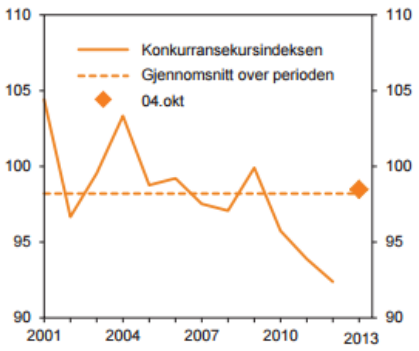


Figure 8. Norwegian Crown exchange rate index. 1990 = 100. Higher number means weaker krone; (Finansdepartement D. K., 2013-2014, s. 30).

Figure 8 shows how the value of the Norwegian currency has from 2001 until 2008 been kept in a somehow low level considering the size of the oil proceeds. Though the figure exhibits an appreciation from 2008s, 2015's first semester has registered a fall in Norwegian Crown value. All this supports the argument that keeping the oil-rent abroad enables to prevent the appreciation of the Norwegian currency, which preserves the competitiveness of the tradable (primary and secondary sector). However, the volatility noticed in the evolution of the Crown exchange rate may reveal the persistence of the Dutch disease threat. In fact withdrawing the oil revenues from the sovereign fund where they are kept, in order to finance for instance the government budget has the same effect as the inflow of foreign currencies from the export of oil, into the Norwegian economy: this effect is the Norwegian currency appreciation. It follows that the Norwegian oil-rent cannot be freely allocated.

To conclude on this section, the Norwegian economy has escaped the resource movement effects due to the original structure of its sectors. The real threat that has hang and still hangs on Norway is the spending effects that constitute a constraint for the allocation of the Norwegian oil-rent. This may be the incentive behind the choice of the current method of oil-rent allocation (i.e. the Fiscal rule) that prescribes the isolation of a great part of the oil proceeds out of the Norwegian economy.

The Chapter 5 presents some consequences of the allocation of the Norwegian oil-rent that is bound by the threat of the Dutch disease. But before, that the subsequent chapter (i.e. Chapter 4) clarifies the scope of this work, which expands over the boundaries of the mainstream economics and reaches the domain of political economy. The first reason is as seen in the

previous chapter: the Dutch disease issue has both an economic dimension and a political dimension. The second reason is that, as it will be presented in the subsequent part, the Norwegian oil-rent is redistributed mostly through the social welfare programs. Addressing this aspect requires a resort to welfare economics that also relates to political economy.

Chapter IV.THE INTERCONNECTION OF THE ECONOMIC, POLITICAL AND SOCIAL AREAS REGARDING THE REDISTRIBUTION OF THE NORWEGIAN OIL-RENT.

This chapter explains why the case study of the allocation of the Norwegian oil-rent cannot be tackled only through a purely economic perspective but by taking into account the political (and more precisely democratic) and legal aspects. Thereby this work is an inquiry in the realm of *political economy* and as such, it resorts somehow to moral philosophy since political economy[17] also derives from moral philosophy. When the political aspects are included in the analysis, the term Dutch disease becomes problematic but more realistic. In the case of The Netherlands for instance, the Dutch voters and politicians willingly chose to spend more of the gas revenues and by doing so freely took some long-term risks for present benefits. More precisely the allocation of the natural gas proceeds by the Dutch authorities promoted the welfare of the citizens through the increase of social services in the short run. However, in the end that allocation choice of the gas-rent turned out later to entail stagflation beyond the one experienced by other European countries in the same period. Indeed, they expressed their true preferences, even though it brought about economic slowdown. The political system, so speaking, took risk with the economic system that incurred negative consequences in terms of stagflation and currency appreciation. By calling this a disease seems to indicate that there was something wrong with the voters, the politicians, or the Dutch democracy. Indeed, the term disease comes from the perspective of the premise of the economic system but in Europe, we surely have with a wide limit the premise of the political system. The Dutch experience could occur in Norway, where the oil-rent could be sold by politicians to the voters and generate an economic gloom. In fact, the politicians could be tempted to sell the oil-rent benefits because their programs should reflect voters' expectations in order to stay in office. But what is shown in the next is rather the politicians' restraint to allocate more oil-rent to the welfare of present generation of Norwegian citizens. All these cases show the nexus between decisions taken politically and their effects on the economic structure.

The issues associated with the Norwegian oil-rent allocation, just as many contemporary and persistent economic challenges registered worldwide, show the limit of analyses that rely on fragmented social sciences and thereby call for "complexity science" that "produces a unified

[17] The political economy is an interdisciplinary approach of studying economic behavior that enhances the mainstream perspective with political sciences, social sciences and so forth.

field of analysis". Regrettably no such analysis exists we seem to be condemned to live in a various silo as a result of the division of labour and social sciences; (Tett, 2015). Recalling the origin of the term Dutch disease that applies to the Dutch case, though, it addresses mostly economic problems, several aspects are of political nature. In fact, the Dutch disease can be summarized as socio-economic consequences of "irrational" economic decisions taken politically. Through this work, we saw how the allocation of the Norwegian oil-rent requires considering at the same time the oil industry (in order to understand how the oil revenues get to the government via the tax institution), the sovereign fund (where it is saved via a global investment), the Fiscal Rule (that is the guideline of the allocation), and considering the government budget (that is the channel by which the oil-rent reaches the citizens). Analysing the allocation of the Norwegian oil-rent only from a purely economic point of view "as traditionally happens in divided social science disciplines, hinders the understanding of the" associated issues that involve "finance, the economy, the welfare and politics"; (Walby, 2015). This chapter explains why the topic of this work is not an issue of economics alone as it touches almost all the spheres of the social system. Thus, my interest for the Dutch disease issue is not only the analysis of the paradox of plenty, but above all the fact that the Dutch disease issue is a rare topic that explicitly requires an analysis that does not isolate the economics from the politics. Accordingly, the topic of this work relaxes the ontological premise in economics that assumes the possibility of an isolated economic system in our social reality.

As claimed by Aristotle, the social reality like any reality is made of structures and stuffs: Reality = Stuffs + Structures (Holt, 2013). In order to avoid a complicated analysis, the social reality I have chosen to present is made of a set of stuffs and three main structures (the political, the economic and the legal structure).

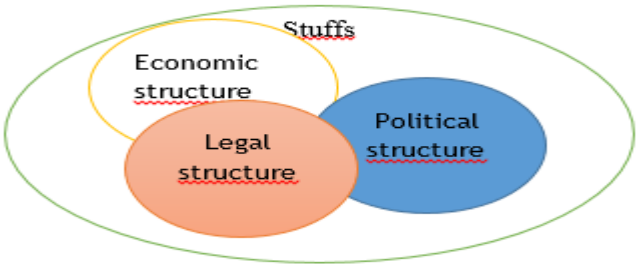


Figure 9. Simplified social reality.

The biggest (green) circle represents the social reality with the three structures just mentioned. The white space between the three structures and the green circle represents the set of stuffs.

The economic structure can be accounted for as the institution of mutually beneficial exchange with money as the neutral means of exchange. As for *the political structure*, it is the institution of the government budget characterized in bulk by the decisions regarding the issue of "who gets what when and how" (Lasswell, 1936). Eventually, *the legal structure* loosely defines rules for the exchange system (i.e., the economic structure) and the political structure. The obvious and striking fact with this simplified social reality is that the three structures are not isolated from each other but rather overlap.

Each of the three structures can by itself, without any doubt, be regarded at as a reality of its own, which is what happens in politics, economics, or specific social sciences. Thus to isolate the economic structure from the others, economics greatly relies on the *ceteris paribus*[18] assumption famous in scientific inquiries. "Economics is the study of how men and society chose, with or without the use of money could even think to employ scarce productive resource which could have alternative uses, to produce various commodities over time and distribute them for consumption, now and in the future among various people and groups of society"; (Samuelson, 2002). Applying the *ceteris paribus* assumption would consist in analysing the allocation of the Norwegian oil-rent from a purely economic point of view and setting as starting hypothesis that the Norwegian political and legal structures remain untouched. Such a reasoning is mostly found in the mainstream economics. Although a reasoning as the one in the mainstream economics can certainly allow the design of sophisticated and elevated economic models, the latter would be useless, as they will poorly connect to the reality (Finne, 2014). In fact, such a narrow perspective would fail to catch the political and legal dimensions that are not the least issues when it comes to the Norwegian oil revenues allocation. In other words, the consideration of these political and legal dimensions will provide a more realistic and therefore consistent analysis. Reasoning like a mainstream economist would imply for instance to focus on the efficiency of using the oil money less as it keeps the Dutch disease away from Norway, ignoring the political motives and consequences of such decision. However the perspective adopted in this analysis prevent the silo effect and therefore addresses the fact that there are other (possibly more serious) issues than economic efficiency related to the allocation of the Norwegian oil-rent. This is developed in the subsequent chapter.

[18] The *ceteris paribus* assumption is the assumption that consists of holding all other variables constant when analyzing the relationship between some variables.

Chapter V.THE FISCAL RULE: UNDERLYING CRITERIA AND ASSOCIATED OPPORTUNITY COSTS.

The second chapter of this work describes what the Norwegian oil-rent is made up of and how it has been transferred into the Government Pension Fund Global – GPFG (*SPU* in Norwegian), where it is managed. The third chapter explains one of the incentives for the transfer of the oil revenues into the GPFG, namely the fear to incur the Dutch disease. The oil-rent is however not completely blocked in the GPFG but also allocated to the Norwegian citizens in a strictly monitored way via a guideline called the Budgetary Rule or the Fiscal Rule (*Handlingsregelen* in Norwegian). The current, fifth, chapter explains and illustrates via some examples how the Fiscal Rule works. Thus the first part of this chapter presents the underlying criteria selected for the Fiscal Rule (i.e., the allocation method of the oil-rent). The second part, then, highlights some empirical shortcoming outcomes of the allocation method chosen for the Norwegian oil-rent that represents the Fiscal Rule.

V.1. THE CRITERIA FOR THE ALLOCATION OF THE OIL-RENT DEFINED IN THE FISCAL RULE.

The GPFG is a sovereign fund, and as such it generates returns. As the GPFG grew, a Budgetary Rule (or Fiscal Rule) regulating the management of the oil revenues was established in 2001. That Fiscal Rule (*Handlingsregelen* in Norwegian) is the allocation method chosen by the Norwegian representatives for the allocation of the oil-rent. Methods of resource allocation are designed after criteria that reflect society values. These criteria are what, in economics, are referred to as preferences. In the case of the Norwegian oil-rent, the criteria chosen for the allocation method would stand for the *preferences* of the Norwegian citizens or different groups of Norwegian stakeholders. In fact these preferences correspond to "values" that are hopefully shared by most Norwegian citizens and, when used by Norwegian representatives to justify the chosen allocation method (i.e. the Fiscal Rule) for the oil-rent, will "preserve the moral foundations of social collaboration" (Calabresi & Bobbitt, 1978, s. 18). The Budgetary Rule relies on two main arguments; namely the productivity growth argument (*produktivitetsvektsargumentet* in Norwegian) and the savings- or distribution argument (*spare- eller fordelingsargumentet* in Norwegian). The analysis of these two arguments give an overview of the criteria selected in the allocation method decided for the Norwegian oil-rent. The subsequent subsections present these criteria.

V.1.1. The criterion of productivity

In the Budgetary Rule, the *productivity growth argument* prescribes the allocation of the oil-rent in a manner that will not adversely affect productivity in the different sectors of the Norwegian economy, and therefore in a manner that will preserve economic growth. *Productivity* is defined as the ratio between production (i.e. output) and use of inputs (or total factor input)[19]. *Productivity growth* is therefore observed when output grows faster than the total factor input. Put differently, productivity growth is the growth of output that is not attributable to the total factor input. There are many concepts of productivity that are used in different contexts. For instance, studies of the path for productivity gains can be based on labor productivity, while analyses of sources of economic growth require total factor productivity – TFP (or multi-factor productivity) that takes into account several additional inputs than only labor. The productivity concept addressed in the productivity growth argument of the Norwegian Budgetary Rule (*Handlingsregelen* in Norwegian) is the total factor productivity, which includes labor factor among the other factor inputs. Correspondingly, the productivity concept in the framework of this paper is actually the one used when analysing the sources of economic growth and it encompasses labor productivity (Statens Forvaltningstjeneste, 2015, s. 86).

A broad range of factors drive productivity growth namely investments in physical capital, human capital, innovation, "competition in and regulation of domestic markets, as well as the degree of internationalization of the economy". This shows that productivity growth is in fact a global process where different countries in different ways contribute to or benefit from the development of the source of global technology. For a small economy like Norway, the ability to adopt "forefront technology developed abroad" and to undertake structural restructuration (that promotes "high-productivity activities" at the expense of "low-productivity" activities) "is of decisive importance to productivity growth". (Statens Forvaltningstjeneste, 2015, ss. 14-44).

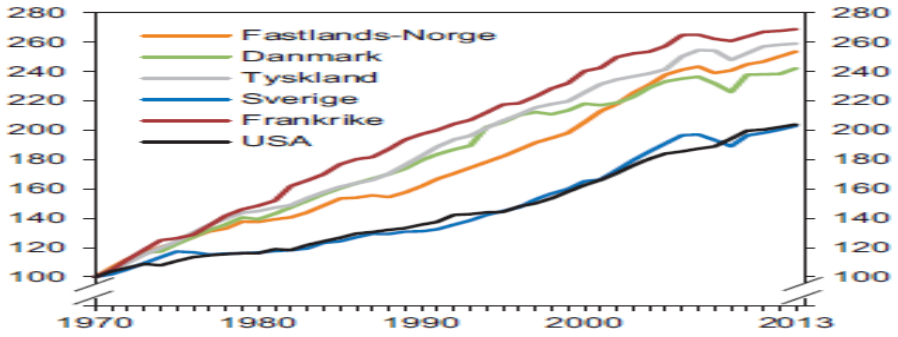
[19] $\text{Productivity} = \frac{\text{Output}}{\text{Input}}$, generally $\text{Input} \Leftrightarrow \text{Labor} \,\&\, \text{Capital}$

The table that follows shows the move of the total factor productivity in Norway since 1970s.

Table 6. Productivity growth. Percentage change from previous year[20].

	Yearly average					
	1971-1980	1981-1990	1991-2013	1971-2013	2014	2015
Labor productivity						
Mainland Norway	3.2	1.6	2.0	2.2	0.9	0.9
Mainland private industries[2]	2.9	1.7	2.2	2.2	0.7	1.0
Total factor productivity (TFP)						
Mainland Norway	2.1	0.8	1.7	1.6	0.7	0.6
Mainland private industries[2]	2.1	1.0	1.8	1.7	0.8	1.0

The aftermath graph complements the table by presenting the position of Mainland-Norway in term of labor productivity, in comparison to those of Denmark, Germany, Sweden, France, and the USA.



Translation:**Mainland Norway** (Fastlands-Norge); **Denmark** (Danmark).
Germany (Tyskland); **Sweden** (Swerige);**France** (Frankrike); **USA** (USA).

Figure 10. Growth of labor productivity since 1970. Index. 1970 = 100; Sources: OECD and Statistics Norway (Solberg & Finansdepartementet, 2014, s. 104).

[20] **1** Labour productivity is defined as value added per hour worked, while total factor productivity is defined as the portion of the change in the gross product which cannot be attributed to changes in the use of labor and capital formation. (Solberg & Finansdepartementet, 2014, s. 182). **2** Private industries in mainland Norway excluding housing, primary and electricity.
Source: Statistics Norway and Ministry of Finance.

Two aspects are put forward in the table. First, labor productivity appears to weight the most among the components of the Norwegian total factor productivity since the 1970s. The second point is that Mainland-Norway private industries contribute the most to the growth of total factor productivity since the start of Norwegian oil exploitation in the 1970s; (Statens Forvaltningstjeneste, 2015, ss. 14-16) & (Statens Forvaltningstjeneste, 2015, s. 23).

The criterion of productivity growth, obviously mentioned in the Fiscal Rule, belongs to the more general (and therefore quite abstract) *criterion of efficiency* (Calabresi & Bobbitt, 1978) frequently used when proceeding to resources allocation. The concept of economic efficiency corresponds to the outcome of an action or a policy whom benefits (or profits) exceed costs (or losses). Efficiency can thus be considered one of the criteria for the allocation of the Norwegian oil-rent insofar as the application of the *productivity growth argument* aims at sustaining the benefits and reducing the actions that entail losses. As the Dutch disease intensifies loses, a method of Norwegian oil-rent allocation that hinders the Dutch disease can be considered as productivity growth friendly, hence efficient. Accordingly, the efficiency criterion is applied through the *productivity growth argument* that prescribes the allocation of the oil-rent to social welfare on the one hand, and the allocation of the oil-rent to the drivers of productivity, on the other hand. The Fiscal Rule prescribes the use of an amount (i.e. up to 4%) of expected the return to investment on the (sovereign) oil fund. This method of allocation of the oil-rent (i.e. the Fiscal Rule) dampens the adverse fallouts of the Dutch disease spending effect. For this reason, efficiency is via the productivity growth argument, one of the Fiscal Rule criteria. In this work, I consequently assume that a productivity growth-oriented resource allocation method can be more generally named an efficiency-oriented resource allocation method. That is why for simplicity reason and because I resort to Calabresi & Bobbitt writings on resource allocation and tragic choices, I just call the criterion of productivity growth, the *criterion of efficiency*. An efficient method of Norwegian oil-rent allocation should thus provide social welfare without skipping the drivers of productivity growth cited above. The case-study of the Netherlands experience of the Dutch disease reveals the imbalance in the allocation of the gas-rent between the social welfare and the investment for the promotion of productivity growth. As mentioned in the second part of chapter four, the inflow of gas revenues has caused the appreciation of the Dutch Guilder and the loss of competitiveness in the other tradable sectors of the Dutch economy. As a result, the Dutch government transferred more gas-rent to social programs (such as unemployment benefits) in order to solve social consequences of economic slowdown, instead of investing in productivity growth drivers. Stagflation, eventually, took

over when the gas revenues began to go down. All this emphasizes and explains the relevance of the productivity growth criterion (or efficiency criterion) in the allocation method chosen for the Norwegian oil-rent (i.e. the Fiscal Rule). Norway, aware of Dutch experience, selected productivity growth (and more generally efficiency) as one of the criteria assumed to guide the redistribution method for the oil-rent. The next section presents the second criterion considered in the Fiscal Rule.

V.1.2. The criterion of equality

A fundamental issue that arises when faced with the challenge of allotting a scarce resource is the concern for justice (called equity or equality in the scope of this paper, taking the two to be synonymous). The political economy has borrowed from the Theory of Justice two dominant approaches for an equitable allocation of resources. These approaches are the *additive-welfare approach* and the *Rawlsian "max-min"* approach (Solow, 1974). *The additive-welfare approach* (also called the sum-of-utilities criterion) relies on an interpersonal "cardinal utility function $U_i(c_i)$, where c_i is the consumption of the i th individual". An equitable or just resource allocation in this theory is the one that maximizes the sum of all these interpersonal "cardinal utility function". That is: $Max\left[\sum_i U_i(c_i)\right]$, where c_i "are constrained by technology, initial resources, and informational and other difficulties in transferring goods among individuals" (Arrow, 1973). A weakness of the *additive-welfare approach* lies in the fact that it fails to reduce inequality and therefore can lead to an inequity allocation, hence the consideration of the Rawlsian approach.

In the *Rawlsian max-min approach*, an equitable or just resource allocation is the one that maximizes the utility of the "least well-off member of the society", which is equally function of c_i , the consumption as previously constrained by "technology, initial resources, and informational and other difficulties in transferring goods among individuals" (Arrow, 1973). That is: $Max\left[\min_i U_i(c_i)\right]$. This approach seems to satisfy more the need of an equitable resource allocation and more especially in the case of common resources like the Norwegian oil-rent.

An additional issue is the time dimension. Specifically the issue of fairness in resource allocation can concern on the one hand individuals of the same generation (i.e., intragenerational equity), and on the other hand it can concern individuals of a generation relative to individuals of other generations, generally future generations, (i.e., intergenerational equity). Thus this part explains how, via its *savings- or distribution argument (*in Norwegian *Spare- eller fordelingsargumentet),* the Budgetary Rule (*Handlingsregelen* in Norwegian) reveals a certain willingness for *intragenerational equity* and *intergenerational equity* regarding the allocation of the Norwegian oil-rent. This said, there are two level of equality concern expressed in the Fiscal Rule that are successively presented in the following subsections.

V.1.2.A. *Equality among the present generation of citizens.*

The Norwegian oil-rent is allocated to the present generation of citizens via the Government budget. Indeed, a purpose of the Budgetary Rule[21] (made of the *productivity growth argument* and the *savings- or distribution argument*) is, among others, to equalize the welfare of the Norwegian citizens, by financing (by up to 4% of the return to the oil fund investment) the government budget deficit. The two following tables provide an insight into how the Norwegian oil-rent is "indirectly" redistributed via the different accounts of the government budget. "Indirectly" in the sense that it is the deficit of the government budget that is financed by the oil fund (i.e., the Government Pension Fund Global).The first table depicts the main accounts of 2013 Norwegian government budget, while the second table details the account "Transfers to private citizens" of the first table.

Table 7. The spending in the Norwegian government 2013's budget.

	Budget 2013	% of Total
Operating costs	157 822	14.8%
Investments	62 548	5.9%
Transfers to other state budgets	44 930	4.2%
Transfers to local and regional governments	188 139	17.7%
Transfers to private citizens	611 430	57.4%
Total expenditure excluding loan transactions and Government Pension Fund Global (GPFG).	**1 064 869**	**100.0%**

[21] Budgetary Rule or Fiscal Rule

22

Amounts in NOK million	Bud. 2013	% of Tot. Private	% of Grand tot.	% of the Tot. Social Security
Social Security, sick leave	37 660	6,2%	3,5%	10,2%
Social Security, pensions	162 208	26,5%	15,2%	44,0%
Social Security, other purpose	113 958	18,6%	10,7%	30,9%
Social Security, health services	25 086	4,1%	2,4%	6,8%
Social Security, employment related	12 070	2,0%	1,1%	3,3%
Social Security, contributions to parents	18 063	3,0%	1,7%	4,9%
Other pensions	3 111	0,5%	0,3%	
Regional health service institutions	111 951	18,3%	10,5%	
Allowance for children support	14 985	2,5%	1,4%	
Cash allowance	878	0,1%	0,1%	
Agriculture deal	12 774	2,1%	1,2%	
Development aid	26 312	4,3%	2,5%	
Cultural purposes	6 586	1,1%	0,6%	
Employment measures	8 961	1,5%	0,8%	
Education support	5 247	0,9%	0,5%	
Research	4 451	0,7%	0,4%	
Home, living environment and buildings	4 115	0,7%	0,4%	
Private schools and higher education	5 191	0,8%	0,5%	
Costs of transport services	4 893	0,8%	0.5%	
EEA finance agreements	1 897	0,3%	0,2%	
Interest, domestic government debt	12 800	2,1%	1,2%	
Other transfers	18 233	3,0%	1,7%	
Sum transfers to private	**611 430**	**100%**	57,4%	
Grand total structural non-oil budget	**1 064 869**		**100%**	**100%**
Total Social Security costs	**369 045**	**60,4%**	**34,7%**	

This second table is mostly made of components that are addressed in bulk as social welfare in this paper and whose consumption provides the utility of the least well-off [i.e. $\min_i U_i(c_i)$] that is maximized in the Rawlsian max-min approach: $Max\left[\min_i U_i(c_i)\right]$. Norway is, a propos, globally recognized as one of the most "egalitarian society". The equality in question here is not the willingness to have all the citizens acquire the same social and economic position, but the willingness to provide equal chances to the less favoured in the society. This shows that

[22] Source: regjeringen.no, EcPoFi (Willems, 2013).

http://www.ecpofi.com/2012/10/norwegian-government-budget-2013.html#.VeQOLvntmko

the essence of the social welfare is to reduce inequality by providing 'equal chances' to the citizens poorly endowed by the state of affairs. In this respect, the allocation method for the oil-rent (that is, the Norwegian Budgetary Rule) abides more to the Rawlsian max-min approach than to the "additive-welfare approach".

In conclusion, this part explains, through the Rawlsian max-min approach, how the Budgetary Rule, which is the method of allocation for the oil-rent, is, among others, based on the criterion of equity among the present generation of citizens. The next part completes this part with, this time, the criterion of equality between the current and the future generation of citizens.

V.1.2.B. *Intergenerational equity or equality between the present and the future generation of citizens.*

The *savings- or distribution argument (*in Norwegian *Spare- eller fordelingsargumentet)* of the Budgetary Rule[23] prescribes the use of the oil-rent in a way that considers, in addition to the welfare of the present generation, the welfare of the future generation of citizens. This implies that the future generation of citizens should benefit also from the oil-rent even when the oil reserves are exhausted. Thus, unlike the allocation of the Norwegian oil-rent to the present generation of citizens that goes through the government budget, the allocation between the current and the future generation of citizens goes through the GPFG (that is the Norwegian sovereign oil fund). In fact, the intergenerational equity is only implementable through *"productive" resources* (Arrow, 1973, s. 324). About this, the GPFG – being a sovereign fund – is a productive resource. "In a model with exhaustible resources, Solow [1974] has interpreted intergenerational equity to mean equal consumption per capita at each date" (Dasgupta & Mitra, 1983). Productive resource is essential when seeking for intergenerational equity in resource allocation insofar as it is the only way to ensure the constancy of "the time path of current output and current consumption per head" (Hartwick, 1977, s. 972). Such state is referred to as an "*efficient equitable path*" (Dasgupta & Mitra, 1983, s. 133). None of the models analyzed by these economists considers sovereign funds as the productive resources mentioned but investment in "machines" for instance. This points to the fact that the findings of these models are more or less different from their implementation to the case of Norway, where the oil-rent has been converted into a sovereign fund. For the moment, this part does not discuss whether the Budgetary Rule has led the Norwegian economy to the "efficient equitable path", which

[23] Budgetary Rule or Fiscal Rule.

will be addressed later. The aim of this part is solely to highlight that the Budgetary Rule reveals a willingness for intergenerational equity and how the economic literature describes the mechanism that permits to reach intergenerational equity. The section that comes next deals with the third underlying criterion in the Fiscal Rule.

V.1.3. The criterion of honesty

Honesty is the more latent but far from the least important criterion when proceeding to the allocation of scarce resources. In political economy, honesty is expressed through *transparency*, that is, the release of "timely and reliable economic, social and political information accessible to all relevant stakeholders" (Bellver & Kaufmann (2005) in (Kolstad & Wiig, 2009)). By "holding out the promise of efficiency while building credibility, trust and collaboration, transparency has become a popular leadership style". Accordingly, "transparency has been adopted as a policy and potent management tool in public and private sectors" (Drucker & Gumpert, 2007). Thus despite the fact that the criterion of honesty (or transparency) is not obviously revealed in the two arguments of the Fiscal Rule, it is an implicit value (or preference), on which Norwegian citizens and representatives base their relationship. In the resource curse literature, the good quality of Norwegian institutions is countlessly quoted as a key factor of the Norwegian economic performance. This good quality of institution comes from the trust politicians has gained from the citizens thanks to their transparent political behavior.

Confidence is the society glue and fuel. Trust (or equally reliance, or confidence) is based on recognition, social equality, […] balance between employers and unions, high degree of redistribution through taxes, and active fight of social disparities[24]. Systems based on trust wastes little energy in "suspicion- frictional heat" through "excessive use and abuse of rules" and control. Trust is therefore not only an input for the promotion of life quality but also an input for value creation. Trust is Norwegian citizens' premier social capital (Hessen, 2015, s. 18). Trust however does not go without honesty (or transparency). Indeed, one can hardly believe that Norwegian citizens would trust their institutions, if they did not assume their politicians and the managers of these institutions were honest (or transparent). The story of the Norwegian Oil Fund -and Norwegian oil history more generally- is fundamentally a story of

[24] Joseph Stiglitz says a lot about it, while Thomas Piketty has explained how inequality increases.

trust: voters have trust in politicians, politicians have trust in each other across party lines- and they have trust in bureaucrats, who have trust in institutions. And all of them have shown that they have been trust worthy; (Skredderberget, 2015, s. 100).

In the allocation of the Norwegian oil-rent, *dishonesty* (or a sort of *subtle opacity*) would be the fact of hiding others criteria that have counted when choosing the Fiscal Rule as the allocation method for the oil-rent. The transparency about the size of the oil fund, its governance and management is not of great interest in this work, as Norway ranks among the most transparent countries worldwide concerning those aspects. Therefore the focus of this paper remains on the transparency regarding the criteria (or preferences) expressed for the oil-rent allocation in the Norwegian Fiscal Rule. This third criterion is the key issue of this work insofar as Norwegian politicians seem to be less than franc about the criteria chosen as justifications for the method of oil-rent allocation (or equally the Fiscal Rule). In fact, they officially present the scarcity associated to the oil resource and show big concern for intergenerational equity to justify the allocation of the oil proceeds that gradually entails social welfare cuts via some reforms. Furthermore, they use dubious bearish statistics in order to emphasize that either the oil resource contributes weakly to the national income or the exhaustion of oil reserves is imminent. Though this political ploy aims at highlighting the scarcity of the oil resource, there is a gap between the scarcity Norwegian politician displayed and the other scarcity that guides their policies about the allocation of the oil-rent. That other scarcity is the absorptive capacity of the oil-rent that Norway has due to the smallness of its population size relative to the size of the accumulated oil-rent. Politicians' choices about the allocation of the Norwegian oil-rent (and the provision of welfare services) seem to be silently but greatly driven by the fear of the Dutch disease. Hiding that fact and pretending that it is the scarcity of the oil-rent that drives the Fiscal Rule breaches the principle of transparency, turns the Fiscal Rule into a tragic choice and therefore may damage the Norwegian institutions over time by inducing citizens' distrust towards politicians. The problem with trust and credibility is that they can growth and productivity in a way that cannot be measured as an undetectable poison. This point will be analysed in details and illustrated in the following subsection.

V.1.3.A. *The dynamics that turns a method of scarce resource allocation to a tragic choice.*

Any method of resource allocation contents opportunity costs brought about by the relative scarcity of that resource. Because of the relative scarcity of that resource, some criteria that

prescribe ‘who can get what how and when’ have to be determined as justification to the allocation method chosen. The alternative combinations of these criteria or the different possible dosages of these criteria result in different possible methods of allocation for the scarce resource considered. Every alternative allocation method has its opportunity cost that can be expressed via the rationing of the resource to a certain category of individuals, which for instance may incur a degradation of their welfare. As long as the allocation managers are transparent (or honest) about the selected criteria, the opportunity costs incurred by the citizens (and that degrade their lives or welfare) will be considered “merely a fatal misfortune”. However, if it comes out to the public that the allocation managers failed to account all the criteria that define the allocation method chosen (e.g. the Fiscal Rule), then the associated opportunity costs will be unacceptable for the citizens and the method of allocation (here the Fiscal Rule) “perceived as a tragic” method of oil-rent allocation. For this reason transparency “is more than the instrument, it is measurement itself, of a resource allocation method” (Calabresi & Bobbitt, 1978). In fact, transparency is at the same time a neutral criterion of allocation just as “efficiency” and “equality”, and a criterion that enables to evaluate the decisions made by the politicians concerning the method of oil-rent allocation. A complete information about the criteria of allocation enables us to have the overview of substitutable alternative methods and their associated opportunity costs. Without transparency (or with a *biased transparency,* or with a *subtle opacity*), it is no more possible to correctly evaluate the alternative methods of resource allocation, which leads to situations of absolute scarcity that is neither the scope of economics nor of tragic choices. Furthermore, in absence of transparency or in a situation of biased transparency, even if the chosen method of resource allocation by the politicians has the lowest possible opportunity costs, these opportunity costs will be painful for the citizens due the breach in the criterion of honesty (or transparency).

The remainder of this chapter investigates whether the Fiscal Rule is a tragic choice. It presents challenges encountered in the implementation of the Fiscal Rule that is the redistribution method chosen for the Norwegian oil-rent. In fact this part is an inquiry into the transparency regarding the criteria defined for the Fiscal Rule. We will analyse (through some empirical examples) whether there are some contractions or puzzles regarding the information released by the Norwegian politicians when they are to use the oil-rent to finance the government budget. More specifically, are there some hidden additional criteria that implicitly bound or constraint the Fiscal Rule?

V.2. IS THE FISCAL RULE A TRAGIC CHOICE?

As already mentioned, the method of allocation of the Norwegian oil-rent is called the Budgetary Rule or Fiscal Rule (*Handlingsregelen* in Norwegian) and it has been introduced in 2001 by the First Cabinet Stoltenberg. The Budgetary Rule or Fiscal Rule (*Handlingsregelen* in Norwegian) specifies the allocation of the Norwegian oil-rent to the citizens via the government budget and to use the expected real return on the oil fund up to an estimated rate of 4 percent. This means that the Norwegian government budget can be made up with a non-oil deficit equivalent to this return (4%). The Budgetary Rule emphasizes, however, that the use of petroleum revenues in a given year can differ from this guideline, but over time there will be a correlation between the use of income and return of the fund. It is the deficit which determines how much money must be transferred from the oil fund to the government budget. A broad majority in the Parliament agreed with the Budgetary Rule. Thus, the Government Pension Fund Global- GPFG (i.e. the oil fund) is to build long-term objectives using petroleum revenues. The Budgetary Rule guarantees a management of public expenditure that has maintained the Norwegian government budget in a sustainable state. However, complying with the Budgetary Rule seems to affect the provision of welfare for the present generation, owe to some measures of fiscal consolidations undertaken by the Norwegian government: Indeed, the real rate of return is measured by time (per year) may be considered as payment through the present generation for postponing the consumption of the capital, which surely means that the present generation has a very strong claim on the real return while keeping the capital for future generation.

"*Discretionary fiscal consolidation measures*", that erode the welfare of the present generation of Norwegian citizens, are implemented through either "tax increase" or "cuts in social welfare programs and pensions" (Barry & Elizabeth, 2014). As for the choice of "*spending cuts*" rather than "*tax hikes*" the reasons are that some researchers have showed that "tax increases were more harmful to economic growth (Leigh et al. (2010)" and less "effective than spending cuts "in making consolidation successful" (Larch and Turrini (2008). Moreover, Barry & Elizabeth (2014) emphasize that tax hikes tend to work better in countries with low levels of tax, hence the opting for spending cuts in Norway where the tax levels are already quite high (Barry & Elizabeth, 2014). Theses "discretionary fiscal consolidation measures" may either aim at "correcting past conditions", reducing "government deficits and debt accumulation" or

"enhancing economic growth" (Barry & Elizabeth, 2014). In addition, "the traditional *Keynesian view* proposes that fiscal consolidation policies be reserved for times of economic expansion, while policies of increased spending and lower taxes should be implemented during recessions" (Barry & Elizabeth, 2014). Since the 2008 financial crisis, fiscal consolidation measures have taken over public debate especially in OECD countries that underwent economic slowdown or crisis. Norway has essentially been spared by that crisis, what makes it hard for an ordinary citizen to give credit to any argument by the government to justify these fiscal consolidation measures.

The Budgetary Rule prescribes that the use of the Norwegian oil-rent should not block the productivity growth on the one hand, and on the other hand it should preserve the welfare of both the present generation and the future generation of Norwegian citizens. So far, the Norwegian government has succeeded in protecting the productivity growth and saving the oil-rent for the future generations. As for the welfare of the present generation, there are some puzzling aspects to highlight. The puzzling aspects this work addresses correspond to the method chosen for the allocation of the oil-rent (i.e. the Fiscal Rule) and that induces the degradation of "life or its correlative well-being" through "suffering and death"; (Calabresi & Bobbitt, 1978). Two examples are used to illustrate fiscal consolidation measures undertaken by the Norwegian politicians: the pension cuts reform and the rationing in some health spending. The case-study of the rationing of welfare services, gains credibility due to the trend of politicians to minimize the economic value of the natural resources in general and the oil more specifically. This fact is thus illustrated before exposing the two examples of welfare services rationing.

V.2.1. The Under-evaluation of oil resource to value creation in Norway.

V.2.1.A. *The Norwegian politicians' tradition of undervaluing the natural capital.*

The Norwegian Department of Finance released a report (in "*Perspektivmelding*") that shows the contribution to the national income of the different types of capital (e.g. human capital, natural resource capital, real capital, and financial capital). Flåten (2013, ss. 4-10) has looked

at the report as well as the computational methods used and found some inconsistencies regarding the figures released on human capital and natural resource capital especially. More precisely, he finds out that the computational methods used by the Norwegian Department of Finance leads to the undervaluation of natural capital (i.e. the capital that is not associated to any ownership) and the overvaluation of human capital (i.e. the economic value of labor and human knowledge) in value creation in Norway. The figures were (as shown in the following diagrams) that the contribution of human capital to the national income would amount to 81% while the one of natural capital would be of only 4%.

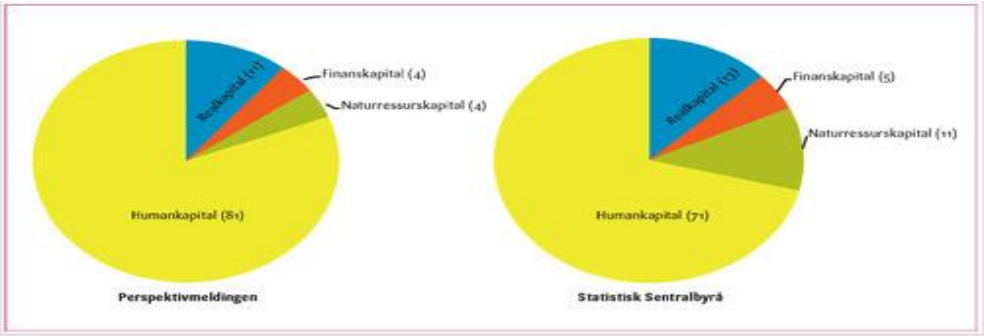


Figure 11. National income repartition as it is presented by the Norwegian Finance Department (in "Perspektivmeldingen) and by the Norwegian Statistics Agency (i.e. Statistisk Sentralbyrå); (Flåten, 2013, s. 5).

When Flåten then checks the same figures from the Norwegian agency of statistics (*Statistisk sentralbyrå – SSB* in Norwegian), he finds slight differences; namely that the contribution of human capital to the national income would amount to 71% while the one of natural capital would be of 11%. Abstracting away from the different magnitude of the figures, the conclusions from either the Finance Department or the Statistics agency converge; that is, the human capital would contribute the most to the Norwegian national income. Flåten analyses in his article the valuation method of each variable used by either the Norwegian Finance Department or SSB, then he makes the same valuation but by replicating the twofold Danish method[25] made up of the costs method (called method A) and the income method (called method B), see Appendix 6 for more explanation. The following table summarizes his findings: the most striking point is that human capital is certainly the type of capital that contributes the most to the national income

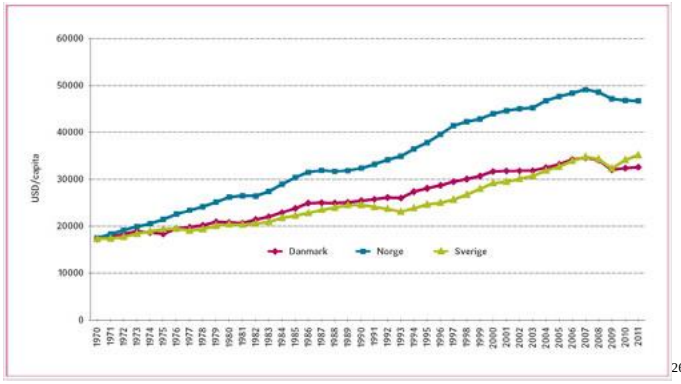
[25] In 2012 the Danish economic council (that releases every year a report on the development of the Danish economy) made a comprehensive analysis on, among others, real savings, human capital, physical capital, oil, gas, financial capital, air pollution, timber, fishery, and groundwater (see "De Økonomisk Råd, 2012" for more details).

but far less than the statement from the Norwegian Finance Department ("Perspektivemelding").

Table 8. The two alternative calculations of human capital and natural capital contribution to national product.

	The Norwegian evaluation methods		The Danish evaluation methods replicated by Flåten.	
	'Perspektivmelding' evaluation method	SSB evaluation method	Costs method (Method A)	Income method (Method B)
Human Capital	81% of 2010's national income.	71% of 2011's national income.	37.3%	66.2%
Natural Capital	4% of 2010's national income.	11% of 2011's national income.	25.6%	13.8%
Real capital			27.7%	14.9%
Financial Capital			9.4%	5.1%
National wealth			25 409 318 (100%)	47 126 067 (100%)

Flåten's article addresses the central political economy questions of which factors drive the Norwegian economy. More precisely, he inquires the method of computation that brought about the figures used by Norwegian politicians to state that labor was the key factor of Norway economic performance. But such statement seems confusing when the Norwegian economy is compared to the Swedish or Danish economy, which shows almost the same features except for the endowment in natural resources that entails economic rent: for instance, since the boom in the Norwegian energy sector, for the same type of professional position, wage in Norway is far higher than the ones in Sweden and in Denmark. Furthermore, the Norwegian GDP per inhabitant is 74% over the OECD average (see the following graph, Fig. 11). If Norway performs economically better than the other countries that share almost the same economic features except for the endowment in natural capital, then the Norwegian difference is attributable to that natural capital. This is what Flåten (2013) put to the light.



[26]

Figure 12. GDP per capita for Norway, Sweden and Denmark, 1970-2011, 2005 prices, CCP basis in USD. Source: OECD and Cappelen and Mjøset (2012).

The impressive Norwegian economic performance would be, according to Flåten, attributable to a shielding wage or a hidden economic rent that is in fact generated by the energy sector (or more generally by the natural resources) but is not included by government experts in the natural capital. Flåten (2013) does not deny the important contribution of labor (through human capital) to the Norwegian economy, but his point is that the method used by the Norwegian department of finance and the SSB tends to undervalue the contribution of natural capital. All in all, Flåten's article points at the issue of transparency regarding the contribution of the Norwegian energy sector to the economy. Dubious transparency is actually comparable to a subtle opacity. Such politicians' position could lead to wrong policies, such as a poor the management of natural resources and – coming back to the topic of this work – to a questionable allocation of Norwegian resources like the oil-rent (or GPFG). Specifically considering that the natural capital contributes very little to the national income would tend to orient budget policy towards spending cuts.

The subsection that comes next pursuits the illustration of the Norwegian government trend to underweight the position of natural resources (and thus of oil) in the national added value.

V.2.1.B. *SSB's data on Norwegian oil reserves assessment.*

Many fiscal consolidation measures enacted in Norway are supported by computations using data released by the Norwegian statistics agency (Statistisk Sentralbyrå-SSB in Norwegian). For example the Norwegian pension commission resorted to data by the SSB on the oil reserves to come out with the idea of the need for pension cuts. The SSB produces its own data but also

[26] Translation: Danmark=Denmark, Norge=Norway, Sverige=Sweden.

collects data from others specialized institutions such as the Norwegian Petroleum Directorate – NPD (Oljedirektoratet in Norwegian) in charge of producing figures like quantity of reserves for example. In this process of collecting data from other institutions, it happens that the SSB sometimes behaves strangely. This is the object of Osmundsen's (2015) analysis of the projected decline in oil revenues (mostly caused by the foreseen exhaustion of oil reserves), which is part of SSB released data.

According to Osmundsen (2015) data released by the Norwegian Petroleum Directorate – NPD, if used minutely leads to a more positive forecast of oil reserves, and therefore of expected oil revenues. In 2000, the NPD estimates 13.8 billion standard cubic meters of oil and gas reserves. In 2015, this figure is revised up to 14.1 billion cubic meters. This increase is due to advance in technology that facilitates the discovery of new fields. Thus the Sverdrup field in the north shelf, the Castberg field, the Pil and Bue field, the Alta-Gotha field are examples of new reserves discovered after the NPD 2000's estimates. For this reason, the NPD proceeds periodically to an adjustment of its projections. What Osmundsen (2015) notices in his article, is that government works continue to rely on decreasing forecasts of oil reserves because they just focus on the fact that the NPD makes long-term projections and thereby overlook the meantime adjustments. About this, the Norwegian statistics agency (Statistisk Sentralbyrå-SSB in Norwegian) produced a (2013) report, for the Holden- committee (Holden-utvalget in Norwegian) and the Rattsø- committee (Rattsø-utvalget in Norwegian), that used the NPD 2000's estimates without considering the following upgrades. Thought the leader in the research department of the SSB, Å. Cappelen, does not deny Osmundsen (2015) findings, he insures however that it was not for purpose. All the same, Osmundsen (2015) point is that the SSB report once again joints the trend for government agencies to produce document where the natural resources and their contribution to wealth creation are underestimated. (Regjeringen mangler faglig grunnlag for sine pessimistiske prognoser for Norges olje- og gassreserver, 2015, s. 27) & (Professor hudfletter oljedommedagsprofeter, 2015, s. 5). This estimation seems to indicate that as a rule, when it comes to natural resources (and particularly oil). Parameters in the pension reform seems to indicate the same impression that the government tends to systematically "play down" the enormous oil revenues.

One of the consequences of such trend of undervaluing the future reserves and revenues of oil is a reduced allocation of the Norwegian oil-rent to present generation of citizens and hence the cut in the provision of social welfare services. The coming sections illustrate via two instances this social services rationing.

V.2.1.C. *The State's Direct Financial Interest (SDFI) and public dependence on energy booming sector.*

The second chapter presented among others, the different ways, the Norwegian government get revenues from the oil booming sector. One of these ways where through State's Direct Financial Interest (SDFI) that is the Norwegian government's directly owned (via Petoro 80%, Statoil 15% and Norsk Hydro 5%) exploration and production licenses for petroleum and natural gas on the Norwegian continental shelf. In fact, the management of 50 % of state's exploration and production licenses were initially (i.e. 1973-1985) assigned to Statoil that was then a public company. In 1985, the SDFI is created (after 1984 SDFI-reform) and granted 80% of state's exploration and production licenses and 20% left to Statoil. The partial privatization of Statoil led to the creation of the public Petoro in charge of the management of 80% of the SDFI, while 15% were left to Statoil and 5% to Norsk Hydro. This state's ownership highlights an alternative allocation of the Norwegian oil-rent that is most of the time overlooked. Indeed through SDFI, a part of the oil revenues is invested in the oil booming sector and thereby expensed. The SDFI subtly veils the whole view of oil revenues. One of the consequences of that operation is, as highlighted by the former Prime Minister, Kåre Willoch (2000, s. 14), that the parliament is really aware of not all but part of the oil-revenue. This constitutes an incentive for reform in the direction of fiscal consolidations.

Willoch (2000) goes on in his article to point out that the veiling of the oil incomes "put a break" on the ease that grip the parliamentarians when confronted with a big income stream". The investment in SDFI becomes a part of oil-rent that is not so visible". Willoch's statement only shows the length of the tradition of veiling the oil income.

V.2.2. The pension reform

The Norwegian pension scheme (just as the Norwegian welfare model more generally) is based on the solidarity among groups of citizens at various events and stages in life, and on the solidarity between generations. This mechanism of solidarity is managed via the government budget and other institutional arrangements like the government pension fund Norway-GPFN (Statens pensjonsfond Norge –SPN in Norwegian), the government pension fund Global-

GPFG[27] (Statens pensjonsfond utland- SPU in Norwegian), and so on... In 2011 a pension reform that goes in the direction of fiscal consolidation measures has been enacted and justified by the fact that the Norwegian pension scheme is projected to face some challenges in the coming years due to the strong increase in the number of elderly whose care will require a greater share of national wealth and due to the projection of declining oil reserves. Indeed there would be around 800000-900000 pensioners in Norway nowadays, which represents almost 2.6 workers per pensioner. In 1967, there were around 3.9 workers per pensioner. This number is projected to fall to 1.6 workers per pensioner in 2050 (Finansdepartement D. K., 2004-2005, s. 4), as sketch in the following:

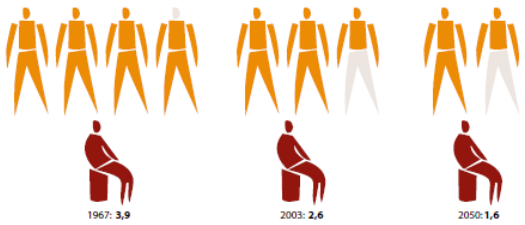


Figure 13. Number of labor per pensioner.

In addition, as seen in the third chapter devoted to the understanding of the Dutch disease, one of the consequences of the boom in the Norwegian oil sector is the substantial rise of real wage. This calls for the adjustment of pension payment to real wage in order to preserve the purchasing power of pensioners. All things considered, pension liabilities are thereby expected to rise, while oil revenues are expected to decline as displays the following figure:

[27] Recall that the GPFG is the oil fund.

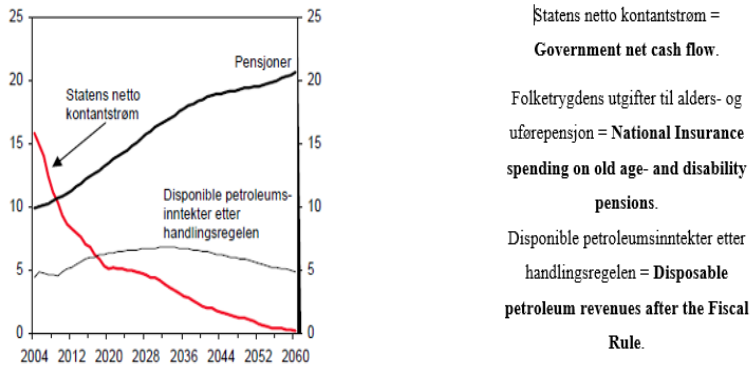


Figure 14 National Insurance spending on old age and disability, the government's net Cash flow from activities and disposable petroleum revenues after the Fiscal Rule (Handlingsregelen in Norwegian); Percent of GDP for mainland Norway. (Finansdepartment, 2004-2005, s. 33)

The above figure summarizes one of the forecasts used by the pension commission to convince on the necessity of a pension reform. One can see that pension spending for old age and disability is expected to reach around 21% of mainland Norway GDP by 2060, while the Government net cash flow and the Disposable petroleum revenues after Fiscal Rule are expected to fall, respectively to around 0 and 5% of mainland Norway GDP by 2060.

The pension reform implemented, is a long-term and comprehensive social and economic policy, which purpose would be to prevent conflicts between generations regarding the distribution of benefits and burdens on the one hand, and on the other hand to sustain the potential growth of national wealth creation. The measures taken for the pension reform are so extensive that they go far beyond the scope of this work which focus is more issues related to the allocation of the Norwegian oil-rent. Among these measures, the funding of pension, in particular, falls within the scope of this work as the funding of the reformed Norwegian pension harnesses the Norwegian oil fund (GPFG).

The Norwegian pension commission had two alternatives as for the funding of pension. The first was the establishment of a broad (or macro) fund that would reflect both the government petroleum revenues and the evolution in the pension liabilities. The second was the establishment of a more insurance-based fund that directly would focus more on the extent of pension liabilities. This second alternative would require, all the same, the establishment of a modified petroleum fund in order to amortize fluctuations in petroleum revenues, foreign exchange rates and fund performance. The first alternative has then been chosen for the pension reform, with the establishment of a "macro" fund called Government Pension Fund (*Statens Pensjonsfond* in Norwegian). The Government Pension Fund is made of two components: the

Government Pension Fund Norway -GPFN (for investment inside Norway) is managed by the Norwegian National Insurance Scheme (*Folketrygdfond* in Norwegian) and it amounts to 186 billion 2015-Crowns; besides, the Government Pension Fund Global -GPFG (for investment abroad) is managed by the Norwegian Central Bank (*Norges Bank* in Norwegian), and it amounts to 6431 billion 2015-Crowns. It follows that the management of the reformed pension – via that "macro" Government Pension Fund – takes into consideration the nexus between pension liabilities and economic long term challenges (Statens Forvaltningstjeneste, 2004, ss. 30-31). Because of the new interconnection between the pension fund (GPFN and GPFG) and the government budget, the computations made to assess the requirement for pension funding relies on assumptions made on changes in the reference path of variables like oil price, population growth, and labour… Such changes affect at the same time the GPFG and the government budget balance, hence the GPFN. In long-term project like pension reform, the consideration of changes in parameter values over time is of great importance for the robustness of computations over time. The parameters attention is drawn at in this section are the oil price, the discount rate, the labor per pensioner. This section brings light only on some aspects of computations made to justify the new arrangements that frame the redistribution of pensions (Statens Forvaltningstjeneste, 2004), and highlights the implications for the allocation of the Norwegian oil-rent.

V.2.2.A. *The discount rate of pension unfunded liabilities.*

This subsection is another way to indicate how the politicians deliberately use parameters values to urge to believe that fiscal consolidations measures are needed for the Norwegian pension. The value of discount rate plays a critical role in the projections of pension liabilities: an understated discount rate entails overstated pension liabilities and fiscal consolidations measures for the present generation of citizens while an overstated discount rate entails understated pension liabilities and fiscal consolidations measures for the future generation of citizens. (Ralfe, 2011). Specifically, the choice of a low discount rate for the unfunded pension liabilities leads to a substantial drop in the fund ratio, which can be seen as a problem of solvency for the pension scheme. As a result, either more contributions are going to be asked to present taxpayers, or cuts in present pension benefits are going to be undertaken in order to have the fund ratio back to a solvent level. (Pattison, 2012). This implies allocating less the Norwegian oil-rent to the present generation of citizens.

The problem is that "it is unclear what an accurate discount rate should be". Discount rates "do not truly reflect the expected risk-free returns" as they can arbitrary be suddenly adjusted upwards or downwards by central banks. "For instance […] Denmark and Sweden took direct approaches, setting floors or specific values for the discount rates applicable to certain obligations" in order to alleviate pension burden on present citizens. (Pozen & Hamacher, 2012).

In Norway, the 2004 pension commission has rather been careful and have not explicitly mention the discount rate used, which is indirectly mentioned on the footnote of the St. Meld. Nr. 5 2006-2007 document at the page 26, and it seems to be somewhere around 2%. However, referring to the Fiscal Rule (Handlingsregelen in Norwegian) the long term expected return in financial investment is assessed to be 4%. The question is then why did the pension commission not use the 4%. The suspicion is of course that with a 4% discount rate, no pension deficit would appear even with a 140 2003-Crowns estimated oil price. So consistency should demand that, in line with the Fiscal Rule, the 4% constitute a discount rate for future pension viability. But as usual, one is faced with the pension commission (and thus politicians) silence in case where parameters entail an optimistic forecast of public finance.

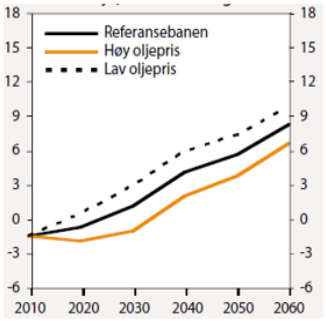
The subsequent subsection presents another questionable parameter used by the pension commission namely the estimation of labour per pensioner.

V.2.2.B. *The oil-price.*

For a given or projected level of pension liabilities, a high oil price is expected to have a positive effect on pension solvency, as high oil price increases the government revenues from oil exploitation. Inversely, a low oil price means less government revenues for a given level of projected pension liabilities, hence expected solvency problem in pension scheme.

The long-term oil price used in the computation of pension reform is 140 2003-crowns per barrel, which amounts to around 22.79 2003-USD per barrels (Finansdepartement D. K., 2004-2005, s. 14). Over time that price, chosen as the main hypothesis for the projection of pension finances, appears quite low even at the time (2004). However, the oil price is maintained in the low level of this main hypothesis. According to the pension commission, even the consideration of a higher price would not succeed in cancelling the long-term funding requirement for public sector; the sustainability of The Norwegian National Insurance Scheme should not be based on

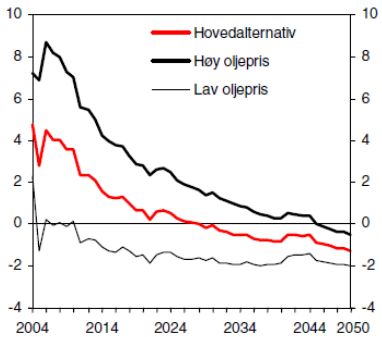
high oil price, and because the experience from 1970-1980s would show that it is much harder to correct the exchange rate if it turns out that the oil price will be lower than expected, than if it is higher (Finansdepartement D. K., 2004-2005, s. 8). The following simulation example has been provided as a support to this statement: 50 Crowns higher oil price than the main hypothesis of 140 2003-crowns per barrel would remove around one fifth of the funding requirement for the public sector. Under the assumptions of such moderate changes of oil price, the two following figures put forward the projected outcomes for public finances (including pension fund):



Referansebanen = Main hypothesis of 180 2003-Crowns per barrel.
Høy oljepris = Hypothesis of high oil price of 230 2003-Crowns per barrel.
Lav oljepris = Hypothesis of low oil price of 130 2003-Crowns per barrel.

Figure 13. Unmet funding requirements of public finances in relation to 2003 under different assumptions of the price. Percent of GDP for mainland – Norway. (Finansdepartement, 2004-2005, s. 9).

Figure 15 shows that under the main hypothesis of an oil price of 180 2003-Crowns per barrel, the public finances (including the pension fund) are expected to record a deficit of about 8% of Mainland Norway GDP in 2069. That deficit falls around 7% of Mainland Norway GDP when considering the hypothesis of a higher oil price of 230 2003-Crowns per barrel and reach around 10% of Mainland Norway GDP when considering the hypothesis of a lower oil price of 130 2003-Crowns per barrel. The next figure presents the balance of the state budget including the oil fund with various paths of oil price.



Hovedalternative = Main hypothesis of 140 2003-Crowns per barrel.
Høy oljepris = Hypothesis of high oil price of 180 2003-Crowns per barrel.
Lav oljepris = Hypothesis of low oil price of 100 2003-Crowns per barrel.

Figure 14. The balance of state budget including the Petroleum Fund with various oil price paths. Percent of GDP for mainland Norway.

One sees that under the main hypothesis of an oil price of 140 2003-Crowns per barrel, the public finances (including the pension fund) are expected to record a deficit from around 2030. That deficit is reached from around 2045 when considering the hypothesis of a higher oil price of 180 2003-Crowns per barrel and would start permanently from around 2010 under the hypothesis of a lower oil price of 100 2003-Crowns per barrel.

The pension commission concluded then that there is, anyways, a need for a pension reform, even with a relatively wide span of assumptions about oil price, life expectancy and labor (Finansdepartement D. K., 2004-2005, s. 9). However those projections show a weakness lying in the fact that the actual price of oil is, for almost a decade now, far beyond the intervals chosen by the pension commission. The following figure shows how the oil price per barrel has substantially changed since 2003 and lies constantly over 180 2003-Crowns.

Figure 15. New York Mercantile Exchange prices for West Texas Intermediate since 2000, monthly overlaid on daily prices to show the variation.

This observation is enhanced by an analysis provided by the Head of Econ[28]'s Petroleum group, Knut Nørve on a Norwegian economic newspaper (Dagens Næringsliv). Nørve first observation is that the oil price has been over 50 2005-USD per barrel since 2003, which is twice the price of 180 2003-Crowns of the main hypothesis by the pension commission. Though such a price seemed unbelievable for the pension commission, the oil price has been over the average of 50 2005-USD since 2005. Thus according to Nørve, the average of 50 2005-USD would be a better range than the 180-2003-Crowns main scenario by the pension commission. For him, this average of 50 2005-USD is set either to maintain itself or to rise, considering the growing

[28] Econ is the Norwegian largest private consultative-, research-, advisory- firm and a renowned trendsetter in socio economic debate. (Grande, 2005, s. 5).

demand from China and India, the small number of discoveries outside Opec-countries, insecurity in Opec-area and expected rising production costs. The consequences of Econ's scenario in terms of public finances are necessary more optimistic than those by the pension commission: Econ's estimates lead to between 100 and 170 billion 2005-Crowns more cash flow from oil exploitation to the government budget for the period 2006-2030 than the estimates by the Finance department; the GPFG will reach 5200 billion 2005-Crowns in 2020 that is twice the expected 2020 GNP; the oil revenues are projected to be 1000 billion 2005-Crowns larger than pension liabilities, even if the use of the oil-rent follows the prescription by the Fiscal Rule (Handlingsregelen in Norwegian). This alternative findings from Eco, undermines the arguments put forward by the pension commission to promote pension reform. (Løvås, 2005, ss. 4-5).

Yet the pension commission's main hypothesis of 140 2003-Crowns per barrel has not been upgraded till now, even in the parliament reform undertaken until 2011. As a result the pension reform in place corresponds to a fiscal consolidation policy against expected deficit of public finances based on unrealistic parameter value (i.e. the oil price).

After having confronted the estimates of oil price by the pension commission with the suggestion by the Head of Econ's Petroleums Group, the following sketch, summarizes the findings from the two subsequent subsections devoted on the on hand to the discount rate and on the other hand to the oil price[29].

[29] From economic theory, the Hotelling's Rule is a way for finding an "alternativet" estimate of the oil price. Indeed the Hotelling's Rule "states that the price of an exhaustible resource must grow at a rate equal to the rate of interest, both along an efficient extraction path and in a competitive resource industry equilibrium". That is: $p_t = p_0 \cdot e^{rt}$; with p_t the price in period t ; p_0 the price in the initial period and r the interest rate. Relying on the Hotelling's Rule would just leave one remaining problem that is the choice of the "best" interest rate (i.e. the inverse of the discount rate). Following this Hotelling's Rule and for instance considering the 4% of the Fiscal Rule as the inverse of the Discount rate would yield higher oil price than the ones tested by the pension commission.

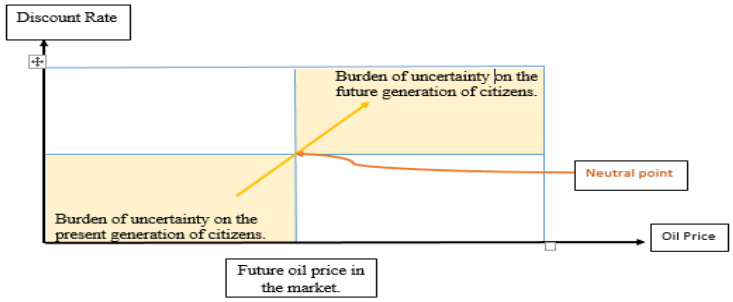


Figure 16 The relationship between the discount rate and the oil price regarding the risk for the pension scheme.

The pension commission applied a low discount rate to pension liabilities and considered a low oil price. This corresponds to the position on the bottom left of the sketched graph where it is the present generation of citizens that is to bear the risk burden of pension liability. This burden would have been put on the future generation of citizens, if a higher discount rate and a higher oil price were considered by the pension commission.

The debate about the pension reform lasted until 2009 and typically did not take into account the radically changed oil price, which would mean that the oil fund in 2010 already had 300 bn. Crowns, 1500 more than estimated in 2004. No mention of this fortunate circumstance was made in relation to this pension reform before it was put in place in 20011. This certainly prove a certain unwillingness to see extra incomes as good news because it would indicate less need for the pension reform.

The subsection that comes last is an additional illustration of another debatable parameter value used by the pension commission in their projective estimations of pension future liabilities.

V.2.2.C. *The estimation of labour per pensioner.*

The oil price and discount rate are not the only parameters that throw some doubt on the computation used to justify the necessity of reforming the Norwegian pension scheme. The metric of labour (assessed as the number of workers per pensioner by the pension commission) is also debatable. If one would use instead the number of hours per pensioner, then one would see a much larger drop from 1967 up to 2004 because of the increase in vacation and decrease in working hours. Thus the use of the number of hours per pensioner would have shown that

the demographic challenges highlighted by the pension commission has been significantly smaller than presented, which would have made the projected challenges seem less overwhelmed.

This section has described how the fiscal consolidation measures, undertaken in the Norwegian pension scheme, seem to reflect the Norwegian politicians' avoidance to inject the oil-rent into the economy. Through the illustrative cases of oil price, discount rate of unfunded liabilities, and number of workers per pensioner, one realizes that the figures used to defend fiscal consolidations measures adopted, could have been otherwise (considering the path of reference parameters), which would have invalided the projected pension challenges. Indeed, the figures used by the pension commission are not pure outcomes of mathematical modelling but reveal politicians preferences as they can directly be changed under political decisions. Furthermore despite the retained figures, even when the economic conjuncture has led the parameters to their most favourable values over a long period, no revision has been made by the pension commission. For example when the pure assumption turned out to be seriously off and the financial gaps of pension were essentially covered by 2010, the government did not reasonably revise its proposal. An additional puzzling behaviour is that of Norwegian central bank: why has the Norwegian central bank (i.e. Norges Bank) not paid attention to the inconsistencies about any of these parameters used as arguments by the pension commission to let know that Norway, with its financial wealth would have problems paying its pensions. This indicates that the Norwegian Central Bank clearly knew that the pension commission report was for domestic consumption only as it sells pit for the pension reform. At last, if Norway has pension problems then it makes little sense to invest in the debt of countries that has much larger potential (pensions) problems. Thus this pension reform goes with the idea of isolating the oil-rent from the Norwegian economy, what is totally understandable from an economic point of view (see the third chapter that highlights the isolation of the revenues from a booming sector a preventive means against the Dutch disease). Nevertheless, resorting to unrealistic values of parameters to justify a public policy violates the principle of transparency that guarantee the working of Democracy game. In addition such the policy entails the underweighting of present generation welfare.

V.2.3. The allocation of the Norwegian oil-rent and the health scheme funding.

This section is another illustration of the Norwegian government rationing the use of the oil-rent for the welfare of present generation of citizens, this time, in the health area. It describes the allocation of Norwegian oil-rent to the health area, through link between health budget and the Government Pension Fund Global (GPFG). In Norway, the Ministry of Health (MOH) has overall responsibility of good and equitable health care for the population, regardless of residency and economy. The Health Directorate administers the Financial Activity-based funding (*Innsatsstyrt finansiering* – ISF, in Norwegian) and Quality-based funding *(Kvalitetsbasert finansiering* – KBF in Norwegian). In 2013, a health reform (called *Norheimutvalget* in Norwegian) was passed with the aim of finding the ways in which health care can use the available resources equitably. This health reform brought the concept and method of prioritizing in health care, which implies that given the resources the community should spend on health, some patient groups should get most, some have to stand the longest in the queue and some should pay more themselves (Hornburg, 2014, s. 8).This rule of priority is based on three criteria, namely: Condition of severity over time (*Tilstandens alvorlighet* in Norwegian), Benefits of treatment over time (*Nytten av tiltaket* in Norwegian), and Requirement of cost effectiveness (*Kravet om kostnadseffektivitet* in Norwegian). Thus, the three criteria determine the condition of treatment provision or exclusion to patients (Dommerud & Hornburg, 2014, s. 9). As a result, this health reform has led to a number of controversial issues about screening, vaccination, expensive cancer drugs, ceiling for uncertain and expensive treatment, etc… (Dommerud & Hornburg, 2014, s. 9). The following presents some instances of treatment rationing.

V.2.3.A. *The rationing of some cancer treatment*

The most controversial issue so far is the refusal to make use of the medicine Perjeta against breast cancer, due to the high cost relative to output (Dommerud & Hornburg, 2014, s. 9). Unlike Denmark, Sweden, and Spain, where the health care pays for Perjeta treatment, the later has not been included among treatment supply due to its cost that would be too expensive relative to its outcome. In fact, the provision of Perjeta to about 100 patients would cost 120 million Crowns yearly (Hansen E. E., 2014, s. 30). Compared to Denmark, Sweden and Spain, the economic stance of Norway is far more prosperous, which makes it hard to understand why Norway cannot afford this particular treatment.

Similarly, there was a controversy for the public funding of Ipilimumab (the drug against melanoma cancer) and Abirateron (the drug against prostate cancer) because of their expensiveness (Hornburg, 2014, s. 8).

V.2.3.B. *The rationing of Hepatitis treatment.*

Hepatitis C, the infectious liver disease, was previously difficult to treat effectively. But in 2014 a new, far more effective medication with fewer side effects entered the market. Thus doctors started its prescription, by all accounts with good results. In the winter of 2014 the prescription of this effective treatment against Hepatitis C stopped. Indeed, the National health authorities had decided that only patients who have come so far in the disease and that actually have developed liver damage should get the "legendary" medication. The patients, however, who have not developed sufficient damage, will not be cured. According to the Health Directorate, the goal of hepatitis C treatment in Norway is to prevent the development of cirrhosis, therefore only patients with advanced damaged are prioritized, considering the expensiveness of the new effective medication. This treatment cost between 500,000 and 1 million Crowns (Johansen, 2015).

Considering the amount of the Norwegian wealth in the GPFG and the state of the government budget compared to other OECD countries, it is hard to accept the reason of some treatment rationing by the scarcity of (financial) resources to pay the needed treatments

The health reform commission (Prioriteringsutvalg or Norheim Utvalg in Norwegian) with its criteria attempts to put a systematic view on these rationing activities but these criteria are more theoretical than real since the first and second criteria clearly discriminate the other part of population. And the evaluation of life expectancy would for instance result in people from Oslo West being treated more frequently than people from Oslo East; or Women being treated more frequently than men since women live longer than men. This only shows that the Norwegian health reform commission with its criteria is more storytelling and politics mascurating as science.

V.2.4. Answering the question whether the Fiscal Rule is a tragic choice.

Every allocation method for resources contains costs entailed by the relative scarcity of these resources. In the case of the Fiscal Rule that is the allocation method of the Norwegian oil-rent, the costs are for instance the cut of pension or health care rationing just addressed in the preceding sections. Though these costs may cause the degradation of welfare or death for citizens, they do not imply the qualification of the Fiscal Rule as a tragic method of allocation. Referring to Calabresi & Bobbitt (1978), the Fiscal Rule would become a tragic choice for Nowegian citizens as soon as they find out that the politicians have not been completely honest (or transparent) regarding the criteria that form the basis of the Fiscal Rule. The point of this chapter is to highlight, among others, the Norwegian politicians' ploy used in order to enact fiscal consolidation measures. Citizens' awareness of this ploy is what will make them look at the Fiscal Rule as a tragic choice of Norwegian oil-rent allocation. Ideally, in accordance to the Democracy principles, the Government "claims have to win credibility" just as should the claims of any citizen. Unfortunately as shown in the preceding subsections, the politicians have not been completely transparent when considering the debatable figures they used to ration the allocation of the Norwegian oil-rent to the present generation of citizens. Before the Norwegian politicians' stealth were exposed for instance by Flåten (2013) and Osmundsen (2015), the Fiscal Rule may seem a "necessary, unavoidable, rather than chosen" resource allocation method and its associated costs considered "merely a fatal misfortune"; (Calabresi & Bobbitt, 1978, s. 21). However since the release of these articles by Flåten (2013) and Osmundsen (2015) and more surprisingly the absence of the government reaction, the Fiscal Rule can be taken as a tragic oil-rent allocation method.

Chapter VI. WHAT THE ALLOCATION OF THE OIL-RENT REVEALS ON THE NORWEGIAN DEMOCRATIC INSTITUTION.

The previous chapter provided some illustrations of how the Norwegian politicians have resorted to questionable economic assumptions and measurements in order to make it seem necessary to allocate less oil-rent to the welfare of the present generation of citizens. The arbitrary values chosen for instance for the oil price, pension liabilities discount rate, the contribution of the oil sector to the national income, or the remaining endowment in oil reserves reveal a certain biased transparency from politicians. Despite these findings, the rationing of present citizens welfare provision has not been revised, which suggests that the politicians questioned claims are still considered credible by the population that has not protested. The following is therefore devoted to understand the factors that would determine the credibility of claims in Norway. In addition this part goes further by analysing the institutional consequences of the Norwegian procedure of credibility gaining: specifically, the more democratic this procedure the more democratic the Norwegian institution, vice-versa.

VI.1. ON WHICH GROUND DOES THE CREDIBILITY OF ANY CLAIM RELIES IN NORWAY?

"Credibility is the outcome of contingent social and cultural practice". According to Vieira (2010, s. 25), in the practice to gain credibility, a claim is judged on three grounds: on the scientific or technical grounds, on political grounds, and on the grounds of the personal life of the claimant. This part compares the approach the politicians' economist experts i.e. the economists from the 'triangular guild' -The Finance department, the Statistics agency, and the Central bank- (Hansson, 2015) with that of Flåten (2013) and Osmundsen (2015).

VI.1.1. Credibility on the scientific grounds.

The ground to consider here is that of the domain of economics, as the official documents from the Norwegian 'triangular guild' (Hansson, 2015) as well as the articles by Flåten (2013) and Osmundsen (2015) belong to the economic literature. It follows from this that either can gain credibility only by complying with the culture of economics, which establishes the "*truthfulness*" of claims based on proofs and in absence of obvious criticism (Vieira, 2010).

The procedure loosely goes as follows: A first article releases the findings of any proven inquiry. The claims from that first article automatically acquire *credibility* as long as it gets no criticism that is as long as no doubt is cast on the validity of these claims. However, it loses that credibility as soon as a second article (i.e. a critical article) that highlights its weakness (by denouncing its *validity*) is released. Then the first article has to be defended (by clarifying its validity) in order to gain its credibility back and consequently to make the second article (i.e., the critical article) lose its credibility, and so on so forth. In economics, credibility gains from an indirect communication that works via the release of articles that are valid. This ideal procedure is mostly facilitated by the fact that economics uses mathematics, which is a discipline where proving goes without saying. However, mathematics hides the assumptions that greatly condition mathematical data (e.g. figures, graphs…) generally used as proof in many economic claims. The documents produced by the 'triangular guild' (Hansson, 2015) to justify the social services rationing rely on some mathematical data such as the contribution of the oil sector to the Norwegian national income, the remaining amount of oil reserves in Norway, the expected oil price, the discount rate of pension liabilities, so on so forth… These mathematical data are dubious in the sense that "the word data means things that are "given": baseline truths, not things that are manufactured, invented, tailored or spun"; (Deaton, 2015). Flåten (2013) and Osmundsen (2015) show however in their articles that what the politicians did in their official documents is actually what is called "*Mathiness"* that is the "use of algebraic symbols and quantitative data to give an appearance of scientific content to ideological preconceptions"; (Kay, 2015). Flåten and Osmundsen articles seem to provide "the plausibility of the claim; the known reliability of the procedures used to produce the […] claim; the directness and multiplicity of testimony; the accessibility and replicability of the phenomenon; the ability to impute bias to the claimants or to assess risks being taken in making the claims" (Vieira, 2010). All these aspects are expedient for the "technical judgement" hence the validity of Flåten and Osmundsen articles. As mentioned at the beginning of this paragraph, the absence of significant reaction from the government, after the criticism brought out by Flåten (2013) and Osmundsen (2015) can have different interpretation: on the one hand that even the Norwegian politicians recognize the validity (and hence the credibility) of Flåten (2013) and Osmundsen (2015) and in that case there would have been an upward adjustment of welfare provisions to the present generation of citizens; on the other hand that the Norwegian politicians refuse to respect the rules of credibility gaining in the domain of economics and consider that their claims do not need to be valid in order to gain credibility. Alternatively it would be a strategy is to ignore attacks of validity that undermines the credibility.

VI.1.2. Credibility on the personal grounds.

In reality *the personal background* constitutes factors such as "the personal reputation of the claimants or the reputation of the platform from which they speak, knowledge of the friends and allies of the claimants, including their personal reputation and power" that would play an appreciable role in the credibility of a claim. In connection to this, the question is whether Flåten (2013) and Osmundsen (2015) articles have seemingly so far failed to gain credibility, or reciprocally the documents from the 'triangular guild' has seemingly so far gained credibility due to these personal aspects. Is there a hierarchy among Norwegian economists that allows for communication only between the economists of the 'triangular guild' (the Finance department, the Norwegian agency of statistics, and the Norwegian Central Bank) but not with the other economists outside that 'triangular guild' (Hansson, 2015)? More precisely do official documents from the 'triangular guild' have the privilege of escaping the game for gaining credibility, as prescribed in the world of economics? All these questions lead to the question whether there is a polarization of Norwegian economists made of 'plain' economists on the one hand and on the other hand of economists from the 'triangular guild', well supported in the media. In that case, "the authority to speak resides solely with […] highly bounded, communities" such as the economists from the 'triangular guild' (Vieira, 2010, s. 26).

VI.1.3. Credibility on the political grounds.

Last but not least, *the political ground* deals with the "significance and scope of the claim," that is, for instance the implications of the documents from 'triangular guild' (as opposed to Flåten and Osmundsen articles) for the allocation of the Norwegian oil-rent. As seen before, the allocation method chosen for the Norwegian oil-rent is the Fiscal Rule (Handlingsregel in Norwegian). The documents from the 'triangular guild' content claims that determine the way the Norwegian oil-rent is allocated and therefore have a certain political echo. Flåten and Osmundsen articles that criticize the validity of those claims, undermine politicians' credibility. This also has a political echo. Thus, there is an intricate "relationship between political interests and technical judgements" that may affect the process of credibility gaining. Gaining credibility on scientific grounds enhances the political credibility of an article that is already politically

interesting due to its topic. Producing an article or issuing official documents is at the same time taking "a credibility risk" and bidding "for rich credibility rewards" on scientific grounds. The more actively a claimant plays the game of credibility gaining, the higher his expected credibility risk and reward. Furthermore, the social, economic and/or political status of a claimant has an impact on his "own exposure to credibility-risk". Thus, for debate like the resort to questionable data to reduce the allocation of the oil-rent to the present generation of citizens via the rationing of some welfare services, Flåten's and Osmundsen's credibility risk is obviously minimum unlike the credibility risk of the politicians' advised by the economists from the 'triangular guild'. The risk in question here encompasses the (political) reputation of the claimant, which is more critical for the politicians. In that case, silence can be a cautious strategy. This is all the more reasonable given that the credibility Osmundsen and Flåten would expect to gain is more the "credibility internal to scientific practices" while the target of the Norwegian politicians is the "public credibility". What are the chances for the claims in Flåten and Osmundsen articles to get out of the economists' circle and reach the population compared to the claims in the documents by the 'triangular guild'? The chances are minimal, which illustrates the monopole of public credibility held by the politicians' experts from the Norwegian 'triangular guild'.

The Norwegian politicians' absence of significant reaction after the release of Flåten (2013) and Osmundsen (2015) articles arouses the following question: what does the politicians' violation of the "truthing" procedure, prescribed in economics for the game of credibility gaining (Vieira, 2010), implies or reveals about the Norwegian political institution? The subsequent paragraphs explore this question.

VI.2. THE 'TRIANGULAR GUILD' CREATES A GROUND TO HYPERDEMOCRACY IN NORWAY?

The data used by Norwegian politicians in order to enact fiscal consolidation measures, denounced by Flåten (2013) and Osmundsen (2015), and the afterwards behaviour of politicians reveals a sort of supra-credibility of politicians' experts. This is a weakness for the Norwegian democratic apparatus. "In practice democracy needs both formal rules and informal values that are not themselves subject to democratic control, exactly as the market needs external regulation of its parameters as well as what Adam Smith called moral sentiments. In particular these

external constraints are needed to restrain powerful interests that have risen within the system and which then use it to make it serve their own interest"; (Crouch, 2016, s. 146). The analysis of the allocation of the Norwegian oil-rent shows thus, among others, some features of "hyper-democracy" (Crouch, 2016, s. 147) since the Norwegian politicians seem "to do good by stealth" (Crouch, 2016, s. 149) via the use of questioned data for the implementation of fiscal consolidation measures and refuse any validity tests through exchanges with others economists. Indeed most of the inconsistent information released by the Finance Ministry (and never denounced by the Norwegian Central Bank) relies on data provided by the Norwegian agency of statistics. The question that this inevitably brings up is whether this is a deliberate choice done with "open-eyes" or whether these 'mistakes' are somehow induced by other parts of the institutional sphere? If these two institutions make recurrent 'mistakes', then why has the Norwegian Central Bank never warned them? The answer is that the three institutions form a sort of 'guild'. All the politicians and the experts working inside that 'triangular guild' trust each other (Skredderberget, 2015). This may explain the lack of attention pa id to Flåten (2013) and Osmundsen (2015) remarks. By doing so, the Norwegian politicians have chosen to sacrifice some transparency by arguing the primacy of the economic sphere. The concrete way they do it is by the application of what Sidgwick called the Government House Ethics, when they argue for the primacy of the economic sphere openly and stick to the primacy of the political sphere behind closed doors. The following figures gives an insight into the type of primacy that should dominate depending on the levels of public debt and deficit.

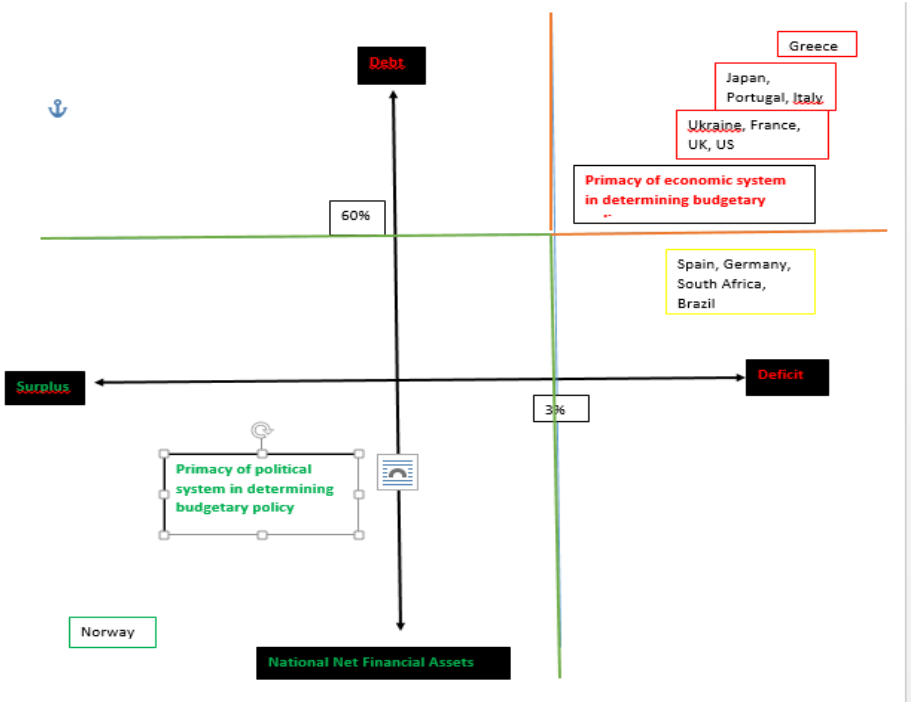


Figure 17 The dominant system determining the budget allocation

60% debt and 3% deficit are chosen in figure 19, since they represent the Maastricht criteria of the monetary system not because they are in any way absolutely correct. In addition, they seem reasonable at the very least for visualization. Norway in this graphic has as previously stated in the introduction, an unprecedented economic freedom to determine its budgetary policy, contrary to most OECD countries where the economic system is predominant. Thus, Norway has at least a higher expected future finance income than its oil income in the year 2005.

Thus the voters trust the politicians who trust each other but do not trust the voters in return, hence the politicians' claims that Norway would belong to the area of economic primacy while it is not true. This is the observation, the analysis of the allocation of the Norwegian oil-rent has enabled to find out.

Chapter VII.CONCLUSION

The starting point of this work is the observation of a paradoxical behavior of Norwegian politicians in the allocation of the gigantic oil-rent. As a matter of fact, the fiscal consolidation measures they have been undertaking (via the rationing of some welfare services) that is their decision to allocate less oil-rent to the welfare of the present generation of citizens, appear puzzling given the gigantic size of the Norwegian oil-rent that insures the sustainability of public budget. The first reason found that explains the choice of social services rationing is that the transfer of oil revenues in a sovereign fund (i.e. the GPFG) has not permanently removed the threat of the Dutch disease. This inquiry shows how the idea of blocking the massive inflows of oil revenues into the Norwegian economy via the establishment of the GPFG has certainly driven the Dutch disease away, yet it has not completely got rid of it. The threat of the Dutch disease still hangs over Norway. We have to remember that the Dutch problem occurred when the government was spending its extra revenue. Norway has so far spent relatively a little of its revenue. The GPFG has just moved the problem in time, that is to say, as long as just a relative small amount is withdrawn to fund the Norwegian welfare, the Dutch disease is kept remote. However, if huge net amount will be needed in the future (for instance when the oil reserves exhaust), Norway will very likely show some symptoms of the Dutch disease. Thus Norway suffers from an unusual type of scarcity. This scarcity is not the limited size of the resource that constitute the oil fund relative to the size of Norwegian population but rather the limited size of the Norwegian population relative to the size of the oil fund: Norway has a problem of absorptive capacity. This is the main reason behind the rationing of some welfare services, which is covered by an alleged lack of resources, or concern for intergenerational equity. So the Fiscal Rule guideline may not have eliminated the danger of the Dutch disease, but merely moved it into a distant future. We therefore cannot afford to make some thoughts about such a future, otherwise it would be ‘kicking the can down the road’. When that future comes, Norway may be forced for instance to consider joining the European monetary union to keep the currency down, which will be the ultimate irony, for Norwegian citizens who have so far be reluctant to join the European Union.

The main reason found in the course of this inquiry and that explains the rationing of welfare services in Norway in this work is the fear to incur the Dutch disease. But this work stays opened to additional conjectures and research fields regarding the motives behind the allocative choice of the Norwegian oil-rent: for instance, the Norwegian government may feel Norway has a crisis as it is (as shows the first figure in the introduction) the only country that is not in

crisis. Norway is then a sort of 'aberrant point' among the OECD countries: this causes for instance a loss in (labor price- wage) competitiveness. So reasoning, imply that a country, that performs economically well while its trade partners register gloom, may be adversely affected by its favorable position since it cannot undertake any competitive cut. Thus the Norwegian politicians may pretend challenges in order to stay in the same line as Norway economic partners.

The second additional reason that may explain the Norwegian politicians' restraint to allocate further oil-rent for the welfare of the present generation of citizens is the puritanism culture (referred to as "den norske folkesjelens" in Norwegian); (Skredderberget, 2015, s. 203). This cultural aspect though it would be neglected by a mainstream economic analysis justifies well the saving-oriented behaviour of Norwegian politicians.

A third addition reason that can also explain the Norwegian politicians' avoidance to allocate further oil-rent to present generation of citizens is their unwillingness to offset the economic equilibrium. Indeed, blocking the oil proceeds in a sovereign fund has maintained Norway in a certain steady state. Allowing the inflow of a huge net amount of the oil-rent into the Norwegian economy will take Norway in a new steady state. Taking responsibility of such structural changes may be a 'heavy task' for Norwegian politicians. Thus, economic freedom implies responsibility. And substantial unprecedented economic freedom as the one of Norway entails greater responsibility that is avoid such a 'political hot potato' by Norwegian politicians.

The preceding paragraphs have listed some possible reasons that may explain politicians' choice to allocate less oil-rent to the present generation of Norwegian citizens. This work has just focused on the problem of absorptive capacity of the oil-rent, that constrain the Norwegian politicians to resort to "storytelling" by manufacturing unrealistic figures regarding for instance the contribution of the oil sector to value creation in Norway, the discount rate of pension liabilities, the expected oil price, the remaining endowment in oil reserves, etc… in order to justify their avoidance to use the oil-rent. This case of Norwegian politicians' dishonesty by pretending the relative scarcity of resource for providing sufficient welfare services, is not a new phenomenon and political hypocrisy is not a specific Norwegian phenomenon. Indeed "there is a lot of hypocrisy at work in contemporary politics" (Runciman, 2008, s. 1). Politicians evolve in a world of "double standards" (Skredderberget, 2015, s. 124) where the trend is to deliberately say in public what is not really held in privacy. Though one's reflex towards

"political hypocrisy" is blame, Runciman recommends a tolerant look at it in order to catch its complexities and motives (Runciman, 2008, ss. 1-3). To analyze the inconsistency noticed in the allocation of the Norwegian oil-rent, I abide to Runciman's advice in order to avoid self-deception of politicians' sincerity and try to proceed to a neutral inquiry. A finding is that Runciman's "political hypocrisy" is what Sidgwick called Government House Ethics – GHE or Government House Utilitarianism – GHU. What is held privately is also referred to as "esoteric morality" which can only be understood by experts or exceptional individuals; (Skidelsky, 1994, ss. 36-37)[30]. This inquiry has enabled to find out that what is held privately is a less alarming future economic situation than the one forecast by the Norwegian politicians and the economists working either in the Finance Ministry, the Norwegian Central Bank, or the Norwegian Statistics Agency. One can go further and state that what is held privately (and hidden by the "mathiness" of the Norwegian 'experts') is a more prosperous economic future when Norway is fiscally compared to other democratic countries; (Kay, 2015).

However this strategy of GHU, though it is economically understandable, turns out to adversely affect the Norwegian political institutions as GHU illustrates the Norwegian politicians' biased transparency, subtle opacity, or dishonesty towards citizens. The good quality of Norwegian institutions plays a key role in the Norwegian model. The secret of the Norwegian model is trust to institutions that makes the society works at its best: Norwegian citizens have confidence in politicians, in the power apparatus, in the system itself and politicians have confidence in each other. Honesty is defined as one of the criteria for the allocation method of the Norwegian oil-rent (i.e., the Fiscal Rule). Dishonesty makes the opportunity costs (such as pension cuts or health care rationings -seen in chapter V) brought about by the pretended relative scarcity of the resource that constitute the oil-rent, painful. For this reason, the Fiscal Rule can be considered a tragic choice (Calabresi & Bobbitt, 1978, ss. 1-28), as the Norwegian politicians are ready to flout honesty, a key element of the political system (by the Government House Ethics) so as to defend better the economic system against a potential Dutch disease and the loss of national competitiveness hedge. But this work illustrates via the allocation method of the Norwegian oil-rent, the complexity in the trust-based relationship of the Norwegian model.

[30] (See Appendix 7 for extensive explanatory quotes).

Specifically, this paper shows how the allocation of the Norwegian oil-rent puts the Norwegian politicians through a trade-off between equality, efficiency, and honesty that may be called the 'iron triangle'. Politicians' fear for economic inefficiency (equivalently their preferences for economic efficiency) results in an erosion of trust that is the glue of well-working institutions. The problem of transparency noticed regarding the allocation of the Norwegian oil-rent reveals an asymmetric trust: the citizens trust politicians (i.e. their representatives) but the politicians do not trust the citizens, hence their dishonesty. I consider the Norwegian institutions as one of the inputs that are used to produce the impressive wealth accumulated since the start of oil exploitation. This work shows that an "institutional capital" should be explicitly recognized and added to human capital, man-made capital, and natural capital when analyzing the Norwegian economic model. The point of this work is, among others, that the Norwegian politicians' (GHU) strategy of avoiding the Dutch disease damages this "institutional capital", which with time may weaken the performance of the Norwegian model.

This study of the Norwegian oil-rent allocation shows in summary how the measures taken to prevent a potential economic problem (e.g., the Dutch disease) has led to the political problem of transparency or honesty. Transparency is an important principle in democracy as it enables citizens to take rational decision. For this reason, any form of opacity or biased transparency is criticized. However, from a utilitarian view it is the outcome of any action that matter. A reason for this is that "liberal democratic politics are only sustainable if mixed with a certain amount of dissimulation and pretence". (Runciman, s. 3).Thus by making the implemented fiscal consolidations measures seem "necessary and unavoidable, rather than chosen" the Norwegian politicians try "to convert what is tragically chosen into what is merely" presented as lack of sufficient resource (Calabresi & Bobbitt, 1978, s. 21). "Whether the decision is perceived as tragic […] is a function of what methods are used to cope with the […] scarcity; (Calabresi & Bobbitt, 1978, s. 23). Furthermore "Evasions, disguise, temporizing, and deception are all ways by which artfully chosen allocation methods can avoid the appearance of failing to reconcile values in conflict" (Calabresi & Bobbitt, 1978, s. 26). The Norwegian government has tied itself to the mast of the Fiscal Rule (Handlingsregelen in Norwegian) and has been using less of the oil-rent as the fund grows so as not to be seduced by the seductive song of the sirens (of all the good things that one could do with the fund) and thereby sailing around the dangerous cleft. (Elster, 1979).

Since we started out this work with an analysis of the Dutch disease, it would be tempting to conclude with pointing at a Norwegian disease. This cannot be done but this work points to a 'virus' into a system that could very well bring on a disease namely the erosion of transparency that can in the long run undermine some qualities of Norwegian institutions and thereby the potential trust into the system. The politicians should trust the voters with valid information and take the chances with the political sphere which they all defend.

APPENDIX 1: Corden and Neary Dutch disease model.

Preliminaries

$j = E, M, S$: a three sector model where
E denotes the energy (or booming) sector,
M denotes the manufacture (or lagging) sector, and
S denotes the services sector.

$i = L, K$: The model considers two factors of production that are
L, the Labour and K the capital.

p_j: Price of output in sector j, $(j = E, M, S)$.

y: The level of real income.
The circumflex denotes a proprotional rate of change e.g. $\hat{y} \equiv d \ln y$

$\hat{y} \equiv d \ln y$: The change in real income.

a_{ij}: The quantity of factor i used per unit of output in sector j.

$\hat{C}_S$: The demand for services.

ε_S: The compensated own-price elasticity of services demand.

θ_E: The share of energy sector in national income.

θ_{ij}: The share of factor i in the value of output in sector j.

π: The Hicksian measure of the extent of technological improvement
(measures the proportional increase in energy output,
holding constant the employment of all factors in that sector).

$$\lambda_{LE}\left(\hat{a}_{LE} - \hat{a}_{KE}\right) + \lambda_{LM}\left(\hat{a}_{LM} - \hat{a}_{KM}\right) + \lambda_{LS}\left(\hat{a}_{LS} - \hat{a}_{KS}\right) = 0$$

$\lambda_{Lj} = \dfrac{L_j}{L}$: The proportion of factor L used in sector j,
describes the redistribution of labor supply among the three sectors.

$w = \frac{W}{L}$: The wage rate i.e. the real wage per unit of labour.

Δ: The wage elasticity of the aggregate demand for labour.

ξ_j: The proportional contribution of sector j to Δ.

ξ_E: determines the resource movement effect.

$\hat{w}$: The change in the wage rate.
r_j: The rental return to capital of sector j.
$\hat{r}_j$: The change in the rental return to capital of sector j.

σ_j: The Hicks-Allen partial elasticity of susbstitution between L and K in sector j.

$\hat{X}_S = \phi_S \left(\hat{p}_S - \hat{w} \right)$

$\phi_S = \frac{\sigma_S \theta_{LS}}{\theta_{KS}}$: The price elasticity of services supply.

$\left(\phi_S + \varepsilon_S \right)$: The compensated elasticity of excess supply of services at a given wage rate.

A: The compensated elasticity of excess supply of services when the change in w induced by a change in p_S.

η: The real income elasticity of services demand, determines the magnitude of the spending effect.

ξ_E: The proportional contribution of sector E to Δ, determines the resource movement effect. (Δ: is the wage elasticity of the aggregate demand for labour).

If both parameters $\eta = 0$ and $\xi_E = 0$, then the increase in r_E is proportional to π (the Hicksian measure of the extent of technological improvement), and no other domestic variables are affected by the boom.

The model starts with the conditions of full-employment of labor factor,

$$a_{LE}X_E + a_{LM}X_M + a_{LS}X_S = L$$

with the demand for labor factor on the left hand side (LHS) and the supply of labor factor on the right hand side (RHS): where a_{ij} represents the quantity of factor i used per unit of output in sector j; X_E, X_M, X_S are respectively the outputs from the booming (i.e. energy), lagging (i.e. manufactures), and services sector;

The Model with Labor as the Only Mobile Factor.

Let's keep in mind that η determines the magnitude of the spending effect and ξ_E of the resource movement effect.

- On the market of production factors.

The model starts with the conditions of full-employment of labor factor,

$$a_{LE}X_E + a_{LM}X_M + a_{LS}X_S = L \quad \text{(A1)}$$

with the demand for labor factor on the left hand side (LHS) and the supply of labor factor on the right hand side (RHS): where a_{ij} represents the quantity of factor i used per unit of output in sector j; X_E, X_M, X_S are respectively the outputs from the booming (i.e. energy), lagging (i.e. manufactures), and services sector;

Then follows the equation of full-employment of the specific factor (i.e. the capital) in each of the three sectors.

$$a_{Kj}X_j = K_j \quad (j = E, M, S) \quad \Leftrightarrow \begin{cases} a_{KE}X_E = K_E \\ a_{KM}X_M = K_M \\ a_{KS}X_S = K_S \end{cases} \quad \text{(A5)}$$

The Demand for capital is in the LHS while the supply is in the RHS.

The conditions for full-employment implies that the weighted sum of sectorial labor demand is zero as the labor supply (or more generally the endowment of all factors) is assumed fixed:

$$a_{Kj}X_j = K_j \quad (j = E,M,S) \quad \Leftrightarrow \begin{cases} a_{KE}X_E = K_E \\ a_{KM}X_M = K_M \\ a_{KS}X_S = K_S \end{cases} \qquad (A5)$$

$$X_E = \frac{K_E}{a_{KE}}; \quad X_M = \frac{K_M}{a_{KM}}; \quad X_S = \frac{K_S}{a_{KS}}$$

$$a_{LE}X_E + a_{LM}X_M + a_{LS}X_S = L \qquad (A1)$$

$$a_{LE}\frac{K_E}{a_{KE}} + a_{LM}\frac{K_M}{a_{KM}} + a_{LS}\frac{K_S}{a_{KS}} = L \qquad (A1)'$$

Totally differentiating:

$$(\hat{a}_{LE} + 0 - \hat{a}_{KE}) + (\hat{a}_{LM} + 0 - \hat{a}_{KM}) + (\hat{a}_{LS} + 0 - \hat{a}_{KS}) = 0$$

$$(\hat{a}_{LE} - \hat{a}_{KE}) + (\hat{a}_{LM} - \hat{a}_{KM}) + (\hat{a}_{LS} - \hat{a}_{KS}) = 0$$

$$\lambda_{LE}(\hat{a}_{LE} - \hat{a}_{KE}) + \lambda_{LM}(\hat{a}_{LM} - \hat{a}_{KM}) + \lambda_{LS}(\hat{a}_{LS} - \hat{a}_{KS}) = 0 \qquad (A6)$$

$$\hat{K}_E = 0, \ \hat{K}_M = 0, \ \hat{K}_S = 0, \ \hat{L} = 0$$

Since the supply of production factors is fixed, i.e.:

$$L = \text{constant} \Leftrightarrow \hat{L} = d\ln L = 0$$

$$K_j = \text{constant} \Leftrightarrow \hat{K}_j = d\ln\hat{K}_j = 0$$

$$(j = E,M,S)$$

$$\lambda_{LE}(\hat{a}_{LE} - \hat{a}_{KE}) + \lambda_{LM}(\hat{a}_{LM} - \hat{a}_{KM}) + \lambda_{LS}(\hat{a}_{LS} - \hat{a}_{KS}) = 0 \quad \text{(A6)}$$

$$\hat{a}_{Lj} - \hat{a}_{Kj} = -\sigma_j(\hat{w} - \hat{r}_j) \quad (j = E,M,S) \quad \Leftrightarrow \begin{cases} \hat{a}_{LE} - \hat{a}_{KE} = -\sigma_E(\hat{w} - \hat{r}_E) \\ \hat{a}_{LM} - \hat{a}_{KM} = -\sigma_M(\hat{w} - \hat{r}_M) \\ \hat{a}_{LS} - \hat{a}_{KS} = -\sigma_S(\hat{w} - \hat{r}_S) \end{cases} \quad \text{(A7)}$$

The Hicks or direct elasticity of substitution is traditionally derived from the production function.

Stern, David I. (2008): *Derivation of the Hicks Elasticity of Substitution from the Input Distance Function.*

The conditions of profit maximization (price-equal-to-unit-cost):

$$\hat{p}_E = \theta_{LE}\hat{w} + \theta_{KE}\hat{r}_E - \pi \quad \text{(A8)}$$

$$0 = \theta_{LM}\hat{w} + \theta_{KM}\hat{r}_M \quad \text{(A9)}$$

$$\hat{p}_S = \theta_{LS}\hat{w} + \theta_{KS}\hat{r}_S \quad \text{(A10)}$$

$$\hat{w} = \xi_E \pi + \xi_S \hat{p}_S \quad \text{(A11)}$$

Substituting (A7), (A8), (A9), (A10) into (A6) and rearranging gives (A11):

$$\xi_j \equiv \frac{I}{\Delta}\lambda_{Lj}\frac{\sigma_j}{\theta_{Kj}} \ (j = E,M,S) \Leftrightarrow \begin{cases} \xi_E \equiv \frac{I}{\Delta}\lambda_{LE}\frac{\sigma_E}{\theta_{KE}} \\ \xi_M \equiv \frac{I}{\Delta}\lambda_{LM}\frac{\sigma_M}{\theta_{KM}} \\ \xi_S \equiv \frac{I}{\Delta}\lambda_{LS}\frac{\sigma_S}{\theta_{KS}} \end{cases}$$

$$\Delta \equiv \lambda_{LE}\frac{\sigma_E}{\theta_{KE}} + \lambda_{LM}\frac{\sigma_M}{\theta_{KM}} + \lambda_{LS}\frac{\sigma_S}{\theta_{KS}}$$

- Turning now to the market of services:

The equation for the change in services demand:

$$\hat{C}_S = -\varepsilon_S \hat{p}_S + \eta\hat{y} \quad \text{(A2)}$$

A recourse to Slutsky's conditions to the variations of services demand $C_S = C_S\left(p_S, p_M, p_E, Y\right)$, gives the expression in the left side.

The Equation of the change in the real income is given by:

$$\hat{y} = \theta_E \pi \quad \text{(A3)}$$

The change in the real income: $\hat{y} = d \ln y$.

The real income varies with the transfers π (i.e. the Hicksian measure of the extent of technological improvement) weighted by their part in the national income θ_E.

Then the variations of services demand comes as follows:

$$\hat{C}_S = -\varepsilon_S \hat{p}_S + \eta \theta_E \pi \quad \text{(A4)}$$

Substituting the term of real income by its components, gives a more detailed expression of the change in the services demand.

Then comes the expression of services supply:

$$\hat{X}_S = \phi_S \left(\hat{p}_S - \hat{w} \right) \quad \text{(A13)}$$

Where: $\phi_S = \dfrac{\sigma_S \theta_{LS}}{\theta_{KS}}$

$$\left(\phi_S + \varepsilon_S \right) \hat{p}_S = \phi_S \hat{w} + \eta \theta_E \pi \quad \text{(A14)}$$

(A14) comes from the equalization of (A4) and (A13) that is the services demand and supply.

$\left(\phi_S + \varepsilon_S \right)$ is the compensated elasticity of excess supply of services at a given wage rate.

- The last step consists in jointly solving (A11) and (A14) in order to get the effects of the boom on p_S and w:

$$A\hat{p}_S = \left(\eta \theta_E + \phi_S \xi_E \right) \pi > 0 \quad \text{(A15)}$$

$$A\hat{w} = \left[\eta \xi_S \theta_E + \left(\phi_S + \varepsilon_S \right) \xi_E \right] \pi > 0 \quad \text{(A16)}$$

$$A \equiv \phi_S \left(I - \xi_S \right) + \varepsilon_S > 0 \quad \text{(A17)}$$

is the compensated elasticity of excess supply of services, when p_S induces a change in w.

- Derived comparative-static effects:

This part sets forth changes in the returns to factors of production. It is the comparison between these returns to production factors before and after the boom. The sign of the components in the RHS of the following equations indicates whether they move to the same or opposite direction to the returns to production factors.

The comparative-static effect concerning the return to labor (i.e., the real wage)

The real wage determines the change in the output and employment levels of the services sector.

The first expression shows "the change in the real (product) wage in the services sector".

$$A\left(\hat{w} - \hat{p}_S \right) = \left[-\eta \theta_E \left(I - \xi_S \right) + \xi_E \varepsilon_S \right] \pi \quad \text{(A18)}$$

The second expression represents the "change in the real wage from the [`wage-earners'] standpoint".

$$A\left(\hat{w} - \alpha_S \hat{p}_S \right) = \left\{ \eta \theta_E \left(\xi_S - \alpha_S \right) + \xi_E \left[\phi_S \left(I - \alpha_S \right) + \varepsilon_S \right] \right\} \pi \quad \text{(A19)}$$

α_S represents the "share of services in the consumption basket of wage-earners".

The comparative-static effect concerning the return to specific factors in each sector

The following expressions result from combining equations (A15) and (A16) with (A8), (A9), and (A10).

The change in the rental on specific factor in the energy sector:

$$\theta_{KE} A \hat{r}_E = \left[-\eta \xi_S \theta_{LE} \theta_E + \phi_S \left(I - \theta_{LE} \xi_E - \xi_S \right) + \varepsilon_S \left(I - \theta_{LE} \xi_E \right) \right] \pi \quad \text{(A20)}$$

The change in the rental on specific factor in the manufacturing sector:

$$\theta_{KM} A\hat{r}_M = -\theta_{LM}\left[\eta\xi_S\theta_E + \xi_E\left(\phi_S + \varepsilon_S\right)\right]\pi < 0 \qquad \text{(A21)}$$

The change in the rental on specific factor in the services sector:

$$\theta_{KS} A\hat{r}_S = \left[\eta\left(I - \theta_{LS}\xi_S\right)\theta_E + \xi_E\left(\theta_{KS}\phi_S + \theta_{LS}\varepsilon_S\right)\right]\pi \qquad \text{(A22)}$$

The change in the rental in the energy sector relative to the price of services:

$$\theta_{KE} A\left(\hat{r}_E - \hat{p}_S\right) = \left[-\eta\theta_E\left(\xi_S\theta_{LE} + \theta_{KE}\right) + \phi_S\xi_M + \varepsilon_S\left(I - \theta_{LE}\xi_E\right)\right]\pi \quad \text{(A23)}$$

The change in the rental differential between the manufacturing and energy sectors:

$$\theta_{KE}\theta_{KM}\left(\hat{r}_E - \hat{r}_M\right) = \theta_{KM}\pi + \left(\theta_{LM} - \theta_{LE}\right)\hat{w} \qquad \text{(A24)}$$

$$\theta_{KE}\theta_{KM} A\left(\hat{r}_E - \hat{r}_M\right) = \left\{\eta\xi_S\theta_E\left(\theta_{LM} - \theta_{LE}\right) + \phi_S\left(\theta_{KE}\xi_E + \theta_{KM}\xi_M\right) + \xi_S\left[\theta_{KE}\xi_E + \theta_{KM}\left(I - \xi_E\right)\right]\right\}\pi$$

(A25)

This expression is obtained by substituting from (A16) for $\hat{w}$.

<u>Labor mobile between the three sectors and capital mobile between the lagging and services sector</u>

Let's keep in mind that η determines the magnitude of the spending effect and E_{Lw} of the resource movement effect.

- On the market of production factors:

As the manufacturing and the services sectors share now one same specific factor, the rentals r_M and r_S are replaced by the unique return to specific factor, r_{MS}.

- "The relationship between the wage rate and the price of services (both measured in terms of manufactures)":

$$\left|\theta\right|\hat{w} = -\theta_{KM}\hat{p}_S \quad \text{(A26)}$$

$|\theta| \equiv \theta_{LM} - \theta_{LS} = \theta_{KS} - \theta_{KM}$ (A27) is "the determinant of the matrix of factor shares in the manufacturing and services sectors".

It is "positive if and only manufacturing is more labor-intensive than services".

$$|\theta|(\hat{w} - \hat{p}_S) = -\theta_{KS}\hat{p}_S \quad \text{(A28)}$$

"From the Stolper-Samuelson theorem, the change in p_S determines the direction of change in the real wage."

- The change in labor supply, L_E, in the energy sector is the function of wage rate and technology level "(since p_E is held constant)":

$$a_{KM}X_M + a_{KS}X_S = K_{MS} \quad \text{(A29)}$$

$$a_{LM}X_M + a_{LS}X_S = L_{MS} \quad \text{(A30)}$$

$$\hat{L}_E = \frac{\sigma_E}{\theta_{KE}}(\pi - \hat{w}) \quad \text{(A32)}$$

$$\hat{L}_{MS} = E_{Lw}(\hat{w} - \pi) \quad \text{(A33)}$$

Differentiating $L_{MS} = L - L_E$ and substituting it in (A32) yields (A33),

where $E_{Lw} = \frac{\lambda_{LE}}{I - \lambda_{LE}} \frac{\sigma_E}{\theta_{KE}} \geq 0$ (A34)

Is the labor supply elasticity.

A $E_{Lw} = 0$ implies no resource movement effect in the model.

- Turning now to the market of services:

The approach by Jones (1965) and the model by Martin and Neary (1980) have been used in order to solve for the "general-equilibrium services sector supply function":

$$\hat{X}_S = \bar{E}_S \hat{p}_S + \frac{\lambda_{KM}}{|\lambda|} E_{Lw} \pi \quad \text{(A35)}$$

$|\lambda| \equiv \lambda_{LM} - \lambda_{LS}$ (A36) is the determinant of the matrix factor allocations to the manufacturing and services sectors and is positive if and only if manufacturing is relatively labor-intensive.

"By assumption, there are no factor-market distortions"; therefore $|\lambda|$ and $|\theta|$" have the same sign".

$\bar{E}_S \equiv E_S + \frac{\lambda_{KM}\theta_{KM}}{|\lambda||\theta|} E_{Lw}$ (A37) is "the general-equilibrium price-elasticity of supply of services taking account of the variability of labor supply"; where E_S is the fixed labor supply elasticity.

To get the effect of the boom on the price of services, the demand (A4) and supply (A35) of services have been equated:

Recall that $\hat{C}_S = -\varepsilon_S \hat{p}_S + \eta\theta_E \pi$ (A4)

$$B\hat{p}_S = \left(\eta\theta_E - \frac{\lambda_{KM}}{|\lambda|} E_{Lw} \right) \pi \quad \text{(A38)}$$

Where $B \equiv \bar{E}_S + \varepsilon_S$ (A39) is the "general-equilibrium elasticity of excess supply of services and is necessarily positive".

Thus the signs of the components in the RHS of this equation reveal the variables that have a positive and the ones that have a negative impact on the price of the services. Here, as we have both a positive and a negative sign, more information on the magnitude of these variables is needed in order to know whether the price of services will rise or fall.

Now the change in the manufacturing is gotten from the same processes as those that enabled to obtain (A35):

$$\hat{X}_M = -\bar{E}_M \hat{p}_S - \frac{\lambda_{KS}}{|\lambda|} E_{Lw} \pi \quad \text{(A40)}$$

Where "$\bar{E}_M$ is defined analogously to $\bar{E}_S$ and is positive".

"Substituting from (A38) for $\hat{p}_S$ (and making use of the fact that $\lambda_{KM}\bar{E}_M = \lambda_{KS}\bar{E}_S$) yields the required result":

$$B\hat{X}_M = -\left(\eta\theta_E \bar{E}_M + \varepsilon_S \frac{\lambda_{KS}}{|\lambda|} E_{Lw} \right) \pi \quad \text{(A41)}$$

This equation shows that the manufacturing output is a negative function of the set of variables in the RHS. Therefore it is obvious that the output in the manufacturing sector decreases anyway, considering that each of the variables is non-negative.

Labor and capital mobile between the three sectors

In this case, there is one common wage rate (w) and one common rental (r) on the capital for the three sectors. "The coefficient on η determines the sign of the spending effect whereas the coefficient on ε_S determines the sign of the resource movement effect".

The effect of boom on the wage rate:

$$|\theta_E| \hat{w} = \theta_{KM} \pi \quad \text{(A42)}$$

The equation is obtained by suppressing the common rental (r) from (A8) and (A9).

$|\theta_E| \equiv \theta_{LE} - \theta_{LM}$ (A43) is "the determinant of the matrix of factor shares in the energy and manufacturing sectors, and is positive if and only if the energy sector is relatively labor-intensive".

The wage rate is then a positive function of θ_{KM} (the share of factor K in the value of output in sector M) and π (the Hicksian measure of the extent of technological improvement, which measures the proportional increase in energy output, holding constant the employment of all factors in that sector).

The effect of the boom on the price of services:

$$\hat{p}_S = -\frac{|\theta|}{|\theta_E|}\pi \qquad \text{(A44)}$$

"The equations (42) and (A43) underlie the results presented in Table 2 in Chapter III".

The effect of the boom on the services output:

$$\hat{X}_S = \left(\varepsilon_S \frac{|\theta|}{|\theta_E|} + \eta\theta_E \right)\pi \quad \text{(A45)}$$

(A45) is "obtained by substituting (A44) into (A4)".

The equation "shows that the spending effect η necessarily raises the output of services, whereas the resource movement effect ε_S raises it provided manufacturing is not extremal in terms of relative factor intensities".

The effect of the boom on the manufacturing output:

$$a_{KE}X_E + a_{KM}X_M + a_{KS}X_S = K \quad \text{(A46)}$$

$$\lambda_{LE}\hat{X}_E + \lambda_{LM}\hat{X}_M + \lambda_{LS}\hat{X}_S = \delta_L\left(\hat{w} - \hat{r}\right) \quad \text{(A47)}$$

"We use the full-employment constraints (A1) $a_{LE}X_E + a_{LM}X_M + a_{LS}X_S = L$ for labor

and the corresponding equation for capital (A46) $a_{KE}X_E + a_{KM}X_M + a_{KS}X_S = K$".

$$\lambda_{KE}\hat{X}_E + \lambda_{KM}\hat{X}_M + \lambda_{KS}\hat{X}_S = -\delta_K\left(\hat{w} - \hat{r}\right) \quad \text{(A48)}$$

(A47) and (A48) are obtained from "differentiating (A1) and (A46) and relating the changes in input-output coefficients to changes in wage-rental ratio in the manner of Jones (1965)".

δ_L and δ_K, respectively, represents "the elasticity of demand for labor and capital at given output levels in response to a change in the wage-rental ratio; these parameters are positive and their magnitude depends on the ease of substitutability of capital for labor in all three sector".

$$\hat{X}_M = \frac{|\lambda_S|}{|\lambda_E|}\hat{X}_S - \frac{\delta}{|\lambda_E||\theta_E|}\pi \qquad \text{(A49)}$$

(A49) is obtained by "eliminating $\hat{X}_E$ from (A47) and (A48) and using (A8) and (A9) to eliminate the change in the wage-rental ratio".

The second term in (A49):

$\delta \equiv \lambda_{KE}\delta_L + \lambda_{LE}\delta_K$ (A50) is the weighted sum of δ_L and δ_K and is necessarily positive".

"$|\theta_E|$ is defined in (A43) and $|\lambda_E| \equiv \lambda_{LE}\lambda_{KM} - \lambda_{LM}\lambda_{KE}$ (A51) is the determinant of the matrix of factor allocations to the energy and manufacturing sectors". It "is positive if and only if energy is labor-intensive relative to manufacturing and so it has the same sign as $|\theta_E|$. The second term in (A49) is thus unambiguously negative, reflecting the direct de-industrialization brought about by the resource movement effect of the boom. This corresponds in Fig. 5 to the movement of the manufacturing production point from A' to F".

The first term in (A49):

Its "magnitude depends on the change in services output brought about by the boom. Substituting this change from (A45), the change in manufacturing output may alternatively be written as follows":

$$\hat{X}_M = \frac{I}{|\lambda_E||\theta_E|}\left(\eta\theta_E|\lambda_S||\theta_E| + \varepsilon_S|\lambda_S||\theta| - \delta\right)\pi \quad \text{(A52)}$$

"The coefficients of η (which determines the sign of the spending effect) and of ε_S (which determines the sign of that part of the resource movement effect working through the price of services) may be positive or negative depending on the relative factor intensities of all three sectors. These operate both through the determinants $|\theta|$ and $|\theta_E|$ already defined and through the determinant $|\lambda_S|$, which is defined in a similar manner to $|\lambda_E|$":

$$|\lambda_S| \equiv \lambda_{LS}\lambda_{KE} - \lambda_{LE}\lambda_{KS} \quad \text{(A53)}$$

This is positive if and only if services are labor-intensive relative to energy.

APPENDIX 2: Models and Theorems used in Corden & Neary Model.

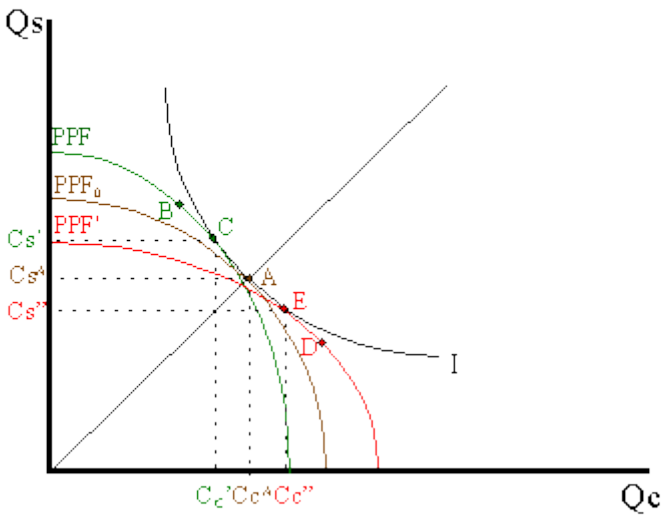
I. Appendix 2.1.The Heckscher-Ohlin (H-O) Theorem.

"The Heckscher-Ohlin theorem states that a country which is capital-abundant will export the capital-intensive good. Likewise, the country which is labor-abundant will export the labor-intensive good. Each country exports that good which it produces relatively better than the other country. In this model a country's advantage in production arises solely from its relative factor abundance.

The Heckscher-Ohlin Theorem - Graphical Depiction - Variable Proportions

The H-O model assumes that the two countries (US and France) have identical technologies, meaning they have the same production functions available to produce steel and clothing. The model also assumes that the aggregate preferences are the same across countries. The only difference that exists between the two countries in the model is a difference in resource

endowments. We assume that the US has relatively more capital per worker in the aggregate than does France. This means that the US is capital-abundant compared to France. Similarly, France, by implication, has more workers per unit of capital in the aggregate and thus is labor-abundant compared to the US. We also assume that steel production is capital-intensive and clothing production is labor-intensive.



The difference in resource endowments is sufficient to generate different PPFs in the two countries such that equilibrium price ratios would differ in autarky. To see why, imagine first that the two countries are identical in every respect. This means they would have the same PPF (depicted as the brown PPF_0 in the adjoining figure), the same set of aggregate indifference curves and the same autarky equilibrium. Given the assumption about aggregate preferences, that is $U = C_C C_S$, the indifference curve, I, will intersect the countrys' PPFs at point **A**, where the absolute value of the slope of the tangent line (not drawn), (P_C/P_S), is equal to the slope of the ray from the origin through point **A**. The slope is given by $\mathbf{C_S^A/C_C^A}$. In other words, the autarky price ratio in each country will be given by,

$$\left(\frac{P_C}{P_S}\right)^0_{Aut} = \frac{C_S^A}{C_C^A}$$

Next suppose that labor and capital are shifted between the two countries. Suppose labor is moved from the US to France while capital is moved from France to the US. This will have two effects. First, the US will now have more capital and less labor, France will have more labor and less capital than initially. This implies that **K/L>K*/L***, or that the US is capital-abundant and France is labor-abundant. Secondly, the two countries PPFs will shift. To show how, we apply the Rybczynski theorem.

The US experiences an increase in K and a decrease in L. Both changes will cause an increase in output of the good that uses capital intensively (i.e. steel) and a decrease in output of the other good (clothing). The Rybczynski theorem is derived assuming that output prices remain

constant. Thus if prices did remain constant, production would shift from point **A** to **B** in the diagram and the US PPF would shift from the brown PPF_0 to the green **PPF**.

Using the new PPF we can deduce what the US production point and price ratio would be in autarky given the increase in the capital stock and decline in labor stock. Consumption could not occur at point **B** since, 1) the slope of the PPF at **B** is the same as the slope at **A** since the Rybczynski theorem was used to identify it, and 2) homothetic preferences implies that the indifference curve passing through **A** must have a steeper slope since it lies along a steeper ray from the origin.

Thus, to find the autarky production point we simply find the indifference curve which is tangent to the US PPF. This occurs at point **C** on the new US PPF along the original indifference curve, **I**. (Note: the PPF was conveniently shifted so that the same indifference curve could be used. Such an outcome is not necessary but does make the graph less cluttered.) The negative of the slope of the PPF at **C** is given by the ratio of quantities C_S'/C_C'. Since $C_S'/C_C' > C_S^A/C_C^A$, it follows that the new US price ratio will exceed the one prevailing before the capital and labor shift, i.e., $P_C/P_S > (P_C/P_S)^0$. In other words, the autarky price of clothing is higher in the US after it experiences the inflow of capital and outflow of labor.

France experiences an increase in L and a decrease in K. These changes will cause an increase in output of the labor-intensive good (i.e. clothing) and a decrease in output of the capital-intensive good (steel). If price were to remain constant, production would shift from point **A** to **D** in the diagram and the French PPF would shift from the brown PPF_0 to the red PPF^*.

Using the new PPF we can deduce the French production point and price ratio in autarky, given the increase in the capital stock and decline in labor stock. Consumption could not occur at point **D** since homothetic preferences implies that the indifference curve passing through **D** must have a flatter slope since it lies along a flatter ray from the origin. Thus to find the autarky production point we simply find the indifference curve which is tangent to the French PPF. This occurs at point **E** on the new French PPF along the original indifference curve,**I**. (As before, the PPF was conveniently shifted so that the same indifference curve could be used.) The negative of the slope of the PPF at **C** is given by the ratio of quantities C_S''/C_C'', Since $C_S'/C_C'' < C_S^A/C_C^A$, it follows that the new French price ratio will be less than the one prevailing before the capital and labor shift, i.e.,$P_C^*/P_S^* < (P_C/P_S)^0$. This means that the autarky price of clothing is lower in France after it experiences the inflow of labor and outflow of capital.

All of the above implies that as one country becomes labor-abundant and the other capital-abundant, it causes a deviation in their autarky price ratios. The country with relatively more labor (France) is able to supply relatively more of the labor-intensive good (clothing) which in turn reduces the price of clothing in autarky relative to the price of steel. The US with relatively more capital can now produce more of the capital-intensive good (steel) which lowers its price in autarky relative to clothing. These two effects together imply that

$$\left(\frac{P_C}{P_S}\right)^{US}_{Aut} > \left(\frac{P_C}{P_S}\right)^{Fr}_{Aut}$$

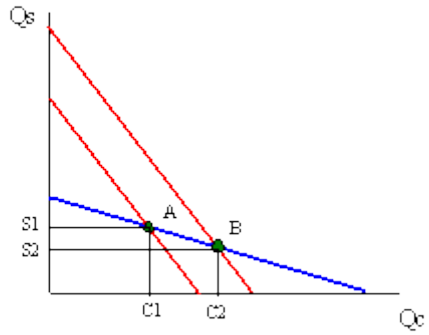
Any difference in autarky prices between the US and France is sufficient to induce profit-seeking firms to trade. The higher price of clothing in the US (in terms of steel) will induce firms in France to export clothing to the US to take advantage of the higher price. The higher price of steel in France (in terms of clothing) will induce US steel firms to export steel to France. Thus, the US, abundant in capital relative to France, exports steel, the capital-intensive good. France, abundant in labor relative to the US, exports clothing, the labor-intensive good.**This is the Heckscher-Ohlin theorem. Each country exports the good intensive in the country's abundant factor**".

http://internationalecon.com/Trade/Tch60/T60-8.php.

II. Appendix 2.2.The Rybczynski Theorem.

"**The Relationship between Endowments and Outputs.**

The Rybczynski theorem demonstrates how changes in an endowment affects the outputs of the goods when full employment is maintained. The theorem is useful in analyzing the effects of capital investment, immigration and emigration within the context of a H-O model. Consider a diagram depicting a labor constraint in red (it's the steeper lower line) and a capital constraint in blue (the flatter line). Suppose production occurs initially on the PPF at point A.



Next, suppose there is an increase in the labor endowment. This will cause an outward parallel shift in the labor constraint. The PPF and thus production will shift to point B. Production of clothing, the labor intensive good, will rise from C1 to C2. Production of steel, the capital-intensive good, will fall from S1 to S2.

If the endowment of capital rose the capital constraint would shift out causing an increase in steel production and

a decrease in clothing production. Recall that since the labor constraint is steeper than the capital constraint, steel is capital-intensive and clothing is labor-intensive.

This means that in general, **an increase in a country's endowment of a factor will cause an increase in output of the good which uses that factor intensively, and a decrease in the output of the other good.**

http://internationalecon.com/Trade/Tch60/T60-3.php

III. Appendix 2.3.The Stolper-Samuelson Theorem.

The Stolper-Samuelson theorem demonstrates how changes in output prices affect the prices of the factors when positive production and zero economic profit are maintained in each industry . It is useful in analyzing the effects on factor income, either when countries move from autarky to free trade or when tariffs or other government regulations are imposed within the context of a H-O model.

Due to the assumption of perfect competition in all markets, if production occurs in an industry, then economic profit is driven to zero. The zero profit conditions in each industry imply,

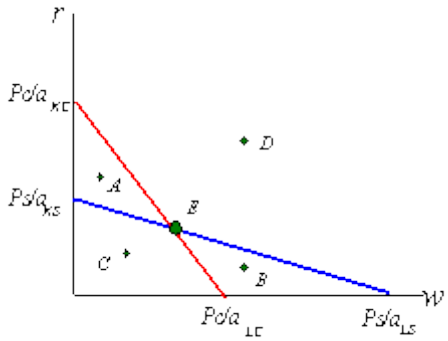
$$P_S = a_{LS}w + a_{KS}r$$

$$P_C = a_{LC}w + a_{KC}r$$

where P_S and P_C are the prices of steel and clothing respectively, w is the wage paid to labor and r is the rental rate on capital. Note that $a_{LS}w \left[\frac{labor-hrs}{ton}\frac{\$}{labor-hr} = \frac{\$}{ton}\right]$ is the dollar payment to workers per ton of steel produced, while $a_{KS}r \left[\frac{capital-hrs}{ton}\frac{\$}{capital-hr} = \frac{\$}{ton}\right]$ is the dollar payment to capital owners per ton of steel produced. The right-hand-side sum then is the dollars paid to all factors per ton of steel produced. If the payments to factors for each ton produced equals the price per ton then profit must be zero in the industry.

The same logic is used to justify the zero profit condition in the clothing industry.

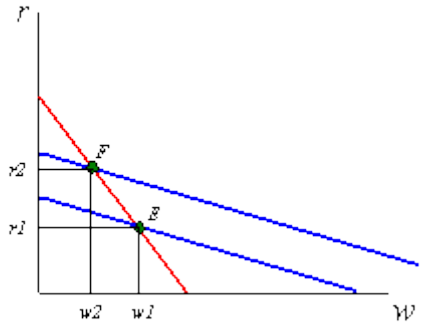
We imagine that firms treat prices exogenously since any one firm is too small to affect the price in its market. Since the factor output ratios are also fixed, wages and rentals remain as the two unknowns. In the adjoining diagram we plot the two zero-profit conditions in wage-rental space.



The set of all wage and rental rates which will generate zero profit in the steel industry at the price P_S is given by the flatter blue line. At wage and rental combinations above the line, as at points A and D, the per unit cost of production would exceed the price and profit would be negative. At wage-rental combinations below the line as at points B and C, the per unit cost of production would fall short of the price and profit would be positive. Notice that the slope of the flatter blue line is $-\frac{P_S/a_{KS}}{P_S/a_{LS}} = -\frac{a_{LS}}{a_{KS}}$.

Similarly the set of all wage-rental rate combinations which generate zero profit in the clothing industry at price P_C is given by the steeper red line. All wage-rental combinations above the line, as at points B and D, generate negative profit, while wage-rental combinations below the line, as at A and C, generate positive profit. The slope of the steeper red line is $-\frac{P_C/a_{KC}}{P_C/a_{LC}} = -\frac{a_{LC}}{a_{KC}}$.

The only wage-rental combination that can simultaneously support zero profit in both industries is found at the intersection of the two zero-profit lines - point E. This point represents the equilibrium wage and rental rates that would arise in an H-O model when the price of steel is P_S and the price of clothing is P_C.



Now, suppose there is an increase in the price of one of the goods. Say the price of steel, P_S, rises. This could occur if a country moves from autarky to free trade, or, if a tariff is placed on imports of steel. The price increase will cause an outward parallel shift in the blue zero-profit line for steel as shown in the adjoining Figure. The equilibrium point will shift from E to F causing an increase in the equilibrium rental rate from r1 to r2, and a decrease in the equilibrium wage rate from w1 to w2. Only with a higher rental rate and lower wage can zero profit be maintained in both industries at the new set of prices. Using the slopes of the zero-profit lines we can show that $\frac{a_{LC}}{a_{KC}} > \frac{a_{LS}}{a_{KS}}$ which means that clothing is labor intensive and steel is capital

intensive. Thus, when the price of steel rises, the payment to the factor used intensively in steel production (capital) rises, while the payment to the other factor (labor) falls.

If the price of clothing had risen, the zero-profit line for clothing would have shifted right causing an increase in the equilibrium wage rate and a decrease in the rental rate. Thus an increase in the price of clothing causes an increase in the payment to the factor used intensively in clothing production (labor) and a decrease in the payment to the other factor (capital).

This gives us the Stolper-Samuelson theorem: **An increase in the price of a good will cause an increase in the price of the factor used intensively in that industry and a decrease in the price of the other factor.**

http://internationalecon.com/Trade/Tch60/T60-5.php.

The Magnification Effect for Prices.

The magnification effect for prices is a more general version of the Stolper-Samuelson theorem. It allows for simultaneous changes in both output prices and compares the magnitudes of the changes in output and factor prices".

http://internationalecon.com/Trade/Tch60/T60-6.php.

IV. Appendix 2.4.The Factor-Price Equalization.

"The fourth major theorem that arises out of the Heckscher-Ohlin model is called the factor-price equalization theorem. Simply stated the theorem says that **when the prices of the output goods are equalized between countries as they move to free trade, then the prices of the factors (capital and labor) will also be equalized between countries.**

This implies that free trade will equalize the wages of workers and the rents earned on capital throughout the world.

The theorem derives from the assumptions of the model, the most critical of which is the assumption that the two countries share the same production technology and that markets are perfectly competitive.

In a perfectly competitive market the return to a factor of production depends upon the value of its marginal productivity. The marginal productivity of a factor, like labor, in turn depends upon the amount of labor being used as well as the amount of capital. As the amount of labor rises in an industry, labor's marginal productivity falls. As the amount of capital rises, labor's marginal productivity rises. Finally the *value* of productivity depends upon the output price commanded by the good in the market.

In autarky, the two countries face different prices for the output goods. The difference in prices alone is sufficient to cause a deviation in wages and rents between countries, because it affects the marginal productivity. However, in addition, in a variable proportions model the difference in wages and rents also affects the capital-labor ratios in each industry, which in turn affects the marginal products. All of this means that for various reasons the wage and rental rates will differ between countries in autarky.

Once free trade is allowed in outputs, output prices will become equal in the two countries. Since the two countries share the same marginal productivity relationships it follows that only one set of wage and rental rates can satisfy these relationships for a given set of output prices. Thus free trade will equalize goods prices and wage and rental rates.

Since the two countries face the same wage and rental rates they will also produce each good using the same capital-labor ratio. However, because the countries continue to have different quantities of factor endowments, they will produce different quantities of the two goods".

http://internationalecon.com/Trade/Tch60/T60-14.php

(Suranovic, 1996).

APPENDIX 3: The measurement of profitability.

"There exists much controversy regarding the most appropriate measure of profitability. Among different measures of profit, two most widely accepted measures are the price-cost margins and rate of return on assets or equity". Yet, "a major problem with rate of return measure of profitability arises from lack of comparable data on assets classified by suitably disaggregated industry (Clarke 1985)". That is why "in most studies", profitability "is measured as value added at factor cost minus wages and salaries, depreciation and other over-head costs divided by total revenue, and hence is an approximation to the ratio of gross profits and overheads to sales. The use of price-cost margin, as a measure of profit rates, has been criticized on the ground that it is profit rate on the firm's sales, not on firm's invested capital or asset (Benishay, 1967). However, on the same ground price-cost margin has been regarded as a superior measure of profit. The price-cost margins are calculated by subtracting costs from gross sales. The Census of Manufacturing

Industries (CMI) data for 1985/86 and 1986/87 are used to calculate the price-cost margins as: $PCM_j = \frac{Q_j - EC_j - IC_j - NIC_j}{Q_j}$

where Q_j is the value of output excluding indirect taxes. EC_j denotes employment cost which includes wage and salaries. IC_j refers to intermediate cost. This is composed of cost on raw material and fuel and electricity. NIC_j depicts non-industrial cost, which consists of depreciation, rent, interest, advertisement and other overhead costs" (Khondker, 1996). The above formula shows how the profitability is supposed to rise with the quantity and the own-price of the output, and to decrease with any cost induced by the production of the output. Thus if the boom effect (through the resource movement and the spending effects) affects only one of the variables in the profitability formula, it would be straightforward to determine whether the shock resulted in the rise or decrease of the profitability. However, mostly the resource movement effect and the spending effect affect more than one variable of the profitability formula. Consequently, the move of the profitability will depends on the variable that weighs more. More precisely the profitability will go down if the spending and resource movement effects lead to heavier costs than the turnover and vice-versa.

APPENDIX 4: Trend-based budgeting.

"When business conditions are changing, developing a budget that anticipates where the trend is going is wise and appropriate. The skilled manager or budget analyst must review historical data, draw conclusions based on those facts and balance that knowledge with current market conditions and what she believes will happen in the future. The results of this analysis will be presented as the new, trend based budget"; (Bigelow).

APPENDIX 5: Intergeneration Equity Model by Hartwick.

(Hartwick, 1977, ss. 972-973)

Hartwick prescribes how an exhaustible resource can equitably be shared between the present generation and the future generation. According to the Hartwick, intergenerational equity translates into the investment of the revenues from the exhaustible resource in productive capital such "machines" (that would not depreciate) so as to maintain the GDP per capita constant throughout the subsequent generations. Thus when considering the case of a "one-commodity world", this is achieved when "the rate of change in the marginal product of the" exhaustible resource equals "the marginal product of reproducible capital". The revenues of the Norwegian oil is kept in the Government Pension Fund Global (a sovereign fund), which is not directly a real capital (like machines) even though it is a reproducible capital (i.e., a financial capital). As such, the growing Norwegian oil-rent does somehow comply to Hartwick intergenerational equity model. The non-renewable resource that represent the Norwegian oil has via the Government Pension Fund Global been turned into a renewable (financial) resource. The creation of this latter renewable (financial) resource has permitted the Norwegian representatives to skirt the application of intergenerational equity since the renewable capital are abroad not in Norway. Therefore, the intergenerational equity associated to the Norwegian Fiscal Rule (*Handlingsregelen*) is debatable.

APPENDIX 6: Flåten's criticism on the valuation of Natural capital contribution to national income.

I. Appendix 6.1. Computation of the human capital by the Norwegian SSB method

$$\text{Economic Rent of Natural Capital} = \text{GrossProduct} - \begin{pmatrix} \text{Depreciation} + \text{Labor Costs} \\ + \text{Net Subsidies} \\ + \text{Normal Retrun To Real Capital} \end{pmatrix}$$

$$\text{Economic Rent of Produced Real Capital} = \text{GrossProduct} - \begin{pmatrix} \text{Depreciation} + \text{Labor Costs} \\ + \text{Net Subsidies} \\ + \text{Normal Retrun To Real Capital} \end{pmatrix}$$

$$\text{Economic Rent of Financial} = \text{GrossProduct} - \begin{pmatrix} \text{Labor Costs} \\ + \text{Net Subsidies} \\ + \text{Normal Retrun To Real Capital} \end{pmatrix}$$

$$\text{Human Capital} = \text{National Income} - \begin{pmatrix} \text{Economic Rent of Natural Capital} \\ + \text{Economic Rent of Produced Real Capital} \\ + \text{Economic Rent of Financial} \end{pmatrix}$$

II. Appendix 6.2. The Danish computation method of human capital.

The economic council (2012) resorts to two methods for the computation of human capital, namely the costs method (called method A) and the income method (called method B):

The first, method A, is the *costs method*, and it computes the cost society bears to constitute the human capital. This cost includes public and part of private expenses devoted to teaching, as well as the opportunity cost of studying. Studying while working is not taken into account as it is difficult to quantify. In that method, human capital depreciates over 67 years, which is the expected remaining lifetime for a 16 year old person. The value of the lost earnings is based on the number of people older than 16 years who are either studying or working (for the unskilled labor). This method, which treats human capital as real capital, enables to show that human capital went from 2.7 times the GDP in 1990 to 3.8 times in 2010.

The second Danish method, method B, is the *income method* and is also based on population education. Besides, this method considers the expected return to education as more education yields higher wage. Applied to Danish data, it came out as a return of 4.3% of more education, which means that one additional year of

education over the average time of education increases human capital by 4.3%. With this method, human capital has been estimated to 12.5 times the GDP. Flåten got almost the same figure when he replicates this B method.

III. Appendix 6.3. Flåten replication of the Danish computation method of human capital.

As it becomes obvious in the preceding paragraphs, the magnitude of figures found when using the Danish A method differs substantially from those obtained from implementing method B. For this reason, Flåten has replicated the two methods. As for the data, he notices that resorting to 2010 data or 2011 data does not make significant differences. The following table summarizes Flåten's findings; the most striking point is that human capital is certainly the type of capital that contributes the most to the national income but far less than the statement from the Norwegian Finance Department ("Perspektivemelding").

Table 9. The two alternative calculations of human capital and natural capital contribution to national product.

	The Norwegian evaluation methods		The Danish evaluation methods replicated by Flåten.	
	'Perspektivmelding' evaluation method	SSB evaluation method	Costs method (Method A)	Income method (Method B)
Human Capital	81% of 2010's national income.	71% of 2011's national income.	37.3%	66.2%
Natural Capital	4% of 2010's national income.	11% of 2011's national income.	25.6%	13.8%
Real capital			27.7%	14.9%
Financial Capital			9.4%	5.1%
National wealth			25 409 318 (100%)	47 126 067 (100%)

Economic rent, resource-rent, natural capital.

APPENDIX 7: Sidgwick quotes on GHE.

"Sidgwick's own solution was different. It was, in effect, to justify double standards- one for exceptional, another for ordinary people […] Thus, on Utilitarian principles, it may be right to da and privately recommend, under certain circumstances, what it would not be right t advocate openly; it may be right to teach openly to one set of persons what it would be wrong to teach to others; it may be conceivably right to do, if it can be done with comparative secrecy, what it would be wrong to do in face of the world… These conclusions are all of a paradoxical character; there is no doubt that the moral consciousness of a plain man broadly repudiates the general notion of an esoteric morality, differing from what is popularly taught; and it would be commonly agreed that an action which would be bad if done openly is not rendered good by secrecy. We may observe, however, that there are strong utilitarian reasons for maintaining this latter common opinion… Thus Utilitarian conclusions, carefully stated, would seem to be this: that the opinion that secrecy may render an action right which would not otherwise be so should itself be kept comparatively secret; and similarly it seems expedient that the doctrine that esoteric morality is expedient should itself be kept esoteric. […] "Government House Utilitarianism""; (Skidelsky, 1994, ss. 36-37).

This idea of "paternalistic duplicity […] was not invented by Sidgwick. In Plato's Republic, Socrates" defends the idea of "noble lie"; (Katarzyna & Singer, 2010, s. 36).

APPENDIX 8: Calabresi & Bobbitt quotes on tragic choices.

"We cannot know why the world suffers. But we can know how the world decides that suffering shall come to some persons and not to others. While the world permits the sufferers to be chosen, something beyond their agony is earned, something even beyond the satisfaction of the world's needs and desires. For it is in the choosing that enduring societies preserve or destroy those values that suffering and necessity expose. In this way societies are defined, for it is by the values that are foregone no less than by those that are preserved at tremendous cost that we know a society's character";

“[…] the tragedies of cultures; it is the values accepted by a society as fundamental that mark some choices as tragic”; (Calabresi & Bobbitt, 1978, s. 17).

“They must attempt to make allocations in ways that preserve the moral foundations of social collaboration”;

“But unless the values held in tension have changed, the illusion that denies their conflict gives way and the transformation will have only been a postponement”;

“Action in the context of necessary scarcity brings ultimate values, the values by which a society defines itself, into conflict”; (Calabresi & Bobbitt, 1978, s. 18).

“The paradoxical fact that societies often refuse to permit the production of the full amount of the scarce resource that could be made available without creating other unacceptable scarcities”;

“We often move in what appear to be erratic jumps, valuing life at a rather low level in some circumstances at the first order and at a high level in other situations”;

“By making the result seem necessary, unavoidable, rather than chosen, it attempts to convert what is tragically chosen into what is merely a fatal misfortune. But usually this will be no more than a subterfuge ”; (Calabresi & Bobbitt, 1978, s. 21).

“Scarcity in general remains a fact oflife, but in the particular tragic situation, scarcity and suffering are not merely imposed: the society incurs them by its own decision or, at the least […] it is then we observe most dramatically […] the progression from decision to rationalize to violence which in succeeding cycles characterizes the development of the tragic choice, the flight which evidences the attempt to transform atragic dilemma into a situation in which the conflictof values is not exposed and which the society will not find tragic ”; (Calabresi & Bobbitt, 1978, s. 22).

“Whether the decision is perceived as tragic […] is a function of what methods are used to cope with the fatal scarcity”; (Calabresi & Bobbitt, 1978, s. 23).

“But the trick of dishonesty depends on assumptions on honesty; when these are questioned, honesty serves as a powerful engine of attack on the allocation”; (Calabresi & Bobbitt, 1978, s. 24).

“Honesty is not merely the backdrop against which tragic decisions are made, though it is surely this, as one quickly sees when it is doubted”.

“Though subterfuge may bring us peace, for a while, it is honesty which causes the tragic choice to reappear. It is honesty which must be protected from those allocation methods which taint it, while using its legitimating prestige to deal with

immediate problems, because if altered, honesty loses its analytical power to deal with future problems quite unlike the ones we presently face and flatter ourselves that we understand"; (Calabresi & Bobbitt, 1978, s. 26).

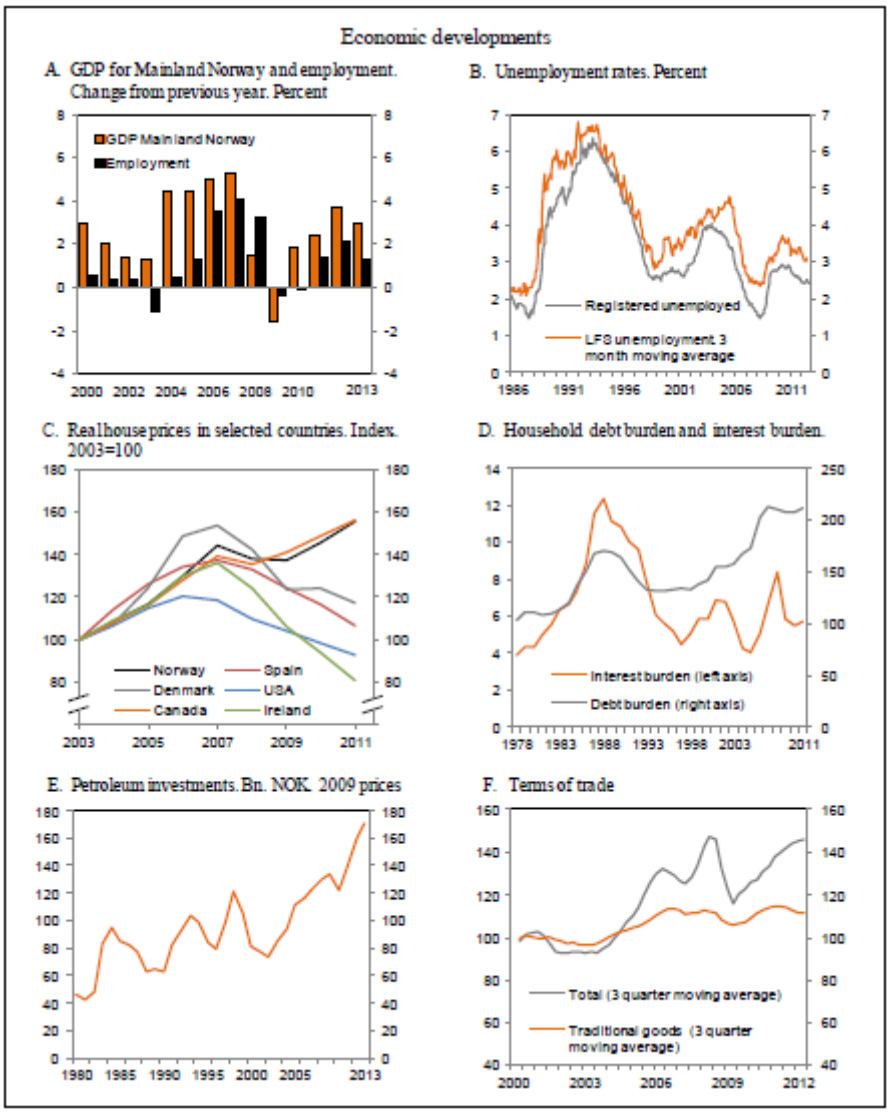
APPENDIX 9: Relationship Wage-Price Level- Output.

http://business.baylor.edu/Tom_kelly/2307ch11.htm

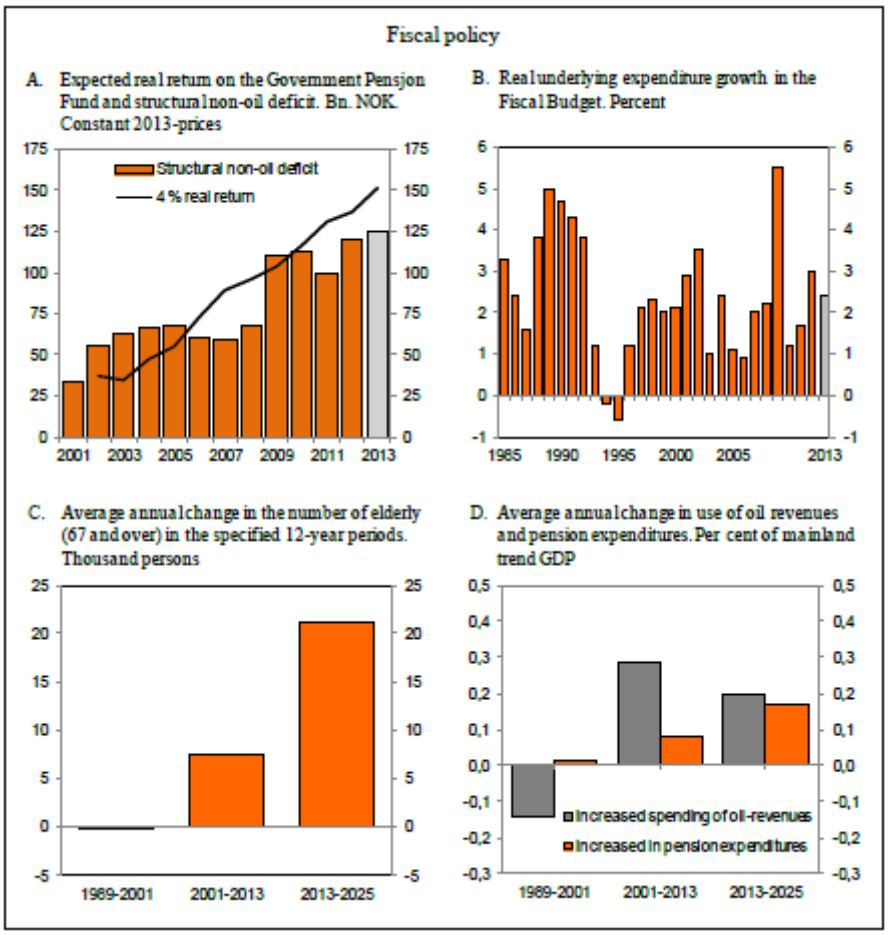
http://www.socscistaff.bham.ac.uk/backhouse/homepage/aukm/Chapter7.pdf

APPENDIX 10: Key figures of the Norwegian economy.

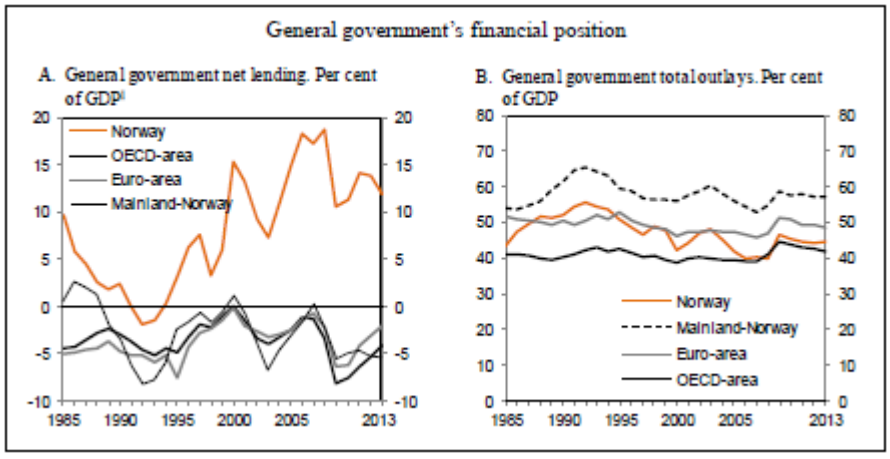
(Finansdepertement, 2013).


Economic developments
A. GDP for Mainland Norway and employment. Change from previous year. Percent
GDP Mainland Norway
Employment
B. Unemployment rates. Percent
Registered unemployed
LFS unemployment 3 month moving average
C. Real house prices in selected countries. Index. 2003=100
Norway
Spain
Denmark
USA
Canada
Ireland
D. Household debt burden and interest burden.
Interest burden (left axis)
Debt burden (right axis)
E. Petroleum investments. Bn. NOK. 2009 prices
F. Terms of trade
Total (3 quarter moving average)
Traditional goods (3 quarter moving average)

(p. 3)


Fiscal policy
A. Expected real return on the Government Pensjon Fund and structural non-oil deficit. Bn. NOK. Constant 2013-prices
Structural non-oil deficit
4 % real return
B. Real underlying expenditure growth in the Fiscal Budget. Percent
C. Average annual change in the number of elderly (67 and over) in the specified 12-year periods. Thousand persons
1969-2001
2001-2013
2013-2025
D. Average annual change in use of oil revenues and pension expenditures. Per cent of mainland trend GDP
Increased spending of oil-revenues
Increased in pension expenditures

(p. 9)

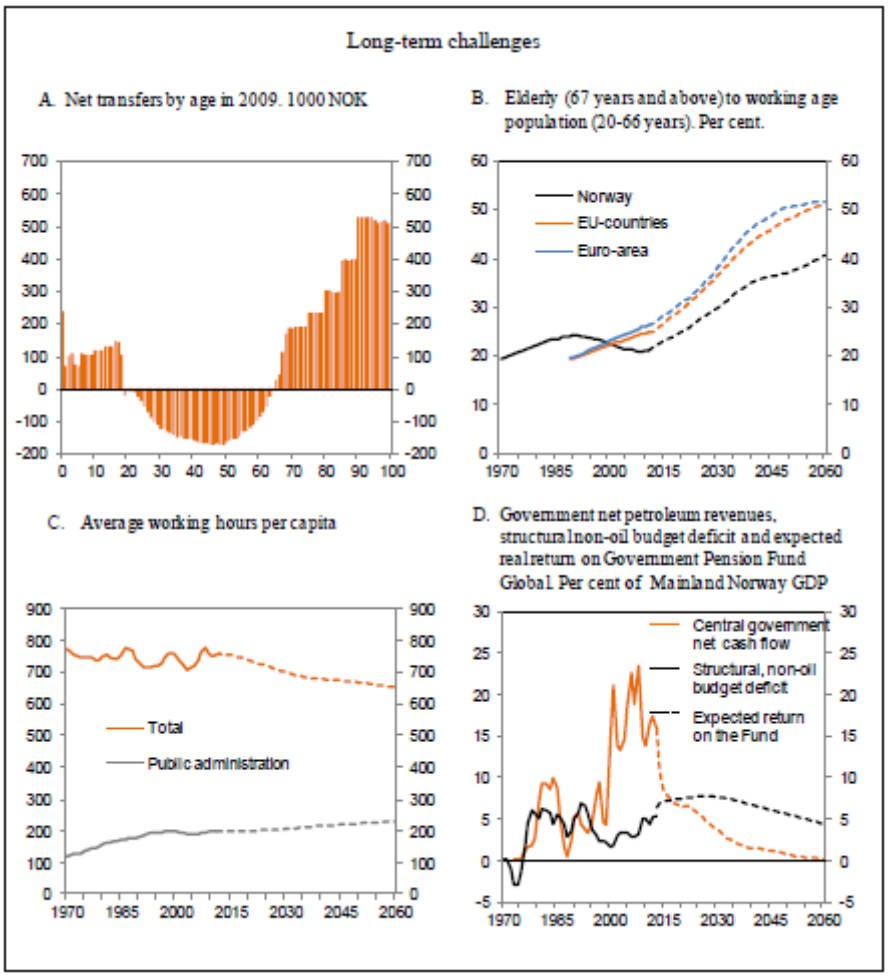

General government's financial position
A. General government net lending. Per cent of GDP
Norway
OECD-area
Euro-area
Mainland-Norway
B. General government total outlays. Per cent of GDP
Norway
Mainland-Norway
Euro-area
OECD-area

(p.11)

Government Pension Fund Global, expected real return on the Fund and structural non-oil budget deficit. NOK billion and per cent.

	Current prices			Constant 2013 prices			Structural deficit	
	Government Pension Fund Global at the beginning of the year[1)]	Expected return (4 pct. on the Fund capital)	Structural, non-oil budget deficit	Expected return (4 pct. on the Fund capital)	Structural, non-oil budget deficit	Deviation from the 4 pct. trajectory	As pct. of Mainland Norway trend-GDP	As pct. of the Fund capital
2001	386.6	-	21.7	-	34.1	-	1.9	-
2002	619.3	24.8	36.7	37.3	55.3	17.9	3.0	5.9
2003	604.6	24.2	43.2	35.0	62.5	27.5	3.3	7.1
2004	847.1	33.9	47.1	47.7	66.3	18.7	3.4	5.6
2005	1 011.5	40.5	49.3	55.2	67.3	12.1	3.3	4.9
2006	1 390.1	55.6	45.7	73.2	60.2	-13.0	2.9	3.3
2007	1 782.8	71.3	46.9	89.6	59.0	-30.7	2.8	2.6
2008	2 018.5	80.7	57.3	95.7	67.9	-27.7	3.2	2.8
2009	2 279.6	91.2	96.1	104.1	109.7	5.6	5.1	4.2
2010	2 642.0	105.7	102.4	116.6	113.0	-3.6	5.1	3.9
2011	3 080.9	123.2	92.6	131.2	98.6	-32.6	4.4	3.0
2012	3 307.9	132.3	116.2	136.6	120.0	-16.6	5.2	3.5
2013	3 793.1	151.7	125.3	151.7	125.3	-26.4	5.3	3.3
2014	4 280.7	171.2	-	165.8	-		-	-
2015	4 641.4	185.7	-	174.1	-	-	-	-
2016	4 954.6	198.2	-	179.9	-	-	-	-
2017	5 275.2	211.0	-	185.4	-	-	-	-
2018	5 600.2	224.0	-	190.5	-	-	-	-
2019	5 926.9	237.1	-	195.2	-	-	-	-
2020	6 262.3	250.5	-	199.6	-	-	-	-

(p.13)


Long-term challenges
A. Net transfers by age in 2009. 1000 NOK
B. Elderly (67 years and above) to working age population (20-66 years). Per cent.
Norway
EU-countries
Euro-area
C. Average working hours per capita
Total
Public administration
D. Government net petroleum revenues, structural non-oil budget deficit and expected real return on Government Pension Fund Global. Per cent of Mainland Norway GDP
Central government net cash flow
Structural, non-oil budget deficit
Expected return on the Fund

(P.14)

REFERENCES.

Afandiyev, E. (2013). Causes of dutch Disease and Ways to Deal with It: Literature Review. *Indiana University-Purdue University Fort Wayne*.

Arrow, K. J. (1973). Rawls's Principle of Just Saving. *The Swedish Journal of Economics, 75*, pp. 323-325.

Baumgärtner, S., Becker, C., Faber, M., & Manstetten, R. (2006). Relative and absolute scarcity of nature. Assessing the roles of economics and ecology for biodiversity conservation. *Ecological Economics, 59*, pp. 487-491.

Beetsma, R., Giuliodori, M., Walschot, M., & Wierts, P. (2012). Fifty Years of Fiscal Planning and Implementation in The Netherlands.

Benjamin, N. C., Devarajan, S., & Weiner, R. (1989). THE DUTCH DISEASE IN A DEVELOPING-COUNTRY - OIL-RESERVES IN CAMEROON. *Journal of Development Economics, 1*(30), pp. 71-92.

Bigelow, L. (n.d.). *How to Budget Based on Trends.* Retrieved from Wiki Fool: http://wiki.fool.com/How_to_Budget_Based_on_Trends

Bos, F. (2008). The Dutch Fiscal Framework: History, Current Practice and the Role of the Central Planning Bureau. *OECD Journal on Budgeting, 8*, pp. 1-22.

Brahmbhatt, M. B., Canuto, O., & Vostroknutova, E. (2010, June). Dealing with Dutch Disease. *The World Bank*, pp. 1-7.

Calabresi, G., & Bobbitt, P. (1978). *Tragic Choices.* Norton.

Cappelen, Å., Eika, T., & Prestmo, J. (2013). Petroleumsvirksomhetens virkning på norsk økonomi og lønnsdannelse. Framtidig nedbygging og følsomhet for oljeprissjokk. *SSB, Rapporter 59/2013*.

Corden, W. M., & Neary, J. P. (1982). Booming Sector and De-Industrialisation in a Small Open Economy. *Economic Journal, 368*, pp. 825-848.

Corden, W. M., & Neary, J. P. (1982). Booming Sector and De-Industrialization in a Small Open Economy. *Economic Journal, 92*, pp. 825-848.

Crouch, C. (2016). *The Knowledge Corrupters. Hidden Consequences of the Financial Takeover of Public Life.* Polity Press.

Dasgupta, S., & Mitra, T. (1983, Feb.). Intergenerational Equity and Efficiant Allocation of Exhaustible Resources. *International Economic Review, 24*, pp. 133-134.

Deaton, A. (2015, November 3). Statistical objectivity is a cloak spun from political yarn. *Financial Times*.

Departementenes servicesenter, I. (2012). NOU 2012: 16 Samfunnsøkonomiske analyser. *NOU*, p. 34.

Departementes sikkerhets- og serviceorganisasjon, I. (2014). Norges Offentlige Utredninger (NOU). *NOU 2014:12 Åpent og rettferdig- prioriteringer i helsetjenesten*, p. 40.

Dommerud, T., & Hornburg, T. B. (2014, November Mandag 10.). Hvem prioriterer i dag? *Aftenposten*, p. 9.

Drucker, S. J., & Gumpert, G. (2007). Through the looking glass: illusions of transparency and the cult of information. *Journal of Management Development, 26*, pp. 493 - 498.

Elster, J. (1979). *Ulysses and the Sirens: Studies in Rationality and Irrationality*. Cambridge: Cambridge University Press.

Finansdepartement, D. K. (2004-2005). Pensjonsreform- Trygghet for pensjonene. *St. meld.nr. 12 (2004-2005)*, p. 14.

Finansdepartement, D. K. (2004-2005). Pensjonsreform- Trygghet for pensjonene. *St. meld. nr. 12 (2004-2005) Kortverjon*, p. 8.

Finansdepartement, D. K. (2013-2014). Nasjonalbudsjettet 2014. *St. Meld. 1 (2013-2014)*, p. 30.

Finansdepertement. (2013). National Budget 2013- A Summary. *The National Budget 2013*.

Finne, G. (2014). Virkeligheten, hva er det? *Samfunnsøkonomen, 128*.

Flåten, O. (2013). Overvurdert humankapital og undervurdert naturkapital. *Samfunnsøkonomen, 127*, pp. 4-10.

Grande, A. (2005, Juli Mandag 25.). Econ startet i olje. *Dagens Næringsliv*, p. 5.

Hansen, E. E. (2014, Oktober Onsdag 15.). Dyr kreftmedesin bør vurderes på nytt. *Aftenposten*, p. 30.

Hansen, S., & Skoglund, T. (2008, 6). Utviklingen i sysselsetting og lønn etter 1930. *Økonomiske analyser*, p. 44.

Hansson, H. (2015, November 5). Sosialøkonomlauget dominerer debatten om oljepengene. Men Erna Solberg og Siv Jensen skjønner nok bedre enn lauget. *Dagens Næringsliv*, p. 37.

Hartwick, J. M. (1977, December). Intergenerational Equity and the Investment of Rents from Exhaustible Resources. *The American Economic Review, 67*, pp. 972-974.

Hessen, D. O. (2015, juli 17.-23.). Mennesket, en historie om tillit. Tillit er vår fremste sosiale kapital. *Morgenbladet- Ideer.*, p. 18.

Holt, J. (2013). *Why Does the World Exist?: An Existential Detective Story.* New York: W. W. Norton & Company.

Hornburg, T. B. (2014, November Mandag 10.). Livets pris. *Aftensposten*, p. 8.

Johansen, R. (2015, Mai 26). Helt sykt å ikke gi behandling. *iTromsø*.

Katarzyna, D. L.-R., & Singer, P. (2010, Mars). Secrecy in consequentialism: A defence of esoteric morality. *RATIO -An international journal of analytic philosophy, 23*(1), pp. 34-58.

Kay, J. (2015, October 6). Economists should keep to the facts, not feelings. *Financial Times*.

Khondker, B. H. (1996). Foreign Competition, Industrial Concentration and Profitability in Manufacturing Sectors in Bangladesh. *The Bangladesh Development Studies, 24*(1/2), pp. 165-188.

Kolstad, I., & Wiig, A. (2009). Countries, Is Transparency the Key to Reducing Corruption in Resource-Rich. *World Development, 37*, pp. 521-532.

Lasswell, H. D. (1936). *Politics: Who Gets What, When, and How.* New York: Whittlesey house, McGraw-Hill book Company, Incorporated.

Løvås, J. (2005, Juli Mandag 25). 50 dollar endrer alt. *Dagens Næringsliv*, p. 4.

Markovits, R. S. (2008). *Truth or economics : on the definition, prediction, and relevance of economic efficiency.* New Haven, Conn.: Yale University Press.

Matsen, E., & Torvik, R. (2003, March 19). Optimal Dutch Disease. *Working Papers (ANO)- Norges Bank*, pp. 1-24.

Moore, E. (2015, August 11). Rise of lending by sovereigns combined with low growth are a 'poisonous combination'. *Financial Times*, p. 24.

Neary, J. P., & Van Wijnbergen, S. (1986). In J. P. Neary, S. Van Wijnbergen, & R. Centre for Economic Policy, *Natural resources and the macroeconomy / edited by J. Peter Neary and Sweder van Wijnbergen* (p. 352). Oxford, UK: B. Blackwell.

Nowak, J.-J., & Grenier, G. (1995). Le syndrome néerlandais : relations intersectorielles et vulnérabilité des branches exposées. *L'Actualité Économique, 71*, pp. 308-333.

Oluwatosin, A. O. (2013). An essay of the evaluation of factor price equalization theory.

Osmundsen, P. (2015). Prognoser for oljenæringen- Fakta eller skremselspropaganda? *Norsk Sokkel nr. 1*.

Pattison, S. (2012, July 20). GASB Enacts Pension Accounting Reforms Regarding the Use of Discount Rates. *The National Association of State Budget Officers (NASBO)*, pp. 1-3.

Pozen, R., & Hamacher, T. (2012, August 19). A realistic discount rate for pensions. *Financial Times*.

Professor hudfletter oljedommedagsprofeter. (2015, juni Lørdag 13.). *Dagens Næringsliv*, p. 4.

Ralfe, J. (2011, March 13). The correct pension discount rate. *Financial Times*.

Regjeringen mangler faglig grunnlag for sine pessimistiske prognoser for Norges olje- og gassreserver. (2015, juni Lørdag 13.). *Dagens Næringsliv*, p. 27.

Rudd, D. (1996). An Empirical Analysis of Dutch Disease:Developing and Developed Countries. *Honors Projects, Economics Department, Paper 62*, pp. 7-8. Retrieved from http://digitalcommons.iwu.edu/econ_honproj/62

Runciman, D. (2008). *Political Hypocrisy:The Mask of Power, from Hobbes to Orwell and Beyond.* Princeton: Princeton University Press.

Ryder, B. (2015, October 10). Norwegian blues. Now the easy times are over, Norway must rediscover its Viking spirit. *The Economist*, p. 68.

Samuelson, P. A. (2002). *Paul Samuelson and the Foundations of Modern Economics*. Karigirappa Puttaswamaiah.

Skidelsky, R. (1994). *John Maynard Keynes Hopes Betrayed 1883-1920.* A Penguin book.

Skredderberget, A. (2015). *Usannsynlig Rik. Historien om Norge og Oljefondet.* Kagge Forlag.

Solberg, R., & Finansdepartementet. (2014). Nasjonalbudsjettet 2015. *Melding til Stortinget (2014–2015)*.

Solow, R. M. (1974). Intergenerational Equity and exhaustible Resources. *The Review of Economic studies, 41*, pp. 29-30.

Statens Forvaltningstjeneste, I. (2004). NOU 2004:1 Modernisert folketrygd — Bærekraftig pensjon for framtida. *Norges Offentlige Utredninger (NOU)*, pp. 201-245.

Statens forvaltningstjeneste, i. (2014). NOU 2014: 12 Åpent og rettferdig – prioriteringer i helsetjenesten. *Norges Offentlige Utredninger (NOU).*

Statens Forvaltningstjeneste, I. (2015). NOU 2015: 1 Productivity – Underpinning Growth and Welfare. *Norges Offentlig Utredninger (NOU)* .

Statens Forvaltningstjeneste, I. (2015). NOU 2015: 1 Produktivitet – grunnlag for vekst og velferd. *Norges Offentlige Utredninger (NOU).*

Suranovic, S. M. (1996). *International Trade Theory and Policy.*

Tanzi, V. (2008). The Role of the State and Public Finance in the Next Generation. *OECD Journal on Budgeting, 8*.

Tett, G. (2015). *The Silo Effect. Why putting everything in its place isn't such a bright idea.* Hardcover.

The Norwegian Petroleum Directorate, N. (2012). *The net government cash flow petroleum activities.* Retrieved from Norwegian Public Accounts: www.npd.no/en/Publications/Facts/Facts-2012/Chapter-3/

Vieira, S. (2010). Shapin, Steven. Never Pure: Historical Studies of Science as If It Was Produced by People with Bodies, Situated in Time, Space, Culture, and Society, and Struggling for Credibility and Authority.(Brief article)(Book review). *Library Journal, 135*, pp. 1-31.

Walby, S. (2015). *Crisis.* Polity.

Willems, A. (2013). *Norwegian Government Budget 2013: Spending Spree taken to New Levels.* Retrieved from EcPoFi - Economics, Politics, Finance: http://www.ecpofi.com/2012/10/norwegian-government-budget-2013.html#.VeQOLvntmko

Willoch, K. (2000, Januar Mandag 31.). Hva skjer med arvesølvet? *Aftenposten-Kronikk*, p. 14.

Economics and Economic Justice.

http://plato.stanford.edu/entries/economic-justice/