Statistics Netherlands

National Accounts

P.O.Box 24500
2490 HA Den Haag
The Netherlands

Economic description of the North Sea for the Netherlands

An update (version 3)

Joram Vuik, Maarten van Rossum and Albert Pieters

Remarks:
The views expressed in this paper are those of the authors and do not necessarily reflect the policies of Statistics Netherlands.

Project number:	*208893*
BPA number:	*2011-08-KNR*
Date:	*July 1, 2011*

ECONOMIC DESCRIPTION OF THE NORTH SEA FOR THE NETHERLANDS

Summary: In this study an economic valuation of activities related to the Dutch Continental Shelf (DCS) is presented for the years 1995, 2000 and 2007. Activities on sea such as sea shipping, oil and gas production and wind energy production are included in this study. Also included are economic activities in seaports and in the coastal zone of the North Sea.. The reason for this study is the European Marine Strategy Framework Directive, which requires social and economic analysis for the use of the marine environment. The applied valuation method covers all activities of Dutch companies based on the 'resident principle' of the national accounts. Figures on production, intermediate consumption and value added are presented for the different relevant industries. In addition, also the number of employees and the compensation of employees are presented.

Activities on sea include the following industries: oil and gas extraction, fisheries, sea shipping, and sand extraction. Since 2006 harvesting of wind power also has become a relevant activity. Measured in production and value added, oil and gas extraction is by far the most important activity on the DCS.

To measure the economic impact on land in areas which are related to the North Sea, relevant industries are selected in specific seaports and the coastal zone. For the coastal zone Hotels and restaurants, Fisheries, Retail trade and Recreational, cultural and sporting activities have been selected. In seaports Manufacturing, Transport, Wholesale Trade, Crude petroleum and natural gas production and Construction have been selected as relevant industries. In these industries, proximity or accessibility to the North Sea is a critical location factor.

The indirect economic impact of the selected activities is calculated using a multiplier analysis based on input-output analyses. For the spillover effect on the transport sector an alternative methodology based on quantities of goods transported (measured in tonnkm) from and to seaports has been developed.

Direct and indirect employment related to the Dutch Continental Shelf was in 2007 equal to 246 thousand employees (fte's), of which approximately 96 thousand employees (fte's) were the result of indirect effects (spillovers). Value added generated by activities related to the Dutch Continental Shelf was in 2007 equal to 35.2 billion euro. Here nearly 9.8 billion euro was the result of indirect effects (spillovers). The share in total value added of the areas of interest and relevant industries was equal to 7.1 percent in 1995 and decreased to 6.4 percent in 2000. In 2007 the contribution to the total value added was equal to 6.9 percent.

Contrary to the other economic indicators[1], the number of employees related to the Dutch Continental Shelf decreased over time. On the other hand, the total number of employees in the Netherlands grew in the reference period. As a consequence, the share of the relevant activities in the number of employees in the Netherlands has decreased. In 1995 this share was equal to 5.0 percent, in 2000 4.4 percent and in 2007 4.2 percent.

Measured in production and value added, manufacturing in seaports is the most important economic activity. Labour intensity in manufacturing is low compared to industries selected in the coastal zone. .

---

[1] All monetary figures presented are in current prices, (price) inflation is included.

Contents

1. Introduction

The first version of this report was finalised in December 2010. In this new report (finalised July 2011) a few changes have been implemented and a few new analyses have been added. The number of seaports is extended in comparison to version one of the study. Five seaports are added to this study in order to value economic activities related to the North sea. Another major difference with respect to the first version is the addition of spillover effect analysis for the relevant activities on the Dutch economy.

This study valuates the economic activities of Dutch companies on the Dutch Continental Shelf (DCS), which is part of the North Sea. Besides the activities taking place on sea, also activities taking place on land in areas related to the North Sea are included. These areas on land are Dutch seaports and the coastal zone. This study is motivated by the European Union's Marine Strategy Framework Directive. The economic valuation presented will facilitate the social and economic analysis of the use of the marine environment of the DCS.

> *"The aim of the European Union's ambitious Marine Strategy Framework Directive (adopted in June 2008) is to protect more effectively the marine environment across Europe. It aims to achieve good environmental status of the EU's marine waters by 2020 and to protect the resource base upon which marine-related economic and social activities depend. The Marine Strategy Framework Directive constitutes the vital environmental component of the Union's future maritime policy, designed to achieve the full economic potential of oceans and seas in harmony with the marine environment."* .... *"Each Member State must draw up a programme of cost-effective measures. Prior to any new measure an impact assessment which contains a detailed cost-benefit analysis of the proposed measures is required"*.
>
> European Commission, 2010

Statistics Netherlands (CBS) executes this study in commission of the Ministry of Infrastructure and Environment, more specifically the Water Service of the Directorate General of Public Works and Water Management (Rijkswaterstaat). The assignment to analyse the economic activities of the North Sea follows from a study executed on the economic description of river basins for the Netherlands (The Netherlands is spatially divided in seven river basins in this particular study) (Brouwer *et al.*, 2005; Statistics Netherlands, 2010a). The economic figures for the river basins are used to evaluate measurements of the Water Framework Directive from the European Union.

Part of the methodology used in the river basin analysis (Brouwer et al., 2005; Statistics Netherlands, 2010a) is adopted in this paper for the valuation of seaports and the Coastal zone. This NAMWArib methodology is internationally coordinated.

A coherent description of economic activities related to the North Sea has been made for three reference years, namely 1995, 2000 and 2007. The economic figures

presented in this paper include the variables production, intermediate consumption and value added. Also, two variables related to labour are presented: the number of employees and compensation of employees[2]. All figures are in chapter 3 to 5 current prices, meaning that price inflation is included. In chapter 6 time series of economic key figures in fixed prices are compiled.

Before the valuation of economic activities in quantitative terms is presented, a short description of the main source used in this study, the Dutch National Accounts, is provided in chapter 2. This chapter also discusses the geographical boundaries used in this study. In chapter 3 the activities on sea are discussed. These activities include oil and gas extraction, shipping, fishing, the harvest of wind energy and the extraction of sand (dredging). The fourth chapter deals with the activities on land related to the North Sea, particularly in seaports and along the North Sea coast. Chapter five describes the calculation of the indirect effect of the activities on the DCS, in seaports and in the coastal zone on the national economy. The methodology and the results of the compilation of economic figures in fixed prices for the relevant activities are presented in chapter six. In the final chapter (7) the conclusions from this study are presented. Recommendations for future research are also included in this chapter.

---

[2] Compensation of employees include wages paid to employees and the contribution paid by an employer for social security and pension schemes (Annex H Glossary)

2.   System boundaries and definitions

The main data source used in this study is the Dutch National Accounts (Statistics Netherlands, 2010b). The system of national accounts shows a quantitative overview of the economic process of a country and its economic relations with the rest of the world. The core in the national accounts is a number of important economic indicators such as gross domestic product (GDP) and national income. Benefits of using figures from the national accounts are that all variables are linked together in a consistent way. The quality is improved because the definitions that underlie the system make it possible to confront different statistics. Also international comparability is an advantage because concepts and definitions are based on International guidelines provided by the United Nations, the European Union and other international organisations. The international standards are documented in the United Nations System of National Accounts (SNA) and the European System of Accounts (ESA).

Geographical boundaries

The North Sea is located on the European continental Shelf and bordered by by Great Brittan in the west and by Belgium, the Netherlands, Germany, Denmark and Norway in the East.

The measurement of activities of Dutch companies on the North Sea in this study is limited to the Dutch part of the Continental Shelf (DCS). The DCS is the part of the North Sea, adjoining the Dutch coast, where the Netherlands claims exclusive rights to mineral resources. This Dutch part of the continental shelf in the North Sea is also regarded as part of the economic territory. Figure 2.1 shows a map of the DCS.
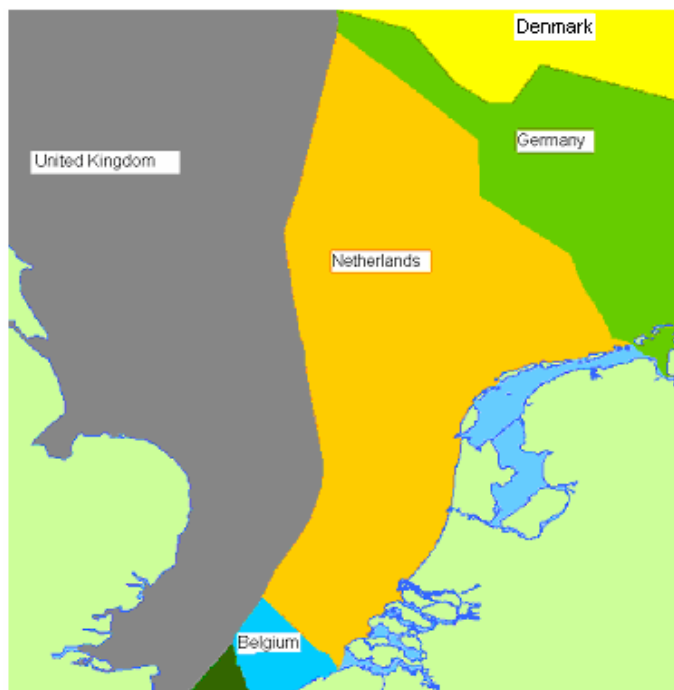
Figure 2.1: Map of the Dutch Continental Shelf

The Wadden Sea, located in the North of the Netherlands, is not included in the figures. The Netherland has included the Wadden Sea under the Water Framework Directive and not under the Marine Strategy Framework Directive relevant for this study.

The geographical boundaries for activities in the coastal zone are discussed in Chapter 4. The geographical boundary of the seaport areas are mostly based on information provided by the relevant Port Authorities and these are also discussed in more detail in chapter 4. Activities related to the seaports located outside the defined areas are not included.

Residents

An important concept in the national accounts is the resident principle. An institutional unit is said to be resident within the economic territory of a country if it maintains a centre of predominant economic interest in that territory (2008 SNA). GDP is an aggregate measure of production by all resident units. However, some of this production may occur abroad and as a result production in the national accounts differs from the sum of all production that takes place within the geographic boundaries of the national economy. All figures represent only activities of resident companies and employees. For example fishing vessels, registered outside the Netherlands, active on the DCS are not included in the estimates of the Dutch production of fisheries in this study.

Employees

The figure on employment, the number of employees is measured in full time equivalents, excluding self-employed persons. The number of self-employed persons differs strongly between industries. In agriculture, forestry and fishing there are many self employed persons while in manufacturing there are almost none. In annex N detailed figures for some relevant industries are shown for the national economy to give an impression of the extent of this omission and the implications for the interpretation of the results.

3.   Activities on sea

In this section economic activities taking place on the DCS by resident companies are described. This includes the extraction of oil and gas, fisheries, shipping, the extraction of sand and more recently the production of energy from wind.

3.1   Oil and gas extraction

The Netherlands has significant subsoil quantities of natural gas as well as some smaller oil deposits. Since the discovery of these stocks in the nineteen fifties and sixties they have been exploited to meet demand of users in the Dutch economy and to facilitate exports to foreign countries. Extraction of natural gas and oil contributes significantly to Gross Domestic Product and to economic growth. Over the last

twenty years, the benefits arising from oil and gas extraction, contributed on average 3 percent to total revenue of the Dutch Government. The share in revenues increased from 1.5 percent in 1999 to 3.9 percent in 2009 with a peak of 5.3 percent in 2008 (Environmental accounts of the Netherlands 2009, 2010).

A part of the subsoil energy resources is located beneath the DCS. On January first 2008 the share of the DCS in total gas reserves, Wadden Sea excluding, is 14%, the share in the oil reserve is 35% (Oil and gas in the Netherlands annual report 2007[3], Ministry of Economic Affairs and TNO).

On the DCS one extracts oil but mainly natural gas. The value of production, intermediate consumption and value added of these activities is published annually in the Dutch Regional accounts (Statistics Netherlands). In the regional accounts, an 'extra-territorial region' is defined, which comprises the territorial waters, the Dutch part of the continental shelf in the North Sea and the so-called territorial enclaves situated abroad (Dutch embassies, consulates, military bases, etc.). For oil and gas extraction, only the DCS is relevant. Table 3.1 shows economic key figures for oil and gas extraction on the DSC. With the exception of the number of employees, the figures are based on the regional module of the national accounts.

In consultation with Netherlands Oil and Gas Exploration and Production Association (NOGEPA) and State Supervision of Mines (SSM) it became clear that the number of employees stated in the regional accounts for this offshore activity were based on a misinterpretation of information supplied by SSM to Statistics Netherlands.

The number of employees in table 3.1 are based on data on offshore exposure hours (Annex A) provided by SSM in response to figures published in the first version of this study in 2010. Two assumptions had to be made to complete table 3.1. Firstly, in calculating the number of employees (fte) the assumption was made that one full time employee works 1,600 hours per year on average. Secondly, exposure hours for 1995 are not available, the figure for 1995 has been assumed equal to that of the year 2000.

Offshore exposure hours of companies and contractors include companies in the industries "Crude petroleum and natural gas production" and "Supporting Crude petroleum and natural gas production" as well as other industries supplying goods and services to the oil and gas industries (caterers, suppliers of installations, etc).

In order to make a distinction between the core industry and suppliers the number of employees (fte) in mining and quarrying from national accounts has been used as a starting point. The figures on onshore and offshore exposure hours (SSM) allow a geographical distribution between the DCS and activities on land.

Compensation of employees has been adjusted to the calculated level of employees by multiplying the average compensation per employee of the relevant industry with the new employment level.

---

[3] Olie en gas in Nederland Jaarverslag Opsporing en Winning 2007

Table 3.1: Economic key figures of the oil and gas extraction on the Dutch Continental Shelf

		1995	2000	2005	2007
DCS	Number of employees (x 1,000 fte)	3.0	3.0	2.8	2.8
	Compensation of employees (x €1,000,000)	219	231	248	278
	Production (x €1,000,000)	2692	4306	5673	7644
	Intermediate consumption (x €1,000,000)	580	993	1477	1777
	Value added (x €1,000,000)	2112	3313	4196	5866

The number of employees includes only employees on offshore facilities. The State Supervision of Mines provides this figure to Statistics Netherlands. The production figure of the national accounts is allocated geographically in the regional accounts on the basis of the produced quantities on regional scale. The quantities produced are published annually by the Ministry of Economic Affairs and TNO (Oil and gas in the Netherlands).

3.2 Fisheries

Unlike the extraction of oil and gas, the Dutch Regional accounts do not provide figures for other relevant activities on the DCS. In the regional accounts economic activities are generally allocated to the registered address of the companies on land (oil and gas extraction is an exception). For fisheries, economic activities are allocated to the ports where the fishing vessels are registered.

Macro economic figures for the fishing industry[4] are obtained from the Dutch national accounts. The fishing industry in the Netherlands consists of Cutter fisheries, Large-scale High sea fisheries, mussel farming and aquaculture. The last two activities do not take place on the DSC. For mussel farming, there is a relationship with the North Sea since the sea provides salt water. Mussels are generally harvested from either the Wadden Sea or the Oosterschelde, thus outside the geographical boundaries of this study.

The Agricultural Economics Research Institute (LEI, Compendium voor de leefomgeving, 2006) has published figures for the Dutch fishing industry indicating yields on the DCS for 2001, 2002 and 2003. In current prices for these years, the share of turnover generated on the DSC in the total national turnover is on average 21.6%. This average share of 21.6% is used to allocate the macro-economic figures of the Dutch fishing industry to the DCS. This results in the economic figures in table 3.2 representing the relevance of the DSC for Dutch Fisheries.

---

[4] An industry refers to a group of companies or organisations that produce similar goods or services.

Table 3.2: Economic key figures of the (Dutch) fisheries on the Dutch Continental Shelf

		1995	2000	2005	2007*
Total NL	Number of employees (x 1,000 fte)	2.2	1.5	1.1	1.0
	Compensation of employees (x €1,000,000)	93	84	63	64
	Production (x €1,000,000)	471	511	472	524
	Intermediate consumption (x €1,000,000)	191	245	277	317
	Value added (x €1,000,000)	280	266	195	207
DCS	Number of employees (x 1,000 fte)	0.5	0.3	0.2	0.2
	Compensation of employees (x €1,000,000)	20	18	14	14
	Production (x €1,000,000)	102	111	102	113
	Intermediate consumption (x €1,000,000)	41	53	60	69
	Value added (x €1,000,000)	61	58	42	45

3.3 Sea shipping

The North Sea is important for marine traffic and its shipping lanes are among the busiest in the world. International shipping companies navigate the Dutch Continental Shelf intensively. The National Accounts provide macro-economic figures for the Dutch sea shipping industry. Though inland vessels may sometimes use the DCS, sea shipping is the most relevant industry. Macro-economic data for the industry sea shipping represent all international and national activities of Dutch sea shipping companies (residents). Sea shipping includes the transport of both cargo and passengers. The residence principle refers to the centre of economic interest of the operators of vessels[5]. The vessels of the Dutch operators may carry a flag of another territory. The ownership of the vessels operated by Dutch residents can be with a foreign company.

---

[5] In the particular case of ships flying flags of convenience, it is often difficult to determine the residence of the operating unit, because of complex arrangements involving the ownership, mode of operation and chartering of such ships, and the fact that the country of registry in most instances is different than the country of residence of the operator (or owner). Nonetheless, in principle, the shipping activity is to be attributed to the country of residence of the operating unit. If that unit establishes a branch (direct investment) in another country to manage the operation, for tax or other considerations, the operation is to be attributed to the resident (branch) of that country. (SNA 1993, UN)

Table 3.3: Economic key figures of the (Dutch) sea shipping industry on the Dutch Continental Shelf

		1995	2000	2005	2007
DCS	Number of employees (x	7	7	6	6
	Compensation of employees (x €1,000,000)	274	303	326	357
	Production (x €1,000,000)	2626	3689	4913	4588
	Intermediate consumption (x €1,000,000)	1996	2762	3576	3380
	Value added (x €1,000,000)	630	927	1337	1208

The total national figure is used for the valuation of the DCS. Considering the DCS exclusively may be considered irrelevant, because the international accessibility matters and not so much the DCS itself. The industry of sea shipping is also included in the analysis of seaports in chapter 4. This results partly in an overlap in figures. In chapter 6 all relevant activities are summed. The overlap between sea shipping on sea and sea shipping in seaports is corrected by excluding sea shipping from the seaports in order to compile a total picture.

Figures in table 3.3 for 2007 are similar to figures presented by the Port Monitor 2007 (RebelGroup Advisory et al., 2009). Value added by the sea shipping industry is 1,146 million euro in 2007 according the Port Monitor. This compares to 1,208 million euro in table 3.3. The number of employed persons (including self-employed) in the Port Monitor is 6,434, again similar to the 6 thousand (rounded) employees (excluding self-employed) in table 3.3 for 2007

3.4   Sand extraction

Sand is collected from the sea floor of the North Sea. This sand is used for land reclamation and the protection of the coast as well as for fill sand for (infrastructural) projects. These activities can be defined as dredging activities. Also maintaining shipping channels on the DCS is a purpose of this activity. Dredging activities on the DCS are included in the industry 'construction', more specifically 'hydraulic engineering'. Besides dredging, this industry includes for example construction of bridges and dams. Data on hydraulic engineering are rare, in the Dutch national accounts this industry is included in the much broader industry 'civil engineering'.

In order to specify dredging on the DCS requires multiple steps. Firstly, hydraulic engineering needs to be specified. The next step requires the allocation of a part of hydraulic engineering to dredging. Finally, figures for dredging activities need to be allocated geographically to the DCS. Dutch dredging companies are very active in different geographical areas, both nationally and internationally.

Financial statistics on both hydraulic engineering and civil engineering are available for 2006, 2007 and 2008 (Statline, Statistics Netherlands). For these years the share of hydraulic engineering in the net revenue of civil engineering industry is 5.4 percent. This percentage is used to allocate figures for civil engineering in the National Accounts to hydraulic engineering (see table 3.4; data for value added and

production). For all figures presented the share of hydraulic engineering is assumed to be equal to the share in production. Since only three years are available, a constant share is assumed over time.

Table 3.4: Economic key figures of Hydraulic engineering by Dutch companies.

		1995	2000	2005	2007*
Hydraulic engineering (NL)	Number of employees (x 1,000 fte)	3	3	3	3
	Compensation of employees (x €1,000,000)	91	124	140	151
	Production (x €1,000,000)	353	530	560	627
	Intermediate consumption (x €1,000,000)	230	358	389	441
	Value added (x €1,000,000)	123	172	171	186

The second step requires isolating dredging activities from the industry hydraulic engineering. No suitable indicators for this specification have been found so far. In addition, no suitable indicators for the geographical specification have been found. Sand extraction from the DCS is thereby only included Pro Memoria (P.M.) in this study. The lack of detailed information of dredging activities and the difficulty of isolating dredging activities from other hydraulic engineering activities and the geographical location of these activities motivate this decision.

In an earlier study (Voet, L. (Royal Haskoning), B. Budding (Rebel Group), 2008) of economic activities on the DCS, the extraction of sand was estimated based on financial statistics (Statistics Netherlands) of the industry 'sand and gravel extraction'. Figures on the quantities of sand produced/extracted on the North Sea and prices estimated by experts are used for the geographically allocation of the national figures. The main argument for abandoning this approach is that the dredging companies active on the DCS are not included in the industry 'sand and gravel extraction', but rather in 'hydraulic engineering'.

3.5 Wind power

Due to the strong prevailing winds, countries surrounding the North Sea, particularly Germany and Denmark, have used these windy areas near the coast for the generation of wind power since the 1990s. In the Netherlands, wind power is harvested on the DCS since 2006. Statistics Netherlands have calculated production, intermediate consumption and value added. This calculation is based on the quantities of electricity produced by wind turbines on the DCS. In 2007 330 million KW h of electricity was produced by off shore wind farms (Statistics Netherlands, Statline, September 2010). This equals 9.5% of the national total production of wind energy. To calculate monetary figures from the quantities produced the relevant producer prices were used. The methodology used to calculate the economic variables for wind energy production is based upon a study of van Rossum and Kulig (2008).

Table 3.5: Economic key figures of the production of wind power on the Dutch Continental Shelf

		2007
TotalNL	Production (x €1,000,000)	218
	Intermediate consumption (x €1,000,000)	100
	Value added (x €1,000,000)	118
DCS	Production (x €1,000,000)	23
	Intermediate consumption (x €1,000,000)	13
	Value added (x €1,000,000)	11

No figures for the number employees or the compensation of employees are available. Wind energy production is labour extensive. Both the small size of this activity and the capital intensive nature of the activity explain why this activity will not contribute much to employment once off- shore wind farms are operational.

3.6 Activities of non- residents on the DCS

Alongside the activities of Dutch companies, also international companies use the DCS for e.g. fishing and shipping. The value of these activities is not included in the previous estimates because foreign activities do not contribute to Dutch GDP. In this section *indicative* figures for the share of Dutch and foreign share in the total industry of both fishing and sea shipping on the DSC are presented.

Fisheries

For monitoring the catch of fisheries and the stock of fish, the North Sea is divided in ICES[6] areas. Eurostat publishes the tonnes of fish caught per country. The DCS is included in two ICES areas. These areas, 4b and 4c, are shown in figure 3.1.
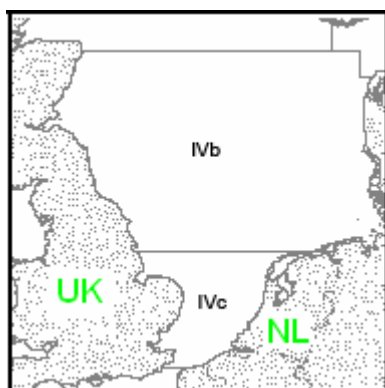
Figure 3.1: ICES areas that overlap with the Dutch Continental Shelf (Source: www.ICES.dk)

In the relevant ICES areas the share of the Dutch fisheries is shown table 3.6. In area 4c, of which the DCS overlaps about half its surface, the share of Dutch fisheries in

---

[6] International Council for the Exploration of the Sea.

the tonnes caught is much larger than in area 4b. Area 4b is mainly fished by Danish fishing vessels.

Table 3.6: Tonnes of fish (x 1,000) caught by Dutch Vessels and total tonnes caught in relevant ICES areas (source: Eurostat)

		1995	2000	2005	2007
NL	ICES 4B	83	68	42	41
	ICES 4C	102	74	65	59
Total	ICES 4B	1533	1194	649	508
	ICES 4C	176	172	131	117
NL/Total	ICES 4B	5%	6%	6%	8%
	ICES 4C	58%	43%	50%	50%
	Total	11%	10%	14%	16%

The value of production depends on the species caught and the price per tonne, but the tonnes caught are indicative for the share of the Dutch fisheries (residents) on the DCS.

Sea shipping

Ships operated by foreign sea shipping companies use the DCS for transport to and from Dutch seaports as well as other destinations outside the Netherlands. It is not feasible to valuate these transport movements for this study. Data source are scarce since considering the DCS exclusively is irrelevant for most causes.

4. Activities on land

Both Seaports and coastal areas in the Netherlands have a strong economic link to the North Sea. Economic activities in these areas depend on access or proximity to the sea. In this chapter, the economic key figures of ports and in coastal areas are presented. Firstly, the methods used for calculating the economic figures are discussed. Next, the results for the North Sea coastal area are presented and the explicit choices made are described. The third section discusses the economic activities in eleven different Dutch seaports e.g. Rotterdam, Amsterdam, IJmuiden. This chapter ends with a summary of the results for the activities on land.

4.1 Methodology

The method used for estimating economic key figures for the areas of interest is based on the NAMWARib[7] method that is used by Statistics Netherlands to calculate the economic figures for different subriver basins (Brouwer et al., 2005). NAMWARiB provides information about the interactions between the physical water system and the economy at a national and subriver basin scale.

For the purpose of geographical research, the Netherlands is divided into COROP regions. The Dutch regional accounts of Statistics Netherlands annually present economic key figures (Production, Value Added, etc) per COROP region. This study has the purpose to allocate these COROP figures to the relevant seaports and to the coastal area.

In constructing statistics for the areas of interest a register of companies is used. The company register provides information on individual companies: e.g. location (address), the number of employed persons and the type of industry (NACE class). Geographical data on the surface area are used for allocating the COROP figures to the areas of interest.

Two distinct methods (hereafter scenarios) for measuring the activities in the area of interest are presented in this study. The first scenario (A) limits the surface of the coastal area and ports (i.e. the areas of interest) to the predefined geographical boundaries. The location of these boundaries is described in the sections 4.2 and 4.3. The second scenario (B) shows the results of extending the areas of interest to complete zip code zones.

---

[7] For more information: http://www.helpdeskwater.nl/onderwerpen/water-ruimte/economische_aspecten/namwa/

Below the first scenario (*scenario A*) is described in four steps. The second scenario (*scenario B*) is similar but skips the second step. The second scenario allocates all zip codes containing both a coastal area[8] and a seaport entirely to the seaport.

1. Define the area of interest.
   Since there was no clear definition of a coastal area, a coastal area had to be defined. For the seaports, the maps published by port authorities on the internet were used as a guideline. The definition of the areas is presented in sections 4.2 and 4.3.

2. Calculate the share of the surface area of interest in the zipcode zones.
   The register of companies allows locating the companies in a 4-digit zip code. A full zip codes (6-digits) map is not available. To correct for zip codes being larger than the area of interest the surface areas (percentages) are used.

3. Allocate the key economic figures per COROP region to the areas of interest. All key figures were allocated using the data on the persons employed per company from the register.

4. Selection of relevant industries. The results in the next sections will underline the necessity of this action.

Scenario A assumes a proportional geographical distribution of economic activities within a zip code zone. In step 2 surface area is used to allocate the figures of a zip code to a particular portion of the zip code.

The second step assumes that labour productivity of the zip code areas in the areas of interest is equal to that of the COROP region containing the area of interest. Per zip code and per industry, all economic figures per employed person are equal[9]. Since the company register gives no specific information on the contracted hours of work for persons employed an equal part-time ratio is implicitly assumed as well for all zip codes in a particular COROP area.

The disadvantage of the methodology used is that the location where the employees are registered is not always equal to the place where production actually takes place (i.e. the production site). Many of the large companies have a production site in a seaport and an office located in the city centre or in a Business Park. Employees are sometimes registered in the city location only. Since production is allocated based upon the registered employees this results in an underestimation of production at the production site[10]. In addition, the valuation does not include forward and backward linkages with other industries or geographical areas.

---

[8] The coastal area and the seaports can overlap. To avoid double counting this geographical overlap is solved by allocating areas that indeed overlap to the seaports.

[9] Production per unit employment per industry is assumed equal for every zipcode in a particular COROP area

[10] This problem has been solved partially for the Rotterdam port by applying total COROP figures only for certain relevant industries. See paragraph 3.3.1 for more information.

The advantage of this method is continuity over time and consistency between different geographical areas. Under conditions, such as limited rearrangements in zip codes, developments in the areas of interest can be monitored over time. In addition, the same data sources were used for all geographical areas. Different geographical areas can be compared and summed. The Dutch regional accounts, which are used to construct the results, are based upon internationally coordinated definitions and concepts.

Allocating economic figures to the coastal zone (Example)

In region (COROP) Y there are four zipcodes of which only two are located in de coastal zone. For zipcode A 90 percent of the surface area of this zipcode is located in coastal zone. For zipcode B 10 percent of the surface area is located in the coastal zone. The company register provides that in zipcode A 200 persons are employed in industry X. In zipcode B 500 persons are employed in industry X. Allocated to this part of the total coastal zone (90 percent *200+10 percent*500= 230) are 230 employed persons.

The company register also provides that in the total region Y 1500 persons are employed in industry X. This means that 15.3 percent (230/1500) of the economic key figures of this region (production, added value, employees, compensation of employees) are allocated to the coastal area in scenario A. The total figures per industry for each region are provided by the regional accounts (Statistics, Netherlands).

For scenario B this figure is larger since complete zipcodes are included, (200+500), resulting in 700 employees. This means that 46.6 percent (700/1500) of the economic key figures of region Y (production, added value, employees, compensation of employees) are allocated to the coastal area in scenario B.

The provisional economic key figures per COROP area are available about twenty months after the end of the reference year. Final economic data per COROP area are available 3 years after the reference year.

For industries containing less then three companies in the areas of interest or that have only one company employing more than 75 percent of all employees in that industry, no figures are presented (because of confidentiality) To prevent publishing data for individual companies, these industries will be added to similar industries.

4.2   North Sea coastal area

The coastal area has been defined as a one kilometre wide strip of land after the Dutch North Sea coastline and includes the entire Dutch Frisian Islands. The coastal strip was put not directly behind the shoreline but behind the beach and sand dunes, since this area includes little or no economic activity. The beach and sand dunes were located using a land use map; all dry natural terrain bordering the North Sea has been defined as beach and sand dunes. Annex B shows a map of the Netherlands

illustrating the location of the beach and sand dunes as well as the coastal strip including the Dutch Frisian Islands.

The estimate of the total production (all industries included) in the coastal area is heavily influenced by industries whose relationship to the North Sea is not obvious. The significance of the selection of industries is illustrated by the results shown in Annex D. Especially in the The Hague area, which is the third largest city of the Netherlands, the coastal and the urban economy merge. The Hague is the administrative capitol of the Netherlands and many government departments are located in The Hague. In the estimates for 2007 the The Hague area is responsible for 37% (scenario A) or 41 % (scenario B) of all the production in the coastal area.

An example to illustrate the situation is 'Defence activities'. In 1995 and 2000 there are no 'Defence activities' in the coastal area. In 2007 the coastal area, however, has a production of 604 million Euro in scenario A. This is an effect of the employees of the Ministry of Defence being registered in different zip code for 2007 that is part of the coastal zone. Obviously, these data should not be interpreted as real growth in the coastal economy. It should be interpreted as a result of an administrative change regarding a large organisation that has employees all around the Netherlands and even abroad (war zones/peacekeeping).

'Public administration and social security' and 'Health and social work activities' are also large sectors in the coastal economy according to the results in Annex D. Ministries, municipal institutions and healthcare located in The Hague are the main cause for this. Most of these issues can be solved by introducing the second criteria, besides the geographical boundaries, in estimating the coastal area: selection of industries that are relevant to the North Sea.

Narrowing down the industries of a coastal economy is a necessity for a fair estimate of the coastal economy. This selection is to some extent a subjective matter. The difficulty in selecting relevant industry is illustrated by the example below.

Textbox: Real estate in the coastal zone (Example)

For real estate activities, the argument can be made that this industry is big in the coastal area because the coast is an attractive residential and business location. In this case, one could argument to include the real estate industry in the selection of the coastal economy. Analysis of the results for this industry clarifies that again the Hague area is important in the figure for the coastal zone. The proximity to the sea is not the only factor defining this area as an attractive location so are employment opportunities and urban facilities such as shops, restaurant and theatres. Therefore, it is sensible to exclude the real estate industry from the coastal economy.

Industries, for which proximity to the coastline is an important location factor, that are concentrated on the coast include:

- Hotels and restaurants

- Retail trade

- Recreational, cultural and sporting activities

- Fisheries

The last two columns of Annex D show the mean share in the total coastal production over the three reference years (1995, 2000 and 2007). In the coastal zone the selected industries are responsible for a larger share of the production than in the Netherlands as a whole. E.g. Hotels and restaurants generate two percent of the total production of the Netherlands. Depending on the scenario for the coastal area this figure is eight percent (scenario A) or six percent (B).

For the coastal zone scenario B is preferred, because the one kilometre strip used in scenario A is somewhat arbitrary. Choosing scenario B (including the full surface of all zip codes along the coast) may however lead to an overestimation. An advantage of scenario B is that the assumption that economic intensity is spread out proportionally within a zip code is no longer relevant.

Table 4.1: Key indicators for selected industries in the coastal zone (scenario B)

Year	Industry	Number of employees (x 1,000 fte)	Compensation of employees (x €1,000,000)	Production (x €1,000,000)	Intermediate consumption (x €1,000,000)	Value added (x €1,000,000)
1995	Fishing	0.7	29	220	89	131
	Hotels and restaurants	8.7	168	658	344	313
	Recreational, cultural and sporting activities	2.7	87	343	202	141
	Retail trade and repair (excl. motor vehicles/cycles)	10.7	212	590	220	370
Total 1995		22.8	495	1810	856	955
2000	Fishing	0.6	31	264	127	138
	Hotels and restaurants	9.7	237	959	485	474
	Recreational, cultural and sporting activities	3.1	113	479	271	208
	Retail trade and repair (excl. motor vehicles/cycles)	11.1	261	723	277	445
Total 2000		24.5	642	2426	1160	1265
2007	Fishing	0.3	22	264	159	104
	Hotels and restaurants	10.3	306	1268	637	631
	Recreational, cultural and sporting activities	2.6	120	523	312	212
	Retail trade and repair (excl. motor vehicles/cycles)	11.6	338	846	346	500
Total 2007		24.9	787	2901	1453	1447

Table 4.1 provides estimates for the available key indicators for the coastal zone. 'Retail trade and repair' and 'Hotels and restaurants' are the most important industries. It is important to note that these industries are seasonal and the results partly depend on the weather in a specific year. The industry 'Fisheries' is the smallest of the selected industries. Part of the production in this industry overlaps with the production of fisheries in the chapter on activities on the sea (DCS). This overlap concerns only the activities on the DCS of fishing companies located in the selected coastal area.

4.3   Seaports

Six seaports in the Netherlands are discussed in seperatly in the next sections: Rotterdam, Amsterdam, IJmuiden (clustered with Velsen and Beverwijk), Drechtsteden, Vlissingen, Terneuzen. Figures for five other seaports (Moerdijk, Den Helder, Harlingen, Delfzijl and Eemshaven) are presented in section 4.3.7.   A geographical overview of the seaports included is presented on the map in Annex C.

4.3.1   Port of Rotterdam

The port of Rotterdam is Europe's largest port for (trans) shipment of goods. It is located between the North Sea coast and the city centre of Rotterdam along the Nieuwe Waterweg. In defining the port, area maps published by the Port Authority[11] were used. Annex E shows the production level per industry in the port of Rotterdam.

Analysis of the results shows that, although production is located in the defined area of the port, the employees are in some cases registered on office locations in the centre of Rotterdam. Since production (and other variables) is allocated based upon zip codes of the companies where employment is registered, production is also virtually shifted to the centre of Rotterdam. This statistical problem exists for all ports and in the coastal zone, but is most prominent for the Port of Rotterdam. The industries in this port are concentrated in a few large companies. Missing a couple of these companies, because the registered location differs from the production site, results in a substantial error. To correct this, both scenario A and B will include the total figure for the COROP region for some major industries. The larger region that includes the port of Rotterdam is called the 'Rijnmond' region. The Rijnmond figures were used for the following industries:

  – Manufacture of petroleum products; cokes, and nuclear fuel

  – Manufacture of basic chemicals and man-made fibres

  – Water transport

  – Supporting transport activities

To make a similar correction for Electricity, gas and water supply is not fully justified. Only the production part of this industry has a direct relation with the port. These plants depend on supply by ship and use water for cooling. However, the distribution part of this industry does not have a direct relationship with the sea. Therefore this industry is not included in the valuation of the seaport. The power plants located in the port are ignored, because production cannot be distinguished from distribution in the regional economic figures.

In the reference years presented in Annex E the production of petroleum products shows extremely strong growth in production value. This growth is partly explained by increased prices. The production in current prices for 2007 is more than 400

---

[11] http://www.portofrotterdam.com/en/about_port/port_maps/port_area/index.jsp

percent larger than in 1995. In this period, producer prices for the domestic market grew 260 percent (Statline, Statistics Netherlands).

For the ports the following industries are selected as relevant:

- Manufacturing

- Crude petroleum and natural gas production, including (specialised) service activities related to oil and gas extraction

- Wholesale trade

- Construction, the construction of buildings excluded.

- Transport

Crude petroleum and natural gas production is included, because some seaports, especially Den Helder, are used as a base for activities related to offshore oil and gas extraction.

The industry of Electricity supply is located in the seaports. Power plants are supplied by waterways or make use or residual heath of the manufacturers located in the ports' industrial areas. This may be considered a relevant industry, but as stated on the previous page the methodology used does not result in adequate estimate for this activity.

Construction is included, because this includes installations for ships and for on- and offshore facilities. Since these businesses are located in the area of interest, construction companies are included even though the port location may be a less critical factor than for some manufacturing or transport companies.

Table 4.2 shows the key figures for the selected industries in the Rotterdam Port.

Table 4.2: Key indicators for selected industries in the Port of Rotterdam (Scenario A)

Year	Industry	Number of employees (x 1,000 fte)	Compensation of employees (x €1,000,000)	Production (x €1,000,000)	Intermediate consumption (x €1,000,000)	Value added (x €1,000,000)
1995	Construction	3	86	273	154	118
	Manufacturing	20	930	13751	11202	2548
	Transport, storage and communication	30	1083	4793	2788	2006
	Wholesale trade	4	145	402	158	244
Total 1995		57	2244	19219	14303	4916
2000	Construction	4	122	408	239	169
	Manufacturing	17	873	23949	21247	2701
	Crude petroleum/natural gas production and service	0	1	7	2	5
	Transport, storage and communication	30	1301	6245	3681	2564
	Wholesale trade	4	174	517	209	308
Total 2000		55	2470	31126	25378	5748
2007	Construction	4	201	643	368	275
	Manufacturing	17	1168	41144	36085	5059
	Crude petroleum/natural gas production and service	0	0	5	1	4
	Transport, storage and communication	30	1661	7798	4496	3303
	Wholesale trade	4	232	1003	485	518
Total 2007		55	3262	50594	41435	9159

Since the definition of the port and its industrial area is based on maps of the Port Authority, scenario A might be preferred in this case. In this scenario, the estimated figures are based on a stricter geographical definition. The most relevant industries have a large share (85 percent on average) in the production of the port. (Annex D).

The results in table 4.2 show that the industries located in the port and industrial area are not very labour-intensive. This is true especially for manufacture of petroleum products, cokes, and nuclear fuel. Production for this industry in the Rotterdam Port was about 7 million euros per employee in 2007. For the total economy, this figure is 182 thousand euros per employee.

The scope of the figures for the port of Rotterdam is limited by the geographical location of business. The analysis does not include any linkages or spin offs with the Dutch economy outside the assigned location. Only companies registered in the port and their industrial areas are included. In other words it is a static approach of reality.

4.3.2 Amsterdam

The North Sea Canal connects the port of Amsterdam to the North Sea. It's the second largest port of the Netherlands for transhipment of goods. The map[12] published on the internet by the Port Authority was used to define the area. In Annex E production per industry is shown (all industries included)[13]. Unlike the Port of Rotterdam, concentration of production in only a few industries is smaller. Economic activities are more diverse in Port of Amsterdam. Industries like banking and other (financial) services, which are not usually located in a port or industrial area or dependent on supply/transport by water, cover a big share of the production. This indicates that the spatial separation of the relevant industrial industries is not strong in this region and selected zip codes.

The same industries used in the port of Rotterdam are selected: 'Manufacturing', 'Trade and repair', 'Construction and Transport', 'Storage and communication'. The results for this selection of industries are shown in table 4.3 for scenario A. Scenario A is preferred, because the concerning zip codes are intensively used for less related economic activities.

Selected industries produce 55% percent of total production in the defined area in scenario A. For Rotterdam, this figure is 85% in scenario A. This means that the designed area for Rotterdam is more exclusive used by the selected industries.

---

[12] http://kaart.gha.nl/havenkaart/

[13] The production of some industries in Annex F can depend on the location on which the employees of a few large companies are registered. This explains the strong decrease of banking, insurance and pension funding in scenario B between 2000 and 2007. Banking is not selected as an industry with a strong relation to or dependency on a port location.

Table 4.3: Key indicators for selected industries in the Port of Amsterdam (Scenario A)

Year	Industry	Number of employees (x 1,000 fte)	Compensation of employees (x €1,000,000)	Production (x €1,000,000)	Intermediate consumption (x €1,000,000)	Value added (x €1,000,000)
1995	Construction	1	21	70	41	30
	Manufacturing	5	196	1138	771	367
	Crude petroleum/natural gas production and service	X	X	X	X	X
	Transport, storage and communication	4	149	572	254	319
	Wholesale trade	2	66	207	85	122
Total 1995		11	431	1988	1151	837
2000	Construction	1	23	84	50	34
	Manufacturing	4	163	1002	700	302
	Crude petroleum/natural gas production and service	X	X	X	X	X
	Transport, storage and communication	4	166	675	360	316
	Wholesale trade	2	87	380	204	176
Total 2000		10	440	2142	1314	828
2007	Construction	0	23	86	53	33
	Manufacturing	4	204	1548	1113	435
	Crude petroleum/natural gas production and service	X	X	X	X	X
	Transport, storage and communication	4	206	988	514	473
	Wholesale trade	2	119	591	290	301
Total 2007		10	551	3212	1971	1241

4.3.3 Port of IJmuiden

Close to the North Sea, along the canal that connects Amsterdam to the sea, there is cluster of ports and industrial area's. This includes the cities of IJmuiden, Beverwijk and Velsen-Noord. The definition of this area is based on the location of ports for the transhipment of goods and the adjoining industrial areas. Production of steel is the biggest industry in this area. Since production is concentrated in a few companies, results are presented in less detailed industries (table 4.4).

Table 4.4: Production in the IJmuiden cluster

	Production Port of IJmuiden (x €1,000,000)							
	Scenario A			Scenario B			Mean share	
	1995	2000	2007	1995	2000	2007	A	B
Manufacturing	2399	2725	4644	2582	2977	5061	83%	66%
Financial and business activities	88	199	275	306	516	760	5%	10%
Trade and repair	112	177	243	294	416	533	5%	8%
Electricity, gas and water supply	X	X	X	X	X	X	X	X
Transport, storage and communication	145	151	152	222	242	282	4%	5%
Construction	83	94	139	226	258	367	3%	5%
Care and other service activities	20	24	30	93	138	155	1%	2%
General government	8	9	7	118	147	141	0%	3%
Hotels and restaurants	7	15	19	26	52	61	0%	1%
Mining and quarrying	X	X	X	X	X	X	X	X
Agriculture, forestry and fishing	4	5	5	9	8	11	0%	0%
Total	2868	3398	5515	3876	4754	7371	100%	100%

This cluster of Ports and industrial areas shows a strong presence of manufacturing. In order to include the steel producer in this port completely, the figure for 'Manufacturing of basic metals' is equal to the total regional figure for the IJmond Corop. Since this correction was made in both scenarios, scenario A can be preferred. Scenario A limits the selected geographical area better.

When the same industries as in the Rotterdam and Amsterdam ports are selected this results in the figures presented in table 4.5. The power plant located in this port, using residual gasses from the manufacturing industry, is not included since the employees are registered on an other site of their company.

Table 4.5: Key indicators for selected industries in the IJmuiden cluster. (Scenario A)

Year	Industry	Number of employees (x 1,000 fte)	Compensation of employees (x €1,000,000)	Production (x €1,000,000)	Intermediate consumption (x €1,000,000)	Value added (x €1,000,000)
1995	Construction	0	9	29	15	14
	Manufacturing	13	515	2399	1263	1137
	Crude petroleum/natural gas production and service	X	X	X	X	X
	Transport, storage and communication	1	52	145	67	78
	Wholesale trade	1	19	57	22	35
Total 1995		15	594	2631	1367	1264
2000	Construction	0	13	46	25	20
	Manufacturing	12	560	2725	1630	1095
	Crude petroleum/natural gas production and service	X	X	X	X	X
	Transport, storage and communication	1	46	151	72	79
	Wholesale trade	1	30	88	34	55
Total 2000		14	648	3009	1761	1248
2007	Construction	0	14	51	27	24
	Manufacturing	11	786	4275	2729	1545
	Crude petroleum/natural gas production and service	X	X	X	X	X
	Transport, storage and communication	1	40	152	72	80
	Wholesale trade	1	35	112	43	69
Total 2007		13	875	4589	2871	1718

4.3.4 Port of Drechtsteden

This port consists of multiple unconnected area's in different municipalilties; Dordrecht, Zwijndrecht, Papendrecht, Sliedrecht, Hendrik Ido Ambacht, Alblasserdam S'-Gravendeel and Puttershoek. The geographical boundaries are based on "*Case study Inland ports of Drechtsteden*" (TNO, 2004) and Google Maps. Table 4.6 shows the results per industry for both scenario A and B.

Table 4.6: Production in the Port of Drechtsteden

| | Production Port of Drechtsteden (x €1,000,000) | | | | | | | |
| | Scenario A | | | Scenario B | | | Mean share | |
	1995	2000	2007	1995	2000	2007	A	B
Manufacturing	1218	1286	2092	2517	2856	3524	45%	40%
Financial and business activities	191	313	463	587	996	1276	9%	12%
Construction	354	571	666	799	1256	1706	16%	16%
Trade and repair	322	588	818	663	1137	1466	17%	14%
Electricity, gas and water supply	X	X	X	X	X	X	X	X
Transport, storage and communication	203	257	332	365	529	668	8%	7%
Care and other service activities	31	76	96	207	514	826	2%	6%
General government	62	74	49	203	222	157	2%	3%
Hotels and restaurants	16	29	37	48	71	98	1%	1%
Mining and quarrying	X	X	X	X	X	X	X	X
Agriculture, forestry and fishing	13	10	10	38	34	35	0%	1%
Total	2411	3205	4564	5428	7616	9758	100%	100%

Since this port consists of a few small geographical areas within an urbanised region, scenario A is preferred. This scenario may result in a better estimate for

postal codes which are included for a small part in the port. The results for the economic key figures for the relevant selected industries in scenario A are presented in table 4.7.

Table 4.7: Key indicators for selected industries in the port of Drechtsteden (Scenario A)

Year	Industry	Number of employees (x 1,000 fte)	Compensation of employees (x €1,000,000)	Production (x €1,000,000)	Intermediate consumption (x €1,000,000)	Value added (x €1,000,000)
1995	Construction	2	79	237	139	99
	Manufacturing	8	250	1212	861	351
	Crude petroleum/natural gas production and service	0	0	0	0	0
	Transport, storage and communication	2	69	203	84	119
	Wholesale trade	3	104	233	73	160
Total 1995		15	503	1885	1157	728
2000	Construction	3	110	380	223	157
	Manufacturing	7	260	1282	896	386
	Transport, storage and communication	2	76	257	112	145
	Wholesale trade	4	162	453	164	288
Total 2000		16	608	2372	1396	976
2007	Construction	2	129	448	255	193
	Manufacturing	7	363	2043	1402	641
	Transport, storage and communication	2	91	332	169	163
	Wholesale trade	5	227	648	223	425
Total 2007		16	810	3471	2049	1422

4.3.5   Port of Vlissingen

In defining the location of this port information of the 'Port Authority, Zeeland Seaports[14]' has been used. Zeeland Seaport is the port authority for both the port of Vlissingen and the port of Terneuzen. The Terneuzen port is discussed seperatly in the section 4.3.6.

In the port of Vlissingen, production in 'manufacture of basic chemicals and man-made fibres' and 'manufacture of basic metals' are the most important industries. . The total production figure in the selected area is shown in table 4.6.

---

[14]http://www.zeeland-
seaports.com/cms/publish/content/downloaddocument.asp?document_id=299
/downloaddocument.asp?document_id=299

Table 4.8: Production in the Port of Vlissingen

| | Production Port of Vlissingen (x €1,000,000) | | | | | | Mean share | |
| | Scenario A | | | Scenario B | | | | |
	1995	2000	2007	1995	2000	2007	A	B
Manufacturing	235	380	654	665	1060	1546	85%	87%
Electricity, gas and water supply	X	X	X	X	X	X	X	X
Transport, storage and communication	17	27	47	50	68	111	6%	6%
Construction	4	10	21	12	26	47	2%	2%
General government	2	1	11	10	2	29	1%	1%
Care and other service activities	4	9	16	9	19	29	2%	1%
Trade and repair	3	5	9	10	14	22	1%	1%
Financial and business activities	28	23	10	62	52	21	5%	4%
Agriculture, forestry and fishing	2	2	3	8	9	7	1%	1%
Hotels and restaurants	2	3	0	5	8	1	0%	0%
Mining and quarrying	X	X	X	X	X	X	X	X
Total	297	460	772	830	1257	1814	100%	100%

Like the other ports the industries selected to delimit the port economy are: 'Manufacturing', 'Trade and repair', 'Construction and Transport', 'Storage and communication'. Scenario A shows a strong decrease in both the number of persons employed and production between 2000 and 2007. This is the result of a rearrangement in zip codes. Since this effect does not relate to an actual decrease in economic activity in the port area, scenario B should be preferred in this case.

Table 4.9: Key indicators for selected industries in the port of Vlissingen (Scenario B)

Year	Industry	Number of employees (x 1,000 fte)	Compensation of employees (x €1,000,000)	Production (x €1,000,000)	Intermediate consumption (x €1,000,000)	Value added (x €1,000,000)
1995	Construction	0	2	6	3	3
	Manufacturing	3	100	665	479	186
	Transport, storage and communication	1	23	50	16	34
	Wholesale trade	0	2	5	2	3
Total 1995		4	127	726	500	226
2000	Construction	0	6	19	11	8
	Manufacturing	2	116	1006	787	219
	Transport, storage and communication	1	27	68	28	40
	Wholesale trade	0	2	7	3	4
Total 2000		3	151	1099	828	270
2007	Construction	0	11	41	23	18
	Manufacturing	2	134	1423	1125	298
	Crude petroleum/natural gas production and service	0	0	0	0	0
	Transport, storage and communication	1	30	111	51	60
	Wholesale trade	0	6	19	7	12
Total 2007		3	183	1594	1205	389

4.3.6 Port of Terneuzen

Terneuzen is located close to Vlissingen; both ports are managed by Zeeland Seaports. The port areas of Terneuzen are spread along the Ghent–Terneuzen Canal and the Western Scheldt. The presence of large chemical companies confirms the economic relevance of this seaport. Production in the reference years for this seaport is presented in table 4.10.

Table 4.8: Production in the Port of Terneuzen

| | Production Port of Terneuzen (x €1,000,000) | | | | | | | |
| | Scenario A | | | Scenario B | | | Mean share | |
	1995	2000	2007	1995	2000	2007	A	B
Manufacturing	755	1173	2073	3371	5235	9313	71%	83%
Financial and business activities	141	152	196	271	317	408	9%	5%
Transport, storage and communication	63	80	153	128	174	353	5%	3%
Care and other service activities	57	70	71	119	146	214	4%	2%
Construction	52	55	64	164	185	185	3%	3%
Trade and repair	51	72	73	123	167	178	4%	2%
General government	64	79	72	97	123	96	4%	2%
Hotels and restaurants	7	10	17	14	20	35	1%	0%
Electricity, gas and water supply	X	X	X	X	X	X	X	X
Agriculture, forestry and fishing	3	4	5	20	19	24	0%	0%
Mining and quarrying	X	X	X	X	X	X	X	X
Total	1193	1695	2727	4309	6386	10807	100%	100%

Like the port of Vlissingen scenario B is preferred. The assumption is made that postal codes that include the relevant geographical areas consist of little economic activity, in the relevant industries that is unrelated to the seaport. For the relevant industries the results are presented in table 4.11.

Table 4.11: Key indicators for selected industries in the port of Terneuzen (Scenario B)

Year	Industry	Number of employees (x 1,000 fte)	Compensation of employees (x €1,000,000)	Production (x €1,000,000)	Intermediate consumption (x €1,000,000)	Value added (x €1,000,000)
1995	Construction	1	27	92	53	39
	Manufacturing	7	309	3,370	2,313	1,057
	Transport, storage and communication	1	36	128	55	73
	Wholesale trade	0	12	33	13	21
Total 1995		10	384	3,624	2,434	1,190
2000	Construction	1	34	113	65	48
	Manufacturing	6	321	5,135	4,159	976
	Transport, storage and communication	1	48	174	78	96
	Wholesale trade	0	16	48	19	29
Total 2000		9	419	5,471	4,321	1,150
2007	Construction	1	34	119	70	49
	Manufacturing	6	384	9,274	7,664	1,610
	Transport, storage and communication	2	75	353	179	174
	Wholesale trade	0	18	49	18	31
Total 2007		9	511	9,795	7,931	1,865

4.3.7   Other seaports

The port of Moerdijk is located along the 'Hollands Diep' river. It's located close to the port of Drechtsteden, both are located quite far inland. The port is known for the presence of companies in the "manufacture of basic chemicals and man-made fibres" industry.

The 'other' seaports included in this section are located in the northern part of the Netherlands and include Den Helder, Harlingen, Eemshaven and Delfzijl. The Den Helder port is known for the presence of Royal Navy of the Netherlands. The number of employees working in the Royal Navy in Den Helder cannot be published because of confidentiality. All employees working in the industry 'defence' are registered centrally in The Hague in the company register of Statistics Netherlands.

In table 4.12 the production figures of the five seaports are presented (summation of all 'other seaports'. Table 4.13 shows the geographical distribution.

Tabel 4.12: Production in the port of Moerdijk and the northern seaports per industry

	Production Port of Moerdijk, Delzijl, Den Helder, Eemshaven and Harlingen (x €1,000,000)							
	Scenario A			Scenario B			Mean share	
	1995	2000	2007	1995	2000	2007	A	B
Manufacturing	601	1034	1798	1972	3591	6452	67%	65%
Electricity, gas and water supply	X	X	X	X	X	X	X	X
Transport, storage and communication	148	157	341	475	650	1075	11%	11%
Financial and business activities	91	108	295	444	430	873	8%	9%
Trade and repair	79	102	192	254	324	605	6%	6%
Care and other service activities	84	99	114	235	300	361	6%	5%
Construction	57	97	59	170	264	230	4%	4%
Mining and quarrying	64	85	89	83	100	139	4%	2%
General government	25	20	25	132	135	123	1%	3%
Agriculture, forestry and fishing	14	10	12	69	50	68	1%	1%
Hotels and restaurants	17	27	23	43	63	60	1%	1%
Total	1181	1738	2948	3878	5907	9985	100%	100%

Tabel 4.13: Production in the port of Moerdijk and the northern seaports, geographically divided.

	Production (x €1,000,000)					
	Scenario A			Scenario B		
Port	1995	2000	2007	1995	2000	2007
Moerdijk	436	702	1416	1624	2671	5344
Delfzijl	401	624	1014	1338	2156	3241
Harlingen	87	106	140	433	503	670
Den Helder	230	294	364	382	476	599
Eemshaven	27	12	15	101	102	131
Total	1181	1738	2948	3878	5907	9985

The production in the ports of Moerdijk and Delfzijl are considerably larger than in the other ports in this selection. The port of Eemshaven has the smallest production figure of the seaports presented in the reference years. This port recently shows some new developments, i.a. the construction of several power plants.

For all five seaports discussed in this section scenario B is preferred over A. For small ports areas the share of the surface area of the port in the postal codes concerned is generally small. In scenario A this results in the allocation of a small share of the companies located in the postal code to the seaport. For scenario B the economic key figures of relevant industries are presented in table 4.14.

Table 4.14: Key indicators for selected industries in the port of Moerdijk, Den Helder, Harlingen, Eemshaven and Delfzijl (Scenario B)

Year	Industry	Number of employees (x 1,000 fte)	Compensation of employees (x €1,000,000)	Production (x €1,000,000)	Intermediate consumption (x €1,000,000)	Value added (x €1,000,000)
1995	Construction	1	26	89	52	38
	Manufacturing	8	295	1972	1327	645
	Crude petroleum/natural gas production and service	1	34	46	3	44
	Transport, storage and communication	4	122	475	249	225
	Wholesale trade	2	50	137	53	84
Total 1995		14	527	2720	1683	1036
2000	Construction	2	50	173	100	72
	Manufacturing	7	318	2923	2184	739
	Crude petroleum/natural gas production and service	1	70	80	3	77
	Transport, storage and communication	4	149	650	350	300
	Wholesale trade	1	56	166	65	101
Total 2000		15	643	3992	2702	1290
2007	Construction	1	31	117	68	48
	Manufacturing	7	419	5284	4074	1211
	Crude petroleum/natural gas production and service	0	47	63	2	61
	Transport, storage and communication	5	208	1075	609	465
	Wholesale trade	2	114	365	138	227
Total 2007		15	819	6904	4891	2013

4.4 Results for activities on land

In the reference period, the total number of employees (full time equivalent) for the activities in the predefined areas shows a minimal decrease (table 4.15). This decrease in employment is explained by a decrease of employment in all of the selected seaports. The number of employees in the selected industries along the coastal area is rather stable. For the Netherlands the total number of employees grew from 5.0 million fulltime equivalents in 1995 to 5.7 million in 2000 and 5.9 million in 2007. The industries selected for seaports are not labour intensive and the decline in the number of employees can potentially be explained by technological developments (automation and mechanization). Compensation per employee is larger in industries selected for seaports than for the industries selected in the coastal zone.

Table 4.15: Key figures for activities on land in predefined areas (selected industries and preferred scenario's).

Year	Industry	Number of employees (x 1,000 fte)	Compensation of employees (x €1,000,000)	Production (x €1,000,000)	Intermediate consumption (x €1,000,000)	Value added (x €1,000,000)
1995	Coastal zone	23	495	1810	856	955
	Rotterdam	57	2244	19219	14303	4916
	Other seaports	69	2566	13574	8292	5282
Totaal 1995		149	5306	34603	23451	11152
2000	Coastal zone	24	642	2426	1160	1265
	Rotterdam	55	2470	31126	25378	5748
	Other seaports	68	2909	18085	12324	5762
Totaal 2000		147	6021	51637	38863	12775
2007	Coastal zone	25	787	2901	1453	1447
	Rotterdam	55	3262	50594	41435	9159
	Other seaports	66	3749	29565	20918	8647
Totaal 2007		146	7799	83060	63806	19253

The value added in current prices for the selected industries in the areas of interest is equal to 4.0% of the Dutch total value added in 1995. In 2000 this figure is equal to 3.4% and in 2007 it was equal to 3.8%. The share of production of the selected activities in the total production figure is larger. For 1995, 2000 and 2007 the share in production is equal to 6.0%, 6.4% and 7.7% respectively.

Textbox: Differences to the Port Monitor

Since 2004 the Port Monitor is published annually. The Port Monitor includes economic figures on seaports. The objective of the Port Monitor overlaps partially with the objective of our study on seaports in the Netherlands. Both studies present figures on employment and value added in the seaports, but results differ substantially.

In this textbox a brief explanation of the differences between the Port Monitor 2007 (RebelGroup Advisory et al., 2009) and the figures presented for seaports in 2007 in this study is provided.

The estimate of total (direct) value added for all seaports in this study is 35% lower than the value added estimated in the Port Monitor for 2007. The largest part of the difference is explained by different geographical boundaries. In this study seaports are limited to industrial areas surrounding these ports only. In many cases maps provided by port authorities have been used in designing the boundaries. The Port Monitor in multiple cases, e.g. Rotterdam and Amsterdam, includes complete municipalities in setting their boundaries. The geographical boundaries set in the Port Monitor are much broader than the boundaries set in this study.

Scheveningen is also included as a seaport in the Ports Monitor. The economic activities in Scheveningen are included in the coastal in zone in this study.

Another difference is the industries selected. Some examples are given: Fisheries are included in the figures of the Port Monitor. In this study this industry is not labelled relevant in the sea ports (already covered by activities on sea. The figures of this

study include more different construction industry classes than the Port Monitor does. Waste processing activities in seaports are included in the Port Monitor while these activities are not included in this study.

A third difference is calculation of direct transport activities. In this study direct transport activities are estimated like all other industries based on location. The Port Monitor makes use of data on transport performances, just like the estimate in this study for the spillover effect of the seaport's industries on the transport industry (see chapter 5.1.2). In this study these transport activities are partly labelled as indirect activities.

For employment, a direct comparison is difficult to make. Contrary to this study, the Port Monitor provides figures on the number of employed persons, which includes self-employed persons. In this study the number of employees is based on full-time equivalents (fte) while the Port Monitor reports the number of employed persons, not corrected for the size of the job (number of hours worked).

In table 4.15 a figure of 121 thousand employees (fte) is presented fir all seaports in 2007. The Port Monitor reports 167 thousand directly employed persons. This is the sum of 122 thousand persons employed in seaport locations and 45 thousand employed persons in industries related to seaports but that may be located elsewhere (e.g. transport). In part the industries related to seaports but located elsewhere are included in our analysis of spill over effects in chapter 5.

5. Spillover effects on the national economy

Activities in seaports, coastal zones and on sea have spillover effects in the rest of the economy of the Netherlands and vice versa. Without hinterland large ports would not be there. Only taking into account direct employment, production and value added would lead to serious underestimation of the importance/relevance of activities in related to the North Sea, more specifically the Dutch Continental Shelf (DCS). The growing interconnectedness of economic activities leads to significant indirect or spillover effects in the rest of the economy. These indirect effects can be determined by calculating multiplier effects derived from input-output (IO) analysis (e.g. Miller and Blair, 2009). Multipliers can be useful instruments in economic analyses despite their limitations.

In this chapter a variety of economic multipliers for different seaports, for the coastal zone and activities on sea for the Dutch economy are described. We will show that these multipliers can be derived by integrating information from national IO tables and regional accounting data. Input-output models are feasible instruments to trace the effects of changes in final demand through the economy over short periods of time, since they track the interconnections of production by industry at detailed level. In this function, they are called impact models or multiplier models. There is a number of different types of multipliers that can be generated by IO models (e.g. Eurostat, 2008; Miller and Blair, 2009). The first general categorisation consists of a distinction between type I and type II multipliers. Type I multipliers capture the direct and indirect effects of a change in output for a particular industry. Type II multipliers capture not only indirect effects but also induced effects on other industries from the extra consumption by people working in these industries. In this study we will restrict ourselves to type I multipliers.

Type I multiplier effects can be broken down into a direct effect and an indirect effect. If there is an increase in final demand for a particular product or service, there will also be an increase in the output of that product. This is the direct effect. In addition, as producers increase their output, there will also be an increase in demand on products from their suppliers and so on, all the way down the supply chain. This is called the indirect effect. According to the terminology we use in this chapter the indirect effect can be separated into backward and forward linkages. Backward linkages consist of the effect an increase in output of a particular industry has on its suppliers. This is also sometimes called the first order effect. The increased output of the suppliers themselves also has effects on other industries. These are sometimes called higher order effects or forward linkages.

5.1 Methodology

In this study we use standard multiplier analysis to estimate indirect effects of seaports spillovers to other regions in the Netherlands in order to quantify the (economic) impact of activities in seaports, coastal zones and on sea for the Dutch economy in general. Concepts and methodologies relevant for standard multiplier analysis for core industries by means of input-output analysis are outlined in paragraph 5.1.1. The spillover effects of Dutch seaports affecting professional transport activities are not estimated by means of standard input-output analysis because standard input-output analysis is not suited for this kind of purpose[15]. These spillover effects are estimated by means of autonomous data sources and compilation methodologies. Concepts and methodologies used for spillover effects related to transport activities are outlined in paragraph 5.1.2. Data has been compiled for 3 reference years, namely 1995, 2000 and 2007. The results for the indirect effects are experimental and therefore more uncertain than standard statistics for direct employment, value added and production.

5.1.1 Multiplier analysis for supplier companies, the intermediate consumption effect

Multiplier effects show the direct and indirect effects of final demand (i.e. output) on a range of variables. The employment multiplier effect shows for instance how many jobs would be created in the economy if the manufacturing industry were to increase its output by 1 million. Suppose the direct effect of this is the creation of 5 jobs in manufacturing, and 10 additional jobs in the rest of the economy. Then the employment multiplier effect is 15. The value added multiplier effect shows for instance how many value added would be created in the economy if the manufacturing industry were to increase its output by 1 million. By means of multiplier analysis we can calculate spillover effects of production in for example seaports to other industries in other regions of the economy. In this chapter we focus only on the additional effects because the direct effects are already monitored in chapters 3 and 4 (the direct effects).

The methodology for the computation of multiplier effects is discussed in detail below. For this study we used a 60 by 60 industry IO table, which is an aggregated IO table derived from the Dutch National Accounts. The 60 by 60 industry IO table corresponds with the classification that underlies the Dutch NAMWA accounts (CBS, 2011; Brouwer et al., 2005). Accordingly, all regional variables, such as production, intermediate use, value added, compensation of employees and employment can easily be linked to the IO table in order to derive the associated multiplier effects. In order to calculate multiplier effects, we first have to adress

---

[15] This is endorsed by the fact that transport margins are registrated in a different way in the Dutch accounts than other industry by industry relationships

output multipliers because the output multiplier is essential for calculating the multipier effects.

Output multipliers

Output multipliers are commonly used to determine the impact of changes in final demand on output (e.g. Eurostat, 2008; Miller and Blair, 2009). An output multiplier for industry j is defined as the total value of production in all sectors of the economy that is necessary at all stages of production in order to produce one unit of product j for final demand. In other words, output multipliers relate the changes in sales to final demand by one industry to total changes in output (gross sales) by all industries. For example, an industry output multiplier of 1.75 would indicate that a change in sales to final demand of 1 euro by the industry in question would result in a total change in domestic output of 1.75 euro. The additional effect is equal to 0.75. The output multipliers correspond to the column sums of the Leontief inverse (CBS, 2010). This can be expressed formally as:

$$m_j = \sum_i [I - A_D]_{ij}^{-1} \qquad\qquad [1]$$

where m_j denotes the outcome multiplier for each industry j; A_D is the technical coefficients matrix and I the identity matrix. The additional effect is calculated by substracting the direct production.

Multiplier effects for other variables

The multiplier effects on other economic variables such as value added, employment can easily be calculated. Mathematically this is done by premultiplying the Leontief inverse with a vector of coefficients of the variable of interest. These coefficients could be employment intensities, loan-intensities or intermediate use intensities per industry j (CBS, 2010). Mathematically, this can be expressed as:

$$f^z_{\ j} = \sum_i e^z_{\ i} [I - A_D]_{ij}^{-1} \qquad\qquad [2]$$

where f_j denotes the multiplier effect for industry j; e_i represents the vector of intensities for the effect of study; the superscript z denotes the subject of our effect (employment etc.). For example, employment multiplier effect for industry j provides an estimate of the direct and indirect increase in employment that would result from an additional unit of output of industry j. The additional effect is calculated by substracting the direct value of the variable under consideration.

The multiplier effect can also be specified for industry-industry relationships. It is possible to analyse how much extra production is needed in all other industries, specified per industry, in order to realise 1 euro extra production in industry j. In this way the effect of extra production in industry j on certain variables in other

industries can be studied in depth. Also typical spillover effects can be excluded from the analysis (transport spillover effects are based upon different methodologies than standard multiplier analysis in this study)

Multipliers

Based upon multiplier effects one can calculate so called multipliers. Multipliers can be calculated for all kind of variables. The employment-multiplier is equal to direct plus indirect employment divided by direct employment. The value added-multiplier is equal to direct plus indirect value added divided by direct value added. An employment multiplier of 1.5 indicates that 1 person employed in, for example the seaport, goes along with another 0.5 person employment elsewhere in the economy. So the spillover effect of one employed person in the seaport is equal to 0.5 person. A value added multiplier of 1.7 indicates that if seaports generate 1 euro value added directly this goes along indirectly with another 0.7 euro value added elsewhere in the economy. So the spillover effect of 1 euro value added generated in the seaport is equal to 0.7 euro value added elsewhere. In paragraph 5.2 the different multipliers for different areas of interest are adressed.

5.1.2 Spillover effects related to transport activities

The seaports have strong spillover effects to transport activities in the Netherlands. Dutch transport companies take advantage of the transfer of goods in the Dutch seaports. Transport companies transport goods to seaports and distribute goods from seaports into the main land of the Netherlands and even abroad. The Netherlands is known as a country with a strong transport industry. The seaports have spillover effects to three transport modules 'transport by railway', 'transport by road' and 'transport by inland shipping'. The methodologies used to make estimates for the spillover effects of Dutch seaports to transport activities are discussed in the next sections. The additional effect is calculated by subtracting the direct transport activities (chapter 4.3) in seaports from total tranport activities

The methodology used to estimate the volume of transport activities triggered by Dutch seaports is discussed here. Data on transport statistics have been used in order to compile economic variables for the spillover effects under consideration. Data on transport performances (measured in tonnekm equivalents) have been collected for a few relevant municipalities/locations of interest. The transport activities from and towards these municipalities are monitored by these transport statistics. It is assumed that the transport performance statistics for the municipalities are relevant for the seaports located within these municipalities.
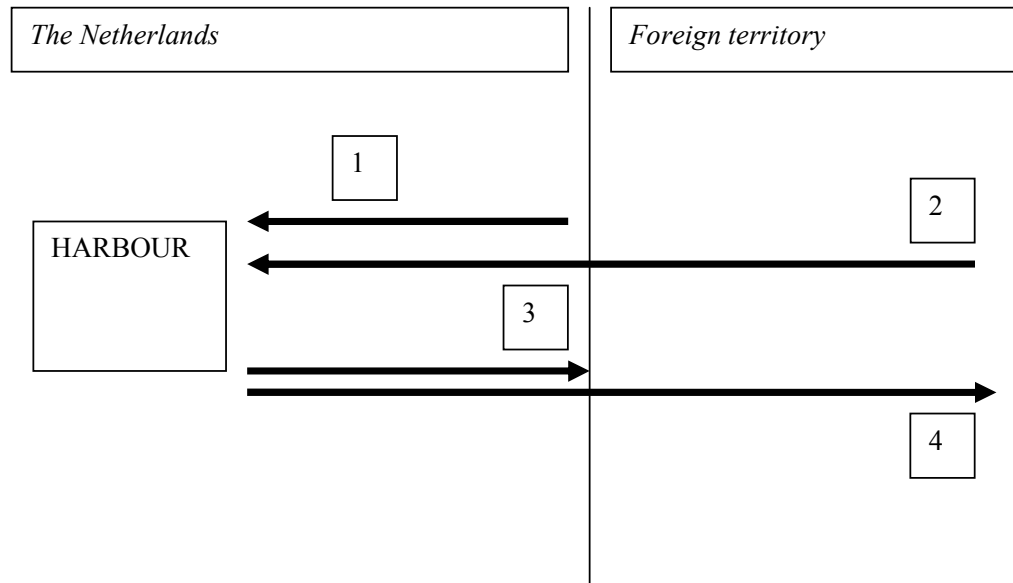
Figure 5.1 Transport movements incorporated in the analysis

The transport performance for the Netherlands in total has been estimated. Using the national figure the shares per municipality can be calculated. For example, a large part of total railway (cargo) transport activities in the Netherlands are triggered from or to Rotterdam (incorporating transport movements 1+2+3+4 in figure 1). For every single municipality employment has been calculated by multiplying the share of transport activities in municipality x with the total employment number in the Netherlands of the transport activity under consideration. Figures for employment, value added, production and compensation of employees are based upon economic ratio's such as value added per employee, production per employee and loan per employee.

Economic figures for railway transport cannot be published explicitly because of confidentiality issues. The economic figures for railway transport activities are summed with the transport by road activities. Employment related to transport by road, inland shipping and railway transport is estimated by making use of exactly the same method.

Figures for value added, production and compensation of employees are based upon economic ratios such as value added per employee, production per employee and loan per employee. Also here counts that the additional effect is calculated by subtracting already covered direct transport activities, of companies established in certain areas under consideration, from total transport activities. The results for the *total* transport activities are presented in annex L. The results for the additional transport activities are presented in annex M. In one occasion negative numbers are presented for certain variables for inland shipping. This is the result of the calculation method for additional effects. Sometimes certain transport companies located in certain seaports are not active (or only partly) in the area where the

establishment is located. This problem only exists for small numbers in small seaports.

5.2 Results for spillover effects, the intermediate consumption effect
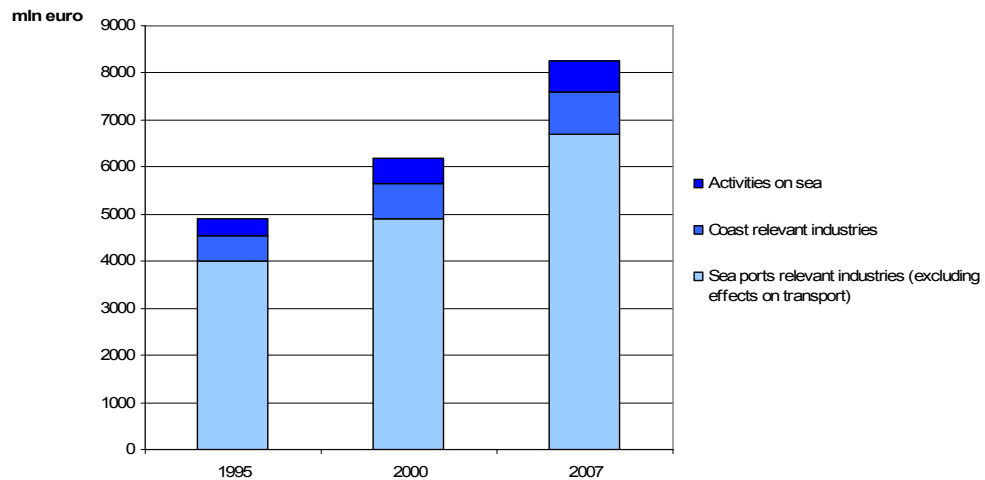
Figure 5.2 Indirect effects (spill-overs) on value added of North Sea activities

Total indirect value added (excluding transport) triggered by by activities on sea and on land (except transport, which is discussed in chapter 5.3) are equal to 8.2 billion in 2007. In 1995 total value added triggered by North Sea activities was equal to 4.9 billion euro, so value added of indirect activities has grown by 67 percent. Indirect value added triggered by seaports has the largest share in total indirect value added. Seaport relevant industries indirectly generated 6.7 billion euro value added elsewhere in the economy. Coast relevant industries generate indirectly just 0.9 billion euro value added. Production in the relevant industries and areas under consideration has grown significantly in between 1995 and 2007. This extra production has gone along with extra intermediate consumption triggering more value added in other industries in other areas of the economy. See annex H, annex I and annex J for a complete data overview for the intermediate consumption effect.
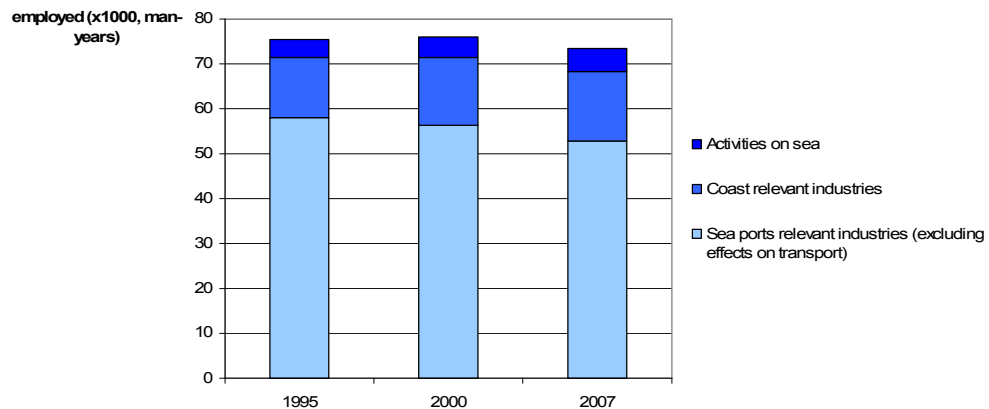
Figure 5.3 Indirect effects (spill-overs) on employment of North Sea activities

Total indirect employment (excluding transport) triggered by North Sea activities is equal to 73 thousand employees (fte's) in 2007. In 1995 total employment as a result of North Sea activities was equal to 76 thousand employed persons (fte's), so employment of indirect activities has decreased by 4 percent. The production multiplier for a few important industries has declined over time. This is due to relatively more import of these industries. Their intermediate use is more and more produced abroad and therefore the spillovers of these industries have become relatively smaller. Secondly, 'intermediate goods and services' supplied by domestic producers can be produced by less employees due to increased labour productivity. As described in chapter 5.5 caution is required in interpreting these time series because regional differences are not specified in the model used.

Indirect employment triggered by seaports has the largest share in total indirect employment (53 thousand employed persons in 2007). Coast relevant industries generate indirectly just 15 thousand jobs (measured in fte's, employed persons). Also here counts that production in the relevant industries and areas under consideration has grown significantly in between 1995 and 2007. This extra production increased intermediate consumption. Production per employee has also grown in the period 1995-2007. Growth in labour-productivity has compensated for this increase in intermediate consumption leading to a nearly stable employment level for the indirect activities.

5.3   Results for spillover effects of seaports on transport activities

The total effects of the seaports in the Netherlands to the rest of the economy are very prominent for transport activities in the Netherlands. Approximately 31.3 thousand fte's (excluding self employed people) are involved in transporting goods from and to the Dutch seaports in 2007 (see annex L). This number of employment has only increased slightly in the period 1995-2007. Total value added related to the spillover effects on transport is equal to 2.3 billion euro in 2007 (see annex L). Total production value related to the spillover effects on transport is equal to 4.6 billion euro in the year 2007 (see annex L). These figures are all based upon cargo tonnekm statistics compiled by the 'Transport Statistics department' at Statistics Netherlands (see annex K, (CBS, 2011))

Approximately 25.4 thousand fte's are involved in transporting goods by the road and railway from and to the Dutch seaports in 2007. Value added and production of these activities are equal to respectively 1.7 billion and 3.3 billion euro. Roundabout 5.9 thousand fte's are involved in transporting goods by inland shipping from and to the Dutch seaports in 2007. Total transport related employment triggered by Dutch seaports has only grown very slowly in the period 1995-2007 from 30.1 thousand fte's to 31.3 thousand fte's. Value added of these transport activities has grown from 1.6 billion to 2.3 in the period 1995-2007 while production has grown from 2.9 billion to 4.6 billion euro.

The total transport industry related to the combined seaports grew over time for all transport modules. Looking at individual seaports the level of employment is not

always increasing over time. The number of employees in road and railway transport related to the Rotterdam seaport diminished between 1995 and 2007. The same holds for inland shipping. It seems that Dutch transporters have been less involved in transport activities from and to the port of Rotterdam. This may have a few causes. Firstly, competition has increased due to new entries in the market for transport activities (for example foreign road transporters are engaged in transport activities from and to Rotterdam). Dutch transporters possibly have lost market share of physical flows of goods. International transport by road is more and more dominated by foreign transporters. It seems that the spillover effects of the Rotterdam mainport have diminished for Dutch transporters while it has increased for foreign transporters (import leakage).

The total effect for employment for total transport activities have grown for the seaports Delfzijl/Eemshaven, Harlingen, Amsterdam, Dordrecht, Terneuzen/Axel, Vlissingen and the Moerdijk area. Especially the transport activities from and to the seaport Amsterdam have grown over time. Inland shipping has been triggered the most. The spillover effects on the transport industry in real terms (here employment) for total transport activities have decreased for the seaports IJmuiden/Velsen and Rotterdam.

In annex L the economic figures for total transport activities triggered by seaports have been presented. Some of these total transport activities are already included as direct economic activities. In order to avoid double counting these direct activities should be subtracted from total activities in order to calculate indirect transport activities. Economic figures for indirect transport activities only are presented in annex M and annex G.

5.4   Conclusions on spillover effects of North Sea activities

Multiplier effects, the additional effect

The spillover effects (additional effects) of the areas under consideration on other industries in the economy can be summed (effects on both supply companies and transport companies). Total indirect employment is equal to 96 thousand employees (fte) that result in 4.6 billion euro of compensation of employees. Indirect value added is equal to 9.7 billion euros while indirect production is equal to 32.5 billion euro. The seaports have a relatively large spillover effect to the rest of the economy. Both the effect on supply companies as well as on the transport activities are relatively big.

Table 5.1 Overview spillover effects North sea activities, 2007

2007	Employees (x1000 fte)	Compensation of employees (mln euro)	Intermediate Consumption (mln euro)	Production (mln euro)	Value added (mln euro)
Sea ports relevant industries (excluding effects on transpo	53	2841	18968	25664	6696
Coast relevant industries	15	491	907	1794	887
Activities on sea	5	255	1274	1929	655
Transport activities by sea ports	23	994	1577	3111	1535
Total	96	4581	22726	32498	9773

Multipliers

The employment multiplier is largest for the coastal zone. For every 10 employees active in the coastal zone trigger approximately 6.4 persons working elsewhere in the economy. For the seaports holds that for every 10 employee's active approximately 6.2 persons are working elsewhere in the economy. The activities on sea have the smallest employment-multiplier. For every 10 employees active on sea, approximately 3.2 persons are active elsewhere in the economy.
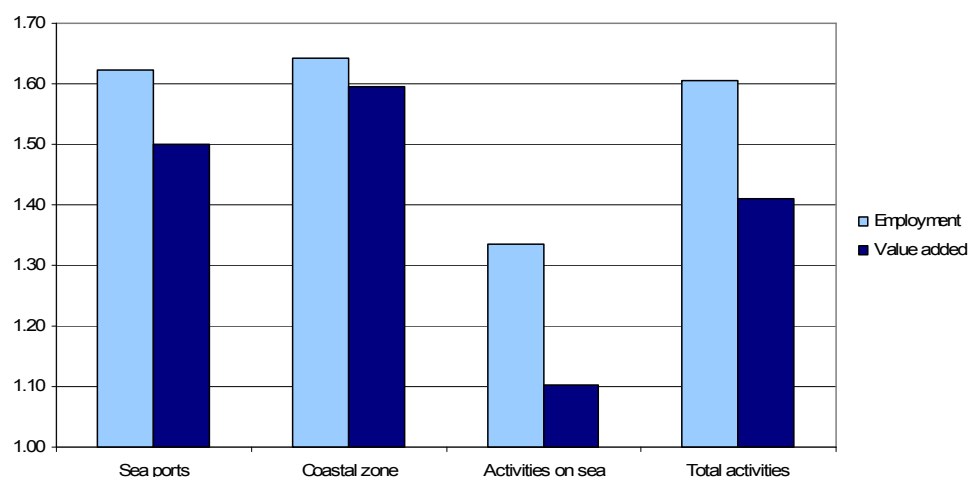
Figure 5.4 Employment-multiplier and value added-multiplier, average 1995-2000-2007

The Dutch Continental Shelf has on average, taking into account all relevant activities, an employment multiplier of 1.6. This is significantly lower than the Dutch average (1.9 in 2008, Environmental Accounts of the Netherlands 2009 (CBS, 2010)). This is due to the fact that the activities on sea have little interactions with other industries because they are located on sea. Activities on sea are relatively capital intensive and do not consume much input of goods and services for their production. So production on sea does not trigger other production that much. Activities in seaports are located there because the relevant companies have strong relationships with foreign economies (for example import of crude oil or import of iron ore). Intermediate consumption consists of many imports cause these specific materials are not available in the Netherlands. Extra production of companies in the seaport does not lead to large spillover effects in the rest of the Dutch economy due to these import-leakages.

The value added multiplier is equal to 1.4 on average for the years 1995, 2000 and 2007. This means that for every 10 euro value added created by North Sea activities approximately 4 euros are created elsewhere in the economy. Like the employment multiplier, the value added multiplier of the selected activities is significantly lower than the Dutch average (1.6 in 2008 Environmental Accounts of the Netherlands 2009 (CBS, 2010)). The value added multiplier for activities on sea (1.1) is significantly smaller. Oil and gas production is responsible for this small multiplier.

Oil and gas production does not consume much goods and services in order to produce gas and oil. Small intermediate consumption leads to small spillover effects.

5.5   Interpretation, strenghts and weaknesses

Standard multiplier analysis for core industries by means of input-output analysis

Production multiplier effects measure to what extent industries use each other's output. Industries with more linkages to other sectors will have large multiplier effects. This does not mean that they are more important to economic growth than other industries. A common mistake in analysis is to use production multiplier effects as proof of the importance of an industry to the overall economy. These multipliers only show linkages to other industries. Value added multiplier effects measure the contribution of an industry to total GDP. The results can be dramatically different. These GDP multiplier-effects values are considerably smaller than production multiplier-effects, because they net out intermediate inputs. GDP multiplier-effects are therefore more informative than production multiplier-effects (source: Canadian Economic Observer, Multipliers and Outsourcing: how industries interact with each other and affect GDP).

A weakness of the analysis is that we do not have regional input-output tables. Only national input-output tables are available for this kind of analysis. Linkages between industries can be very different on the national scale than on the regional scale. Still national input-output tables are the best available for quantifying typical relationships in between industries. The multiplier model is based upon national data. One needs to make some assumption in order to let the model work for typical regions. For example, price developments (production) in the area of interest must be equal to price developments in the national economy in order to let the model work properly. This is not necessarily always the case. Price developments in certain areas can differ from price developments on the macro scale. Another assumption, homogeneity of industry classes in between areas, can also sometimes be violated. The chemical industry in for example Rotterdam can produce different chemical products than the chemical industry does on the macro scale. Production process characteristics can differ substantially inn between those regions. Sometimes these mentioned assumptions are violated. Therefore, the outcomes of the model are experimental and one should be careful in interpreting the data, especially if one looks closer to developments over time.

The regional input-output tables for the areas of interest are not available. The likely error can not be quantified. In theory one could imagine that industries located in seaports are strongly connected to foreign economies and therefore it is not irrational to assume that import leakages are larger in seaports than the 'average' import leakage for the national economy on macro scale. Therefore, multiplier effects could

be smaller than the calculations using the model. Still, data is not available to test this assumption.

In order to compile statistics for the indirect activities we have to make some additional assumptions. The most important assumption made is that relevant industries in certain areas of consideration do not demand goods and services which are supplied by relevant industries incorporating establishments located in the area of consideration. This assumption is violated if indeed certain companies of relevant industries demand goods and services which are produced by other companies of relevant industries in the same area of consideration. If this assumption is violated this leads to double counting with the already covered direct activities.

Strength of the method applied is that it can be repeated for other reference years as the sources used are available on a yearly basis. The method is also consistent with the conceptual framework of the national accounts.

Spillover effects of seaports on transport activities

Spillover effects of seaports on transport activities presented in this study only take into account those effects on Dutch transport companies (Dutch residents). Strength of the method applied is that it can be repeated for other reference years as the sources used are available on a yearly basis. 'Transport Statistics' used in this particular study are also available in other countries so other countries could in theory carry out a similar study which is comparable to this study.

The economic figures are very much dependent upon transport statistics measured in tonnekm. Tonnekm is not always an appropriate criterion in order to distribute total economic activity related to transport activities to municipalities or in our case to seaports. Differences in transport quality (high quality transport activities (including for example organisation of logistics) versus low-quality transport activities) are not taken into account by using this criterion. For example, production per tonn/km can be larger for refrigerated transport than for bulk transportation. This difference is not incorporated into the figures for production. Also differences in the supply of extra services, such as logistic management are not taken into account.

Another weakness is the assumption that all transport activities in a certain municipality are indeed related to the seaport in that municipality. This is not necessarily always the case. Transport activities in tonnkm for inland shipping cannot be distangled for residents and non-residents. In other words, transport statistics for inland shipping cannot make a distinction between foreign entrepreneurs and Dutch entrepreneurs with regard to transport flows on the level of the municipality. It is assumed that the development in tonnkm per municipality for total inland shipping (including foreign residents) is also representative for inland shipping carried out by Dutch residents.

6.   The North Sea economy in fixed prices

Economic growth is defined as the volume growth of gross domestic product (GDP). The analysis of the activities related to the DCS so far included only economic figures on value added in current prices, compensation of employees in current prices, intermediate use in current prices and production value in current prices. Growth in value added of the North Sea economy in current prices cannot be compared with the economic growth of the total Dutch economy. Price fluctuations are imbedded in the current price approach. Economic growth is defined as volume growth of the economy (growth in real terms instead of growth in nominal terms). Value added in current prices therefore should be deflated with relevant price-indices in order to compile statistics on value added in constant prices (constant price level). Value added in constant prices of the North Sea can be compared with macro economic growth.

Correcting the North Sea figures for price changes serves two objectives:

•   If one wants to compare real developments in the North Sea economy with the overall economic growth of the Dutch economy one has to adjust the monetary variables for price changes over time.

•   Production is often used in environmental-economic analysis as a cause of environmental pressure. If growth in production value in current prices is used as indicator for growth in environmental pressure, one overestimates the growth in environmental pressure (in the case of price increases) or one underestimates the growth in environmental pressure (in the case of price decreases). Compiling production figures in constant prices is done by correcting for price changes over time.

6.1   Methodology for deflation

The methodology for deflating the monetary variables is set-up as follows. First we define a base year. The year 2007 is the most recent reporting year of the study so this will be the base year for deflating. Two distinct deflation methods have been set-up. One method (A) for deflating the direct activities in the North Sea on land and on sea plus the indirect transport activities and another method (B) for the indirect activities related to activities on sea and on land.

(A)   Direct activities at land and at sea plus indirect transport activities

The outcomes of production and intermediate consumption for the North Sea, and therefore of the value added, are 'deflated' with national deflators per industry. Statistics Netherlands has no data available about regional price developments per

industry. Expressing the production of direct activities in 2000 and 1995 in prices of 2007 is straight forward. The accumulated yearly price changes have been multiplied by the production level in current prices in 2000 and 1995. The same has been done for the variables intermediate consumption and compensation of employees. Value added is equal to production value minus intermediate consumption.

$$VAR_{2000lp}^{N} \, xDeflator_{2000}^{N} = VAR_{2000\,fixed\,2007}^{N}$$

$$VAR_{1995lp}^{N} \, xDeflator_{1995}^{N} = VAR_{1995\,fixed\,2007}^{N}$$

$$Deflator_{2000}^{N} = (VAR_{2007lp}^{N} \, / \, VAR_{2007cp}^{N})x(VAR_{2006lp}^{N} \, / \, VAR_{2006cp}^{N})x(VAR_{2005lp}^{N} \, / \, VAR_{2005cp}^{N})$$

$$x(VAR_{2004lp}^{N} \, / \, VAR_{2004cp}^{N})x(VAR_{2003lp}^{N} \, / \, VAR_{2003cp}^{N})x(VAR_{2002lp}^{N} \, / \, VAR_{2002cp}^{N})x(VAR_{2001lp}^{N} \, / \, VAR_{2001cp}^{N})$$

$$Deflator_{1995}^{N} = Deflator_{2000}^{N} x(VAR_{2000lp}^{N} \, / \, VAR_{2000cp}^{N})x(VAR_{1999lp}^{N} \, / \, VAR_{1999cp}^{N})$$

$$x(VAR_{1998lp}^{N} \, / \, VAR_{1998cp}^{N})x(VAR_{1997lp}^{N} \, / \, VAR_{1997cp}^{N})x(VAR_{1996lp}^{N} \, / \, VAR_{1996cp}^{N})$$

Whereby:

VAR : *Variable under consideration (production, value added, intermediate consumption)*

N : *NAMEA industry class (58 industries specified)*

lp : *Current prices*

cp : *Constant prices*

$VAR_{2000\,fixed\,2007}^{N}$: Value of variable in reporting year 2000 for NAMEA class N expressed in prices of 2007

$VAR_{1995\,fixed\,2007}^{N}$: Value of variable in reporting year 1995 for NAMEA class N expressed in prices of 2007

VAR_{2000lp}^{N} : Value of variable in reporting year 2000 for NAMEA class N expressed in prices of 2000

VAR_{1995lp}^{N} : Value of variable in reporting year 1995 for NAMEA class N expressed in prices of 1995

Textbox: practical example for calculating 'deflators'

Price index for production (oil and gas production), (t-1=1)
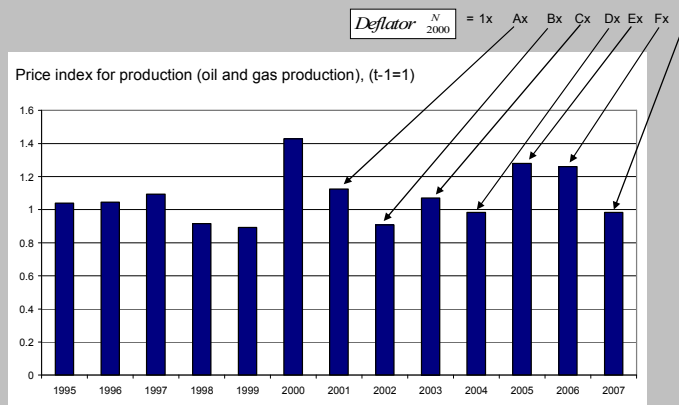
Figure 6.1- Price indices for production in the oil and gas industry

Figure 1 presents the yearly price changes for production in the oil and gas industry. Price changes were for example very large in 2005 and 2006 (more than plus 20 percent). The deflator for 2000 is calculated by accumulating the price mutations in the period 2000-2007 (See figure 1; 1xAxBxCxDxExFxG). The 'deflator' for 2000 is equal to 1.7 and the deflator for 1995 is equal to 2.2 (base year is 2007. Value of production in current prices in 1995 have been multiplied by 2.2 in order to construct production data in 2007 prices for the oil and gas industry for reporting year 1995.

(B)   Indirect activities triggered by activities at land and at sea (excluding transport)

Expressing the production of indirect activities (excluding transport) in 2000 and 1995 in prices of 2007 is less straight forward. The indirect activities are very heterogeneous and are executed by many different NACE classes. The different NACE classes experience different yearly price changes. So first a share (share of NAMEA class in total deliveries to area of interest) has been calculated in order to weight all these different price developments. Hereafter all different price developments are weighted making use of the shares and thereby one single 'deflator' has been constructed. This weighted 'deflator' is used to calculate the variables in one single price-level (following notation above).

$$(\sum_{N} share_{2007}^{N} x Deflator_{2000}^{N}) x VAR_{2000lp}^{N} = VAR_{2000\,fixed\,2007}^{N}$$

$$(\sum_{N} share_{2007}^{N} x Deflator_{1995}^{N}) x VAR_{1995lp}^{N} = VAR_{1995\,fixed\,2007}^{N}$$

$$share_{2007}^{N} = PROD_{2007}^{N} \Big/ \sum_{N} PROD_{2007}^{N}$$

Whereby:

$share_{2007}^{N}$: Share of NAMEA class in total deliveries to area of interest

6.2 Results in fixed prices
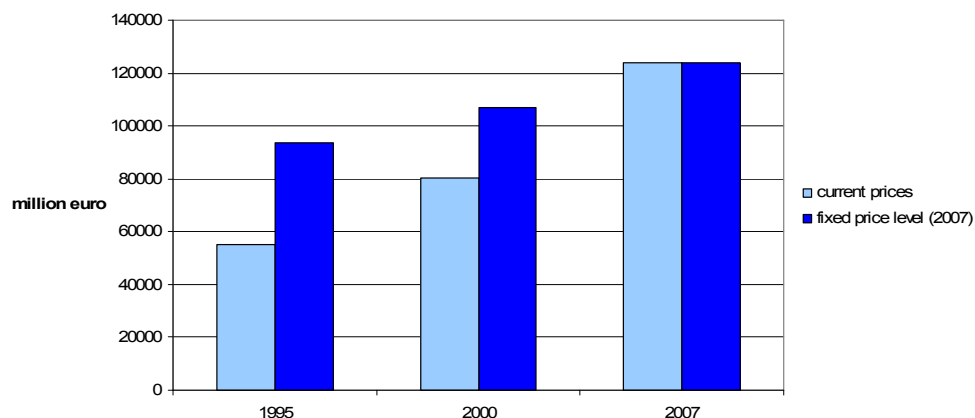
*Figure 6.2 production North Sea economy in current prices and fixed price level
(2007=100), including spill over effects*

Production value created by the North Sea economy equalled 54.9 billion euro in
1995, measured in current prices. Expressed in 2007 prices, production in 1995 was
equal to 93.6 billion euro (for details annexes P and R). Production value in 2007
was equal to 124.0 billion euro. Production growth in real terms of the North Sea
economy equals 32.5 percent over the period 1995-2007. This is significantly less
than the 126 percent growth in production value in current prices. This result means
that if growth in production value is used as indicator for growth in environmental
pressure, and production value in current prices is used, growth in environmental
pressure would be overestimated by approximately factor four. If growth in
production value is used as indicator for growth in environmental pressure, it is
recommended to use production value in fixed prices in stead of production value in
current prices.
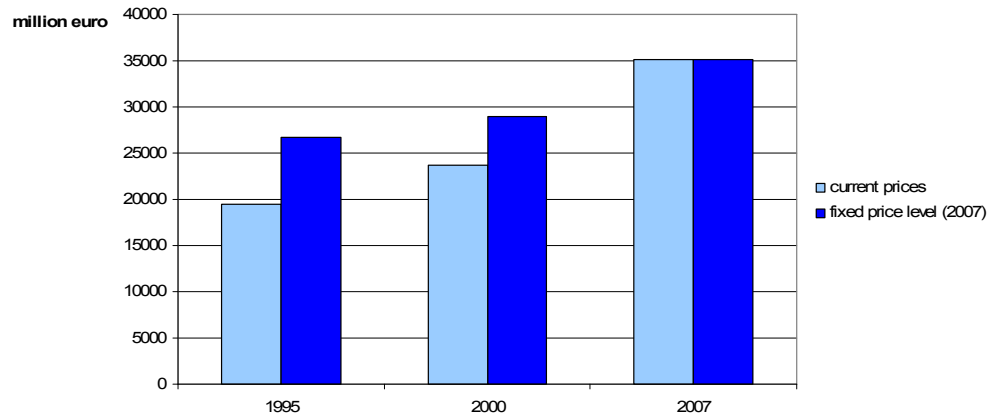
Figure 6.3 Value added North Sea economy in current prices and fixed price level (2007=100), including spill over effects

Value added created by the North Sea economy equalled 19.5 billion euro in 1995, measured in current prices. Expressed in 2007 prices, value added in 1995 was equal to 26.7 billion euro. Value added in 2007 was equal to 35.2 billion euro. Growth in real terms of the North Sea economy equals 32 percent over the period 1995-2007.
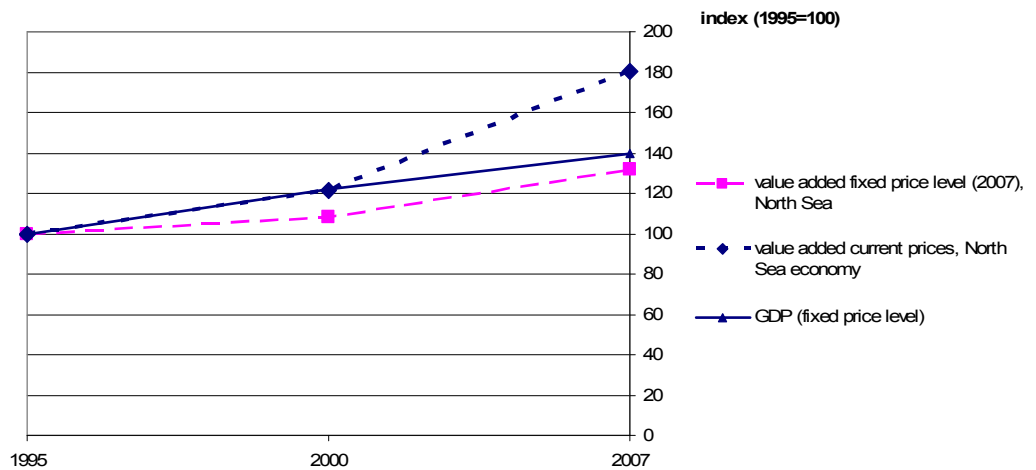
Figure 6.4 Growth in value added North Sea economy versus GDP growth, including spill over effects

Growth of value added in nominal terms equals more than 80 percent. Growth in real terms was equal to 32 percent. As a consequence, on average the price increase in value added for the North Sea economy equalled 36 percent. (1.32x1.36= 1.80; see for details annex R). The Dutch economy as a whole grew with 40 percent in this

reference period. The North Sea economy thus grew less fast than the Dutch economy as a whole.

This difference in growth is explained by several factors. Firstly manufacturing is very prominent in the North Sea economy. Manufacturing has grown less hard in the reference period than the economy as a whole. The service industries are not prominent in the North Sea economy. These services industries have grown above average. Oil and gas extraction has not grown spectacular in the reference period. Growth in oil and gas extraction is very much dependent upon long term extraction strategies and the weather. Growth in real terms (value added, fixed prices) of the oil and gas industry is equal to 14 percent. Growth in nominal terms (value added, current prices) of the oil and gas industry is equal to 180 percent. The relevant activities in the coastal zone have grown with 24 percent. Fishery showed a decline in value added in real terms in the reference period. Growth in nominal terms (value added, current prices) of fishery is equal to 180 percent

Sea shipping is as an exemption, this industry has grown very fast in the reference period, and value added has more than doubled in real terms.

7. Conclusions and recommendations

In this chapter the economic figures for activities on sea (chapter 3), activities on land (chapter 4) and their spill over to the national economy (chapter 5) are added in order to construct a combined estimate for all activities related to the Dutch Continental Shelf. The combined figure is also compared to macro economic key figures for the Dutch economy. This chapter ends with some recommendations for future research and a short reader for correct interpretation of the presented data.

Table 6.1 presents a summery of the economic key figures for the relevant activities (direct) and the spillover effect on the national economy (indirect). Contrary to the other economic indicators, the number of employees (fulltime equivalents (fte)) decreased over time. On the other hand, the total number of employees in the Netherlands grew in the reference period. As a consequence, the share of the relevant activities in the number of employees in the Netherlands has decreased. In 1995 this share was equal to 5.0%, in 2000 4.4% and in 2007 4.2%.

The share in production (current prices) of the relevant activities on sea and on land, including their spillover effect on the national economy, grew subsequently from 9.6% to 10.0% and 11.4% in the years 1995, 2000 and 2007. The share in total Value Added (current prices) of the areas of interest was equal to 7.1% in 1995 and decreased to 6.4% in 2000. In 2007 the share in value added was equal to 6.9%.

Table 6.1 Summary of the economic key figures in current prices for activities on sea and on land and their spillover effect on the national economy (indirect)

		DIRECT			INDIRECT			TOTAL		
		1995	2000	2007	1995	2000	2007	1995	2000	2007
Total on land	Number of employees (x 1,000 fte)	144	142	141	94	94	91	238	236	232
	Compensation of employees (x €1,000,000)	5073	5764	7501	2954	3528	4326	8027	9292	11827
	Production (x €1,000,000)	32294	48477	79124	16118	22058	30569	48412	70535	109694
	Intermediate consumption (x €1,000,000)	21657	36451	60849	10404	15188	21452	32061	51639	82301
	Value added (x €1,000,000)	10637	12026	18276	5714	6870	9117	16351	18896	27393
Total on sea	Number of employees (x 1,000 fte)	10	10	9	4	5	5	14	15	14
	Compensation of employees (x €1,000,000)	513	552	649	152	193	255	665	745	904
	Production (x €1,000,000)	5420	8106	12368	1114	1646	1929	6534	9752	14297
	Intermediate consumption (x €1,000,000)	2617	3808	5239	746	1097	1274	3363	4905	6513
	Value added (x €1,000,000)	2803	4298	7130	368	549	655	3171	4847	7785
Total	Number of employees (x 1,000 fte)	154	152	150	98	99	96	252	251	246
	Compensation of employees (x €1,000,000)	5586	6315	8150	3106	3721	4581	8692	10037	12732
	Production (x €1,000,000)	37714	56583	91492	17232	23704	32498	54946	80287	123991
	Intermediate consumption (x €1,000,000)	24274	40259	66088	11150	16286	22726	35424	56544	88813
	Value added (x €1,000,000)	13440	16324	25406	6082	7419	9773	19522	23743	35178

Growth in value added of the North Sea economy in nominal terms, presented in table 6.1, equalled more than 80 percent in the period 1995-2007. This growth is partially caused by strong price increases (prominent role for energy prices). Growth in real terms was equal to 32 percent. The Dutch economy as a whole grew 40 percent in this reference period. This means that the North Sea economy grew less than the Dutch economy as a whole.

Figure 6.1 shows the contribution of different activities in the total amount of value added generated by relevant industries (direct) in the areas of interest in 2007. The activities in the seaports have the largest share in total value added of the relevant activities. Extraction of oil and gas on the DCS also has a large share in total value added. When the indirect effects of the economic activities are included, the share of seaports is even larger (71.2%). The share of Oil and Gas extraction, including its spillover effects, is 17% of the total value added of the selected activities. This industry has a small spill over effect and smaller share in the value added when spill over effects are included.
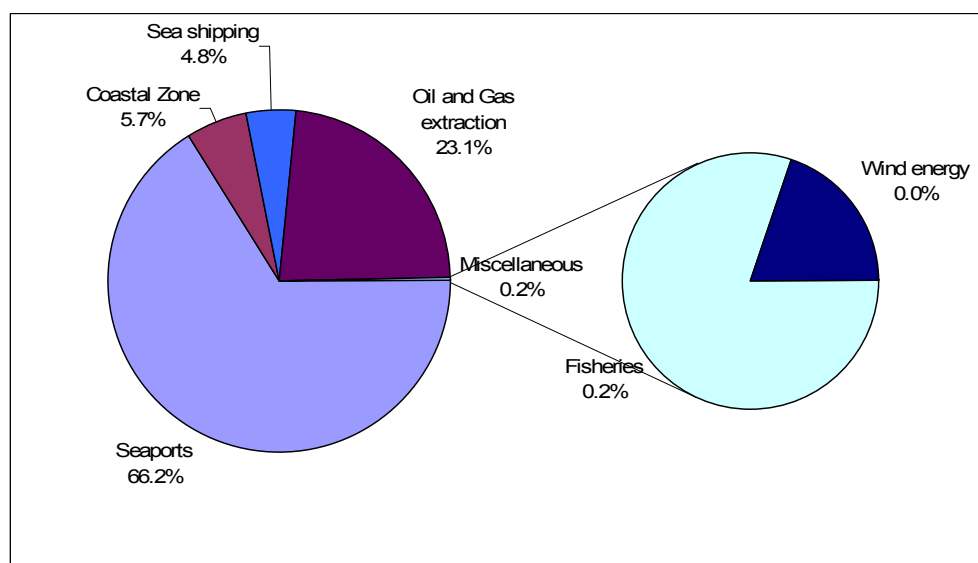
Figure 6.1 Share in total value added (direct) of different activities on or related to the DCS (2007).

In the selected seaports, manufacturing generated the largest part of (direct) value added as shown in figure 6.2. For the three reference years used in this study manufacturing has a share between fifty and sixty percent of the estimated value added in seaports.

In manufacturing the most important activities are 'the manufacture of basic chemicals and man-made fibres' (Rotterdam), 'the manufacture of petroleum products' (Rotterdam) and 'the manufacture of basic metals' (IJmuiden).
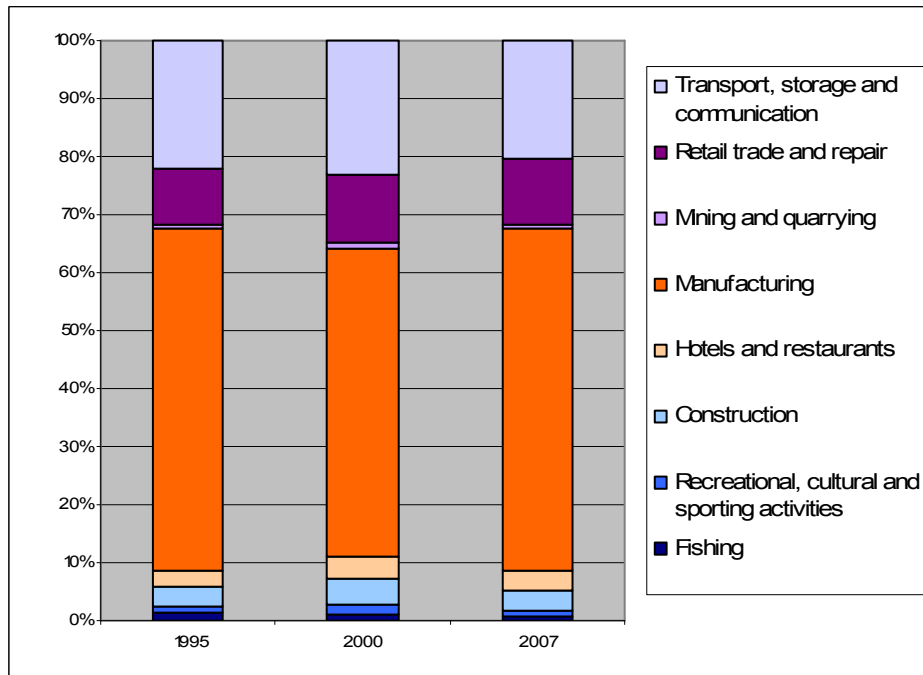
Figure 6.2 Share in value added (direct) of relevant industries in the selected seaports and coastal zone

Number of employees (direct)

The share of relevant activities in the estimated number of employees in 2007 (direct) is shown in Figure 6.3. Unlike the share in value added, the contribution to employment of extraction of oil and gas on the DCS is relatively small. This industry is characterised by low labour intensity. The largest part of employment is generated by activities taking place in seaports and the coastal zone.

Figure 6.3 presents the number of employees excluding the spillover effect on the national economy. Including these indirect effects would make minor difference on the shares presented.

In figure 6.4 the share in the total (direct) employment is presented for the relevant industries selected for seaports and in the coastal zone. In 2007, the industry of 'transport, storage and communication' had the biggest share in the number of employees. The share of manufacturing declined in the reference period, while the share of the activities in the coastal zone (retail trade and hotels and restaurants) increased.
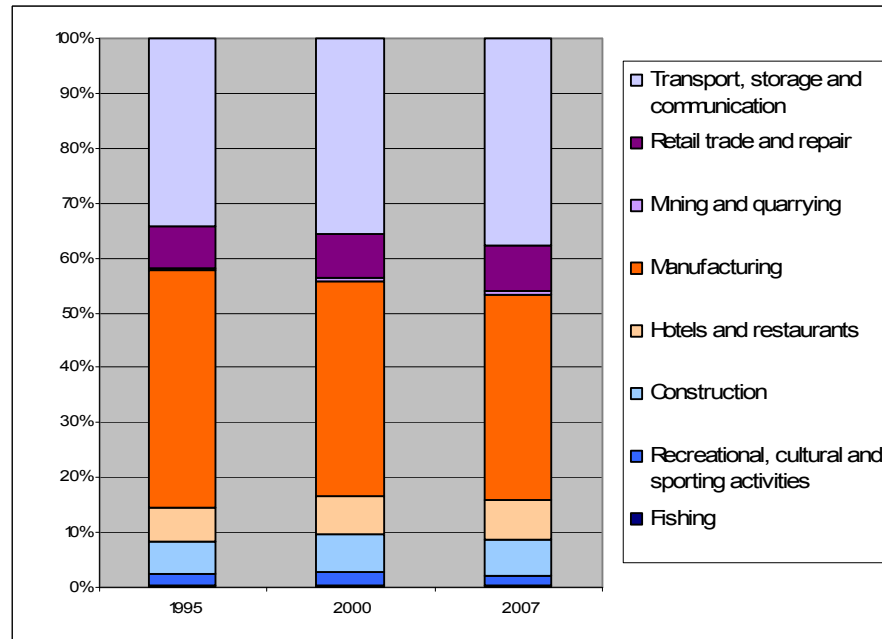
Figure 6.4 Share of the relevant industries in the direct employment in the selected seaports and coastal area.

<u>*Development over time*</u>

Figure 6.5 shows the index (1995=100) for both the number of employees and value added generated by 'North Sea activities' (including spillover effects) and the macro economic figures for Dutch economy as a whole. Employment for the total of the selected activities (direct and indirect) is stable, while the total number of employees for the Netherlands as a whole increased by 18 % in between 1995 and 2007 (full time equivalents).

Value added in current prices for selected activities on the DCS and in the area of interest on land grew similar to total Dutch economy. This figure depends heavily on both extraction of oil and gas on the DCS and the manufacture of petroleum products in the port of Rotterdam. These industries are characterised by strong price inflation in the period 1995-2007. Real economic growth, in volume changes, was considerably smaller.
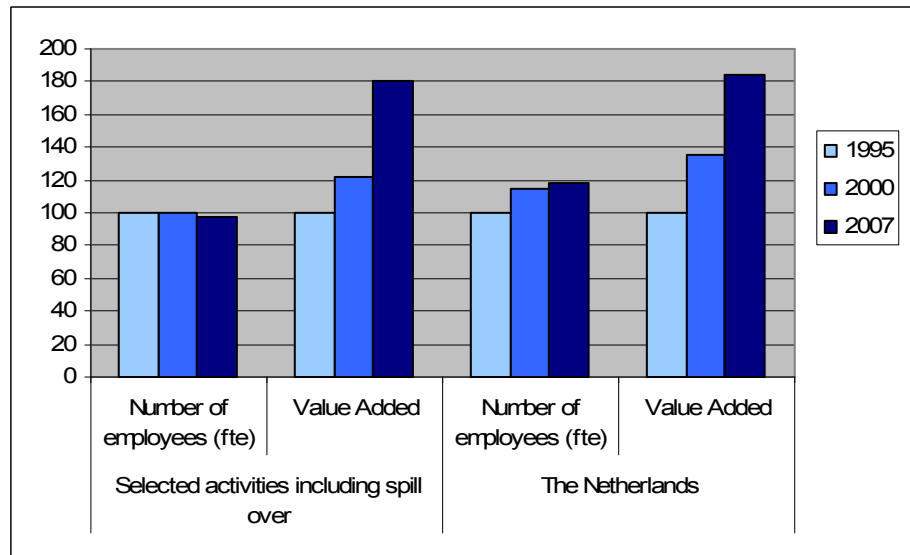
Figure 6.5 Index (1995=100) of employment and value added for selected industries related to the DCS and national figures for the Dutch economy

The Dutch Continental Shelf has on average (1995, 2000, 2007), taking into account all relevant activities, an employment multiplier of 1.6. This is significantly lower than the Dutch average (1.9 in 2008, Environmental Accounts of the Netherlands 2009 (CBS, 2010)). This is due to the fact that the activities on sea have little interactions with other industries because they are located on sea. Activities on sea are relatively capital intensive and do not consume much input of goods and services for their production.

Activities in seaports are located there because the relevant companies have strong relationships with foreign economies (for example import of crude oil or import of iron ore). Intermediate consumption consists of many imports cause these specific materials are not available in the Netherlands. Extra production of companies in the seaport does not lead to large spillover effects in the rest of the Dutch economy due to these import-leakages.

The value added multiplier is equal to 1.4 on average for the years 1995, 2000 and 2007. This means that for every 10 euro value added created by North Sea activities approximately 4 euros are created elsewhere in the economy. Like the employment multiplier, the value added multiplier of the selected activities is significantly lower than the Dutch average (1.6 in 2008, Environmental Accounts of the Netherlands 2009 (CBS, 2010)). The value added multiplier for activities on sea (1.1) is smaller. Oil and gas production is responsible for this small multiplier. Oil and gas production does not consume much goods and services in order to produce gas and oil. Small intermediate consumption leads to small spillover effects.

Evaluation of the methodology used

The figures presented in this paper are mostly based on figures from the national accounts or the regional accounts. The national or regional figures are partly allocated to specific geographical areas: the Dutch Continental Shelf, the selected seaports or the coastal area. Using data from the national accounts means that the used concepts are consistent and based on international definitions. Other advantages are that the data sources are produced annually and that time series are available. Since data are published per industry, it is possible to analyse the economic structure of the areas of interest.

In estimating the economic activities on the DCS (activities on sea) the methodology used differs for each activity. The figures for production of wind power on the DCS are based on already available figures at Statistics Netherlands. For sea shipping and fisheries external sources were used to allow the allocation of the national figures to the DCS. For the number of employees in the offshore oil and gas extraction data supplied by State Supervision of Mines was used. The figures on production, intermediate consumption and value added in this industry were taken from the Regional accounts of the Neteherlands (Statistics Netherlands).

The quality of the sources used differs and is difficult to determine. The continuity is a problem is several cases. The figures on the revenues of fishing on the DCS ((LEI, compendium voor de leefomgeving, 2006) are published only for 2001, 2002 and 2003.

Part of the methodology used in the river basin analysis (Brouwer *et al*., 2005) is adopted in this study for analysing the seaports and the coastal zone. An advantage is that different types of areas are estimated in a similar way. A drawback of this methodology is that it allocates production to the location where employees are recorded in the company register of Statistics Netherlands. When the 'administrative location' differs from the actual production site the results may not be precise. Especially for seaports, where large companies with multiple locations are present this is likely to result in underestimating the economic activities. This problem is partly solved by allocating total figures for the larger region (COROP) to a seaport for some relevant industries. This methodological problem is less substantial for the river basin analysis because these geographical areas are much larger.

The figures for the spillover effect on the national economy are based on a multiplier analysis by means of input-output analysis. The spillover effects of Dutch seaports affecting professional transport activities are not estimated by means of standard input-output analysis because standard input-output analysis is not suited for this kind of purpose[16]. These spillover effects are estimated by means of autonomous data sources and compilation methodologies.

A strength of input-output analysis is the continuity of the availability of the required data. All required data is available annually. A weakness is that only

---

[16] This is endorsed by the fact that transport margins are registrated in a different way in the national accounts than other industry by industry relationships

national input-output models are available. Regional differences in production structures are therefore not taken into account.

Another important assumption made is that relevant industries in certain areas of consideration do not demand goods and services which are supplied by relevant industries incorporating establishments located in the area of consideration. This assumption is violated if indeed certain companies of relevant industries demand goods and services which are produced by other companies of relevant industries in the same area of consideration

Spillover effects of seaports on transport activities are calculated on the basis of quantities of goods transported to and from seaports (measured in tonnkm). A disadvantage of this methodology is differences in quality of the transport are not taken into account. Refrigerated transport may be worth more per tonn/km than bulk transport.

Transport Statistics specify transport quantities per municipality. The assumption has to be made that all transport activities in the relevant municipalities are related to seaports. The impact of this assumptions differs per transport mode. For inland shipping, this is probably more realistic than for instance transport by road.

In Transport Statistics for inland shipping we cannot make a distinction between foreign entrepreneurs and Dutch entrepreneurs (residents) with regard to transport flows on the level of the municipality. Assumed is that the development in tonnkm per municipality for total inland shipping (including foreign residents) is representative for the development in inland shipping by Dutch residents.

An advantage of this methodology is again that the required data is available annually. This supports the production of time series and the possibility to update the figures for new years.

Recommendations

A recommendation for future research is to examine alternative methods for estimating economic activities in seaports in order to solve the discrepancy between the company register used and the (multiple) location of the companies involved. Internet sources on seaports may allow pinpointing relevant companies in seaports and allocating them manually and individually to the relevant port. Another alternative that could be applied to the coastal zone as well as to the seaports is using the LISA register. The company register (ABR) used in this study has 'the company' as an entity. The entity in the LISA register is the 'branch (of a company)'. Theoretically, the LISA register would provide more geographical detail. However, the LISA register may not cover some relevant industries, such as fisheries.

Adding figures on air- and water pollution to the economic key figures is recommended. Production in real terms (fixed prices, see chapter 6) allows for environmental-economic analysis. The Pollutant Release & Transfer Register, established by a collaboration of Dutch research institutes, provides information on

emissions per industry and in case of large companies per individual company. For activities on the DCS, some data are already available. These figures (annex O provides some examples) include both Dutch and international companies and can not be directly related to the economic figures, which are based on the resident principle. For activities in seaports and in the coastal zone, the possibility to merge data on emissions and the economy should be explored.

This study includes both economic figures in current prices (nominal) and in fixed prices (real). Presenting the figures in real terms leads to a different picture and therefore to a different message than presenting the nominal figures. The two concepts and the corresponding figures can be used for different purposes. Nominal figures on value added can be used to analyse to what extent the North Sea economy generates income to have purchasing power. If prices of the products produced by the North Sea economy go up, this has a positive effect on the spending power of the North Sea economy. For example, one can buy more bread and milk for the same amount of gas exploited in the North Sea economy, so the terms of exchange improve. Figures in real terms for the North Sea can directly be compared with economic growth figures. These figures suit analysis on the evolvement of production possibilities in the North Sea economy. Different objectives call for either nominal or deflated figures. Carefulness is required interpreting these figures.

Unfortunately, compiling a reliable estimate for the extraction of sand was not feasible. This activity is included in a broad industry, civil engineering. A suitable source facilitating the allocation of civil engineering to the DCS is not available at this moment in time. Consulting the industry concerned is recommended before incorporating the numbers for extraction of sand in the aggregates.

Current developments in the port of Eemshaven and the port of Rotterdam include the construction of power plants. These sites are supplied by means of transport over water. This activity could be depended upon a port location. Methodological issues were the main reason for excluding this industry as a relevant industry so far. If this activity becomes more prominent in the future in sea ports it is recommended to examine the feasibility of an alternative methodology in order to compile statistics for these relevant activities.

Estimates for indirect economic effects (spill over) of the relevant industries could be improved by using more detailed input-output tables (more industries). Our results are based on a subdivision of economic activities in 60 industries. More detailed input-output tables providing detail of 118 industries will generate more accurate results. In order to run such a detailed input-output analysis one also needs information on direct economic variables subdivided in 118 industries.

(State Supervision of Mines, 2008-2010 also available)

	1999	2000	2001	2002	2003	2004	2005	2006	2007
ONSHORE									
Exposure hours Company	3,852,635	3,659,764	2,681,324	2,710,074	2,951,281	2,396,864	2,417,609	1,600,063	1,667,217
Exposure hours Contractors	4,010,998	2,488,533	2,676,672	3,738,063	3,922,266	3,164,588	3,851,575	4,141,477	3,975,919
Total exposure hours Company & Contractors	7,863,633	6,148,297	5,357,996	6,448,137	6,873,547	5,561,452	6,269,184	5,741,540	5,643,136
OFFSHORE									
Exposure hours Company	901,732	947,173	1,016,262	1,067,346	991,479	1,005,496	1,019,814	1,146,571	1,225,397
Exposure hours Contractors	3,205,592	4,499,117	4,915,689	5,251,098	5,489,080	5,475,721	5,258,791	6,115,727	5,992,028
Total exposure hours Company & Contractors	4,107,324	5,446,290	5,931,951	6,318,444	6,480,559	6,481,217	6,278,605	7,262,298	7,217,425
Total general exposure hours	11,970,957	11,594,587	11,289,947	12,766,581	13,354,106	12,042,669	12,547,789	13,003,838	12,860,561

Annex B Map of the coastal area

Annex C Map of the selected seaports

Annex D Production in the coastal area

Industy_aggregated	Industry	Industry	Production Coastal area (x €1,000,000)							
			Scenario A			Scenario B			Mean share	
			1995	2000	2007	1995	2000	2007	A	B
Agriculture, forestry and fishing	1	Arable farming	31	26	22	64	50	56	0.3%	0.4%
	2	Horticulture	192	238	261	554	647	802	2.7%	4.1%
	3	Live stock	56	50	40	94	89	75	0.6%	0.6%
	4	Other agriculture	59	68	86	138	141	205	0.8%	1.0%
	5	**Fishing**	**171**	**202**	**198**	**220**	**264**	**264**	**2.2%**	**1.6%**
Mining and quarrying	6	Crude petroleum and natural gas production	X	X	X	X	X	X	X	X
	7(incl 6)	Other mining and quarrying	9	16	14	17	19	18	0.1%	0.1%
Manufacturing	8	Manufacture of food products, beverages and tobacco	192	487	1106	335	638	1610	6.1%	4.7%
	9	Manufacture of textile and leather products	12	13	13	20	22	25	0.1%	0.1%
	10	Manufacture of paper and paper products	X	X	X	X	X	X	X	X
	11(incl 10)	Publishing and printing	73	87	66	140	177	142	0.9%	1.0%
	12	Manufacture of petroleum products; cokes, and nuclear fuel	X	X	X	X	X	X	X	X
	13	Manufacture of basic chemicals and man-made fibres	X	X	X	X	X	X	X	X
	14(incl 12, 13)	Manufacture of chemical products	48	97	123	79	155	238	1.0%	0.9%
	15	Manufacture of rubber and plastic products	14	25	13	53	86	47	0.2%	0.4%
	16	Manufacture of basic metals	X	X	X	X	X	X	X	X
	17(incl 16)	Manufacture of fabricated metal products	60	72	117	153	172	276	0.9%	1.2%
	18	Manufacture of machinery and equipment n.e.c.	52	77	71	99	169	187	0.8%	0.9%
	19	Manufacture of electrical and optical equipment	42	92	44	134	181	87	0.7%	0.9%
	20	Manufacture of transport equipment	X	X	X	X	X	X	X	X
	21(incl 20)	Manufacture of wood and wood products	65	52	74	212	162	278	0.7%	1.4%
	22	Manufacture of other non-metallic mineral products	4	15	36	15	35	44	0.2%	0.2%
	23(incl 24, 25, 26)	Other manufacturing	25	28	198	40	48	102	0.8%	0.4%
	24	Recycling	X	X	X	X	X	X	X	X
Electricity, gas and water supply	25	Electricity and gas supply	X	X	X	X	X	X	X	X
	26	Water supply	X	X	X	X	X	X	X	X
Construction	27	Construction of buildings	229	314	457	408	560	905	3.7%	3.7%
	28	Civil engineering	46	64	32	90	117	76	0.6%	0.6%
	29	Building installation and completion	148	205	286	266	381	585	2.4%	2.4%
Trade	30	Trade and repair of motor vehicles/cycles	79	107	110	156	212	251	1.1%	1.3%
	31	Wholesale trade (excl. motor vehicles/cycles)	300	420	413	543	760	1206	4.4%	5.0%
	32	**Retail trade and repair (excl. motor vehicles/cycles)**	**353**	**449**	**487**	**590**	**723**	**846**	**5.0%**	**4.4%**
Hotels and restaurants	**33**	**Hotels and restaurants**	**470**	**694**	**880**	**658**	**959**	**1268**	**7.7%**	**5.8%**
Transport, storage and communication	34	Land transport	108	147	160	208	276	366	1.6%	1.7%
	35	Water transport	59	123	153	96	229	171	1.2%	1.0%
	36	Air transport	1	7	1	1	10	2	0.0%	0.0%
	37(incl 38)	Supporting transport activities	134	153	217	275	364	719	1.9%	2.6%
	38	Post and telecommunications	X	X	X	X	X	X	X	X
Financial and business activities	39(incl 40)	Banking	155	275	293	342	622	581	2.7%	3.1%
	40	Insurance and pension funding	X	X	X	X	X	X	X	X
	41	Activities auxiliary to financial intermediation	41	70	82	83	144	233	0.7%	0.9%
	42	Real estate activities	603	717	1142	1108	1315	2143	9.2%	9.1%
	43	Renting of movables	32	58	68	60	101	130	0.6%	0.6%
	44	Computer and related activities	16	41	106	33	83	233	0.6%	0.6%
	45	Research and development	X	X	X	X	X	X	X	X
	46(incl 45)	Legal and economic activities	352	493	628	1078	1106	1288	5.5%	7.3%
	47	Architectural and engineering activities	64	131	145	160	462	400	1.3%	2.0%
	48	Advertising	60	90	62	100	153	129	0.8%	0.8%
	49	Activities of employment agencies	12	78	134	23	151	305	0.8%	0.9%
	50	Other business activities	69	107	168	145	238	338	1.3%	1.4%
General government	51	Public administration and social security	1130	884	395	1618	1465	1184	10.3%	9.3%
	52(incl 53)	Subsidized education	174	186	897	319	320	1229	4.3%	3.4%
	53	Defence activities	X	X	X	X	X	X	X	X
Care and other service activities	54	Health and social work activities	538	673	817	930	1037	1539	7.7%	7.1%
	55	Sewage and refuse disposal services	17	26	16	42	63	50	0.2%	0.3%
	56	**Recreational, cultural and sporting activities**	**248**	**359**	**351**	**343**	**479**	**523**	**3.7%**	**2.8%**
	58(incl 57)	Other service activities n.e.c.	70	138	186	153	380	470	1.4%	1.9%
	57	Private households with employed persons	X	X	X	X	X	X	X	X
Total			6615	8654	11169	12195	15765	21625	100%	100%

Annex E Production in the Port of Rotterdam

Industy_aggregated	Industry	Industry	Production Port of Rotterdam (x €1,000,000)							
			Scenario A			Scenario B			Mean share	
			1995	2000	2007	1995	2000	2007	A	B
Agriculture, forestry and fishing	1	Arable farming	X	X	X	X	X	X	X	X
	2 (incl 1)	Horticulture	10	16	16	153	213	270	0.0%	0.5%
	3	Live stock	0	0	0	1	1	1	0.0%	0.0%
	4 (incl 5)	Other agriculture	6	9	9	20	32	40	0.0%	0.1%
	5	Fishing	X	X	X	X	X	X	X	X
Mining and quarrying	6	**Crude petroleum and natural gas production**		7	5		8	7	0.0%	0.0%
	7	**Other mining and quarrying**	40	27	29	48	36	48	0.1%	0.1%
Manufacturing	8	**Manufacture of food products, beverages and tobacco**	223	280	540	394	523	733	1.0%	1.4%
	9 (incl 10)	**Manufacture of textile and leather products**	25	41	47	36	55	61	0.1%	0.1%
	10	**Manufacture of paper and paper products**	X	X	X	X	X	X	X	X
	11	**Publishing and printing**	69	36	26	102	76	57	0.1%	0.2%
	12	**Manufacture of petroleum products; cokes, and nuclear fuel**	X	X	X	X	X	X	X	X
	13 (incl 12)	**Manufacture of basic chemicals and man-made fibres**	11681	22016	38747	11681	22016	38747	67.0%	59.9%
	14	**Manufacture of chemical products**	782	573	477	829	646	529	1.7%	1.7%
	15	**Manufacture of rubber and plastic products**	6	11	19	9	17	30	0.0%	0.0%
	16	**Manufacture of basic metals**	X	X	X	X	X	X	X	X
	17 (incl 16)	**Manufacture of fabricated metal products**	123	172	239	200	283	381	0.5%	0.7%
	18	**Manufacture of machinery and equipment n.e.c.**	178	209	403	235	286	512	0.7%	0.9%
	19	**Manufacture of electrical and optical equipment**	131	108	148	205	169	227	0.4%	0.5%
	20	**Manufacture of transport equipment**	355	321	314	390	379	366	0.9%	0.9%
	21	**Manufacture of wood and wood products**	10	9	11	14	12	15	0.0%	0.0%
	22	**Manufacture of other non-metallic mineral products**	X	X	X	X	X	X	X	X
	23 (incl 22, 24, 25)	**Other manufacturing**	166	171	222	205	215	324	0.5%	0.6%
	24	**Recycling**	X	X	X	X	X	X	X	X
Electricity, gas and water supply	25	Electricity and gas supply	X	X	X	X	X	X	X	X
Construction	27	Construction of buildings	196	205	187	363	388	417	0.5%	1.0%
	28	**Civil engineering**	15	41	18	50	90	35	0.1%	0.1%
	29	**Building installation and completion**	258	367	625	430	605	1097	1.2%	1.8%
Trade	30	Trade and repair of motor vehicles/cycles	75	80	121	172	209	312	0.3%	0.6%
	31	**Wholesale trade (excl. motor vehicles/cycles)**	402	517	1003	624	854	1571	1.8%	2.5%
	32	Retail trade and repair (excl. motor vehicles/cycles)	108	81	81	275	256	305	0.2%	0.7%
Hotels and restaurants	33	Hotels and restaurants	33	55	63	78	130	145	0.1%	0.3%
Transport, storage and communication	34	**Land transport**	182	262	446	301	435	714	0.8%	1.2%
	35 (incl 36)	**Water transport**	2174	2860	3326	2174	2861	3327	7.7%	6.9%
	36	**Air transport**	X	X	X	X	X	X	X	X
	37	**Supporting transport activities**	2405	3059	3916	2406	3064	3928	8.7%	7.8%
	38	**Post and telecommunications**	32	63	110	86	146	212	0.2%	0.4%
Financial and business activities	39	Banking	28	46	63	102	134	140	0.1%	0.3%
	40	Insurance and pension funding	16	2	31	17	3	43	0.0%	0.1%
	41	Activities auxiliary to financial intermediation	29	18	25	52	40	59	0.1%	0.1%
	42	Real estate activities	96	101	168	309	324	380	0.3%	0.8%
	43	Renting of movables	26	74	78	54	135	130	0.2%	0.3%
	44 (incl 45)	Computer and related activities	25	54	234	36	94	386	0.3%	0.4%
	45	Research and development	X	X	X	X	X	X	X	X
	46	Legal and economic activities	49	70	166	103	151	322	0.3%	0.5%
	47	Architectural and engineering activities	76	102	153	120	143	229	0.3%	0.4%
	48	Advertising	20	30	32	44	61	71	0.1%	0.1%
	49	Activities of employment agencies	22	81	156	34	133	301	0.2%	0.4%
	50	Other business activities	189	358	534	245	442	666	1.0%	1.1%
General government	51	Public administration and social security	25	50	551	111	171	1723	0.6%	1.7%
	53	Subsidized education	29	36	58	129	131	198	0.1%	0.4%
Care and other service activities	54	Health and social work activities	28	51	223	170	285	501	0.3%	0.8%
	55	Sewage and refuse disposal services	186	427	564	220	493	721	1.1%	1.2%
	56	Recreational, cultural and sporting activities	55	33	65	96	88	162	0.1%	0.3%
	58	Other service activities n.e.c.	25	23	43	71	85	97	0.1%	0.2%
	57	Private households with employed persons	0	0		0	0		0.0%	0.0%
			20612	33159	54295	23393	36916	60540	100%	100%

Annex F Production in the Port of Amsterdam

| Industy_aggregated | Industry | Industry | Production Port of Amsterdam (x €1,000,000) | | | | | | Mean share | |
| | | | Scenario A | | | Scenario B | | | | |
			1995	2000	2007	1995	2000	2007	A	B
Agriculture, forestry and fishing	1	Arable farming	X	X	X	X	X	X	X	X
	2	Horticulture	X	X	X	X	X	X	X	X
	3	Live stock	X	X	X	X	X	X	X	X
	1_5	Other agriculture	0	0	2	5	5	12	0.0%	0.1%
	5	Fishing	X	X	X	X	X	X	X	X
Mining and quarrying	6	**Crude petroleum and natural gas production**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**
	7	**Other mining and quarrying**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**
Manufacturing	6_8	**Manufacture of food products, beverages and tobacco**	**222**	**226**	**466**	**812**	**842**	**1442**	**7.4%**	**9.0%**
	9	**Manufacture of textile and leather products**	**10**	**16**	**20**	**30**	**40**	**32**	**0.4%**	**0.3%**
	10	**Manufacture of paper and paper products**	**1**	**1**	**0**	**15**	**13**	**7**	**0.0%**	**0.1%**
	11	**Publishing and printing**	**169**	**196**	**357**	**790**	**844**	**1344**	**5.8%**	**8.7%**
	12	**Manufacture of petroleum products; cokes, and nuclear fuel**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**
	13	**Manufacture of basic chemicals and man-made fibres**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**
	12_14	**Manufacture of chemical products**	**657**	**473**	**485**	**849**	**544**	**643**	**14.5%**	**6.4%**
	15	**Manufacture of rubber and plastic products**	**1**	**12**	**20**	**26**	**54**	**53**	**0.2%**	**0.4%**
	16	**Manufacture of basic metals**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**
	17(incl 16)	**Manufacture of fabricated metal products**	**12**	**13**	**22**	**87**	**113**	**148**	**0.4%**	**1.0%**
	18	**Manufacture of machinery and equipment n.e.c.**	**16**	**9**	**24**	**128**	**114**	**140**	**0.4%**	**1.2%**
	19	**Manufacture of electrical and optical equipment**	**14**	**8**	**11**	**85**	**62**	**77**	**0.3%**	**0.7%**
	20	**Manufacture of transport equipment**	**6**	**3**	**14**	**34**	**26**	**77**	**0.2%**	**0.4%**
	21	**Manufacture of wood and wood products**	**1**	**1**	**3**	**46**	**32**	**15**	**0.0%**	**0.3%**
	22	**Manufacture of other non-metallic mineral products**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**
	22_26	**Other manufacturing**	**36**	**58**	**200**	**81**	**136**	**229**	**2.2%**	**1.2%**
	24	**Recycling**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**
Electricity, gas and water supply	25	Electricity and gas supply	X	X	X	X	X	X	X	X
	26	Water supply	X	X	X	X	X	X	X	X
Construction	27	Construction of buildings	59	89	124	215	283	357	2.2%	2.5%
	28	**Civil engineering**	**26**	**26**	**39**	**124**	**151**	**143**	**0.8%**	**1.3%**
	29	**Building installation and completion**	**44**	**58**	**47**	**194**	**261**	**300**	**1.3%**	**2.2%**
Trade	30	Trade and repair of motor vehicles/cycles	93	95	45	431	614	527	2.1%	4.7%
	31(incl 32)	**Wholesale trade (excl. motor vehicles/cycles)**	**207**	**380**	**591**	**578**	**1151**	**1590**	**9.3%**	**9.3%**
	32	Retail trade and repair (excl. motor	X	X	X	X	X	X	X	X
Hotels and restaurants	33	Hotels and restaurants	17	19	26	50	78	97	0.5%	0.6%
Transport, storage and communication	34	**Land transport**	**76**	**71**	**173**	**127**	**149**	**445**	**2.6%**	**2.0%**
	35(incl 36)	**Water transport**	**167**	**189**	**308**	**183**	**214**	**320**	**5.4%**	**2.1%**
	36	**Air transport**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**
	37	**Supporting transport activities**	**242**	**252**	**289**	**356**	**347**	**430**	**6.7%**	**3.4%**
	38	**Post and telecommunications**	**88**	**164**	**218**	**404**	**611**	**1235**	**3.8%**	**6.2%**
Financial and business activities	39	Banking	X	X	X	X	X	X	X	X
	40(incl 39)	Insurance and pension funding	230	438	235	1049	1583	957	7.8%	11.0%
	41	Activities auxiliary to financial intermediation	6	5	15	18	30	60	0.2%	0.3%
	42	Real estate activities	123	225	591	270	484	1188	7.1%	5.2%
	43	Renting of movables	16	19	14	37	69	59	0.4%	0.5%
	44	Computer and related activities	82	360	69	116	489	240	4.4%	2.4%
	45	Research and development	1	3	8	7	6	33	0.1%	0.1%
	46	Legal and economic activities	68	114	260	166	322	636	3.4%	3.1%
	47	Architectural and engineering activities	15	20	32	42	69	85	0.5%	0.6%
	48	Advertising	24	42	61	113	134	141	1.0%	1.2%
	49	Activities of employment agencies	X	X	X	X	X	X	X	X
	50(incl 49)	Other business activities	67	120	153	324	595	724	2.7%	4.7%
General government	51	Public administration and social security	X	X	X	X	X	X	X	X
	53(incl 51)	Subsidized education	24	42	51	163	266	327	1.0%	2.2%
Care and other service activities	54	Health and social work activities	59	58	31	279	303	240	1.3%	2.5%
	55	Sewage and refuse disposal services	49	103	72	53	108	75	1.9%	0.7%
	56	Recreational, cultural and sporting activities	23	42	63	58	111	186	1.0%	1.0%
	58	Other service activities n.e.c.	18	25	26	61	65	82	0.6%	0.6%
			2970	3971	5166	8406	11313	14696	100%	100%

Annex G Spillover effects

Indirect effects	1995				
	Employees (x1000 fte)	Compensation of employees (x €1,000,000)	Intermediate Consumption (x €1,000,000)	Production (x €1,000,000)	Added Value (x €1,000,000)
Sea ports relevant industries (excluding effects on transport)	58	1966	9069	13064	3995
Coast relevant industries	13	303	532	1081	549
Activities on sea	4	152	746	1114	368
Transport activities by sea ports	22	685	804	1973	1169
	98	3106	11150	17232	6082
Indirect effects	2000				
	Employees (x1000 fte)	Compensation of employees (x €1,000,000)	Intermediate Consumption (x €1,000,000)	Production (x €1,000,000)	Added Value (x €1,000,000)
Sea ports relevant industries (excluding effects on transport)	56	2329	13458	18354	4896
Coast relevant industries	15	404	730	1485	755
Activities on sea	5	193	1097	1646	549
Transport activities by sea ports	23	795	1001	2220	1219
	99	3721	16286	23704	7419
Indirect effects	2007				
	Employees (x1000 fte)	Compensation of employees (x €1,000,000)	Intermediate Consumption (x €1,000,000)	Production (x €1,000,000)	Added Value (x €1,000,000)
Sea ports relevant industries (excluding effects on transport)	53	2841	18968	25664	6696
Coast relevant industries	15	491	907	1794	887
Activities on sea	5	255	1274	1929	655
Transport activities by sea ports	23	994	1577	3111	1535
	96	4581	22726	32498	9773

Annex H Indirect effects on other industries of relevant industries in seaports (excluding effect on transport)

Area of interest	1995				
	Employees (x1000 fte)	Compensation of employees (x €1,000,000)	Intermediate Consumption (x €1,000,000)	Production (x €1,000,000)	Value added (x €1,000,000)
Total Amsterdam	5.4	182.6	599.1	941.8	342.6
Total Drechtsteden	7.1	225	656	1017	362
Total IJmuiden cluster	6.3	219	754	1165	411
Total Moerdijk	2.8	99	335	533	199
Total Rotterdam	26.3	868	4928	6761	1833
Total Terneuzen	5.5	213	1142	1662	520
Total Vlissingen	1.3	47	201	299	98
Total Delfzijl	1.9	72	320	478	158
Total Den Helder	0.4	14	43	71	28
Total Eemshaven	0.1	4	10	17	7
Total Harlingen	0.7	22	82	119	37
Total	58	1966	9069	13064	3995
	2000				
	Employees (x1000 fte)	Compensation of employees (x €1,000,000)	Intermediate Consumption (x €1,000,000)	Production (x €1,000,000)	Value added (x €1,000,000)
Total Amsterdam	5.3	205	661	1044	383
Total Drechtsteden	7.8	292	883	1372	490
Total IJmuiden cluster	6.5	268	1005	1499	494
Total Moerdijk	3.6	150	771	1084	313
Total Rotterdam	22.3	942	7182	9332	2150
Total Terneuzen	5.7	267	2013	2670	657
Total Vlissingen	1.6	67	352	488	135
Total Delfzijl	2.0	83	400	569	169
Total Den Helder	0.5	19	56	95	39
Total Eemshaven	0.2	9	18	31	14
Total Harlingen	0.7	28	116	169	53
Total	56	2329	13458	18354	4896
	2007				
	Employees (x1000 fte)	Compensation of employees (x €1,000,000)	Intermediate Consumption (x €1,000,000)	Production (x €1,000,000)	Value added (x €1,000,000)
Total Amsterdam	5.9	295	996	1581	585
Total Drechtsteden	7.2	351	1212	1846	635
Total IJmuiden cluster	5.7	330	1510	2170	660
Total Moerdijk	3.8	206	1253	1738	486
Total Rotterdam	21.1	1134	9851	12755	2904
Total Terneuzen	4.8	291	2888	3800	911
Total Vlissingen	1.3	73	440	603	163
Total Delfzijl	1.8	102	620	854	234
Total Den Helder	0.5	24	72	125	53
Total Eemshaven	0.2	10	23	40	16
Total Harlingen	0.5	26	103	152	49
Total	53	2841	18968	25664	6696

Annex I Indirect effects on other industries of relevant industries in the coastal zone (excluding effect on transport)

	1995				
	Employees (x1000 fte)	Compensation of employees (x €1,000,000)	Intermediate Consumption (x €1,000,000)	Production (x €1,000,000)	Value added (x €1,000,000)
Fishing	0.4	18	37	90	54
Recreational, cultural and sporting activities	1.7	55	136	214	78
Hotels and restaurants	6.1	123	250	481	230
Retail trade and repair (excl. motor vehicles/cycles)	5.3	107	109	296	187
Total Coastal zone	13.5	303	532	1081	549
	2000				
	Employees (x1000 fte)	Compensation of employees (x €1,000,000)	Intermediate Consumption (x €1,000,000)	Production (x €1,000,000)	Value added (x €1,000,000)
Fishing	0.4	20	60	125	65
Recreational, cultural and sporting activities	2.1	74	185	303	118
Hotels and restaurants	6.7	169	340	672	332
Retail trade and repair (excl. motor vehicles/cycles)	5.9	141	145	385	240
Total Coastal zone	15.1	404	730	1485	755
	2007				
	Employees (x1000 fte)	Compensation of employees (x €1,000,000)	Intermediate Consumption (x €1,000,000)	Production (x €1,000,000)	Value added (x €1,000,000)
Fishing	0.3	20	97	161	64
Recreational, cultural and sporting activities	1.7	76	201	328	127
Hotels and restaurants	6.8	207	411	830	419
Retail trade and repair (excl. motor vehicles/cycles)	6.5	189	197	475	278
Total Coastal zone	15.3	491	907	1794	887

Annex J Indirect effects on other industries of relevant industries on sea

		DUTCH CONTINENTAL SHELF (DCS)			
		1995	2000	2005	2007
Sea shipping (overlaps partially with seaports)	Number of employees (x 1,000 fte)	3	4		3
	Compensation of employees (x €1,000,000)	132	170		174
	Production (x €1,000,000)	1034	1546		1591
	Intermediate consumption (x €1,000,000)	707	1046		1084
	Value added (x €1,000,000)	326	501		506
Fisheries(overlaps partially with seaports)	Number of employees (x 1,000 fte)	0	0		0
	Compensation of employees (x €1,000,000)	8	9		8
	Production (x €1,000,000)	42	52		69
	Intermediate consumption (x €1,000,000)	17	25		42
	Value added (x €1,000,000)	25	27		27
Oil and Gas extraction (overlaps partially with seaports)	Number of employees (x 1,000 fte)[a]	0	0		2
	Compensation of employees (x €1,000,000)	12	14		72
	Production (x €1,000,000)	39	48		257
	Intermediate consumption (x €1,000,000)	22	26		140
	Value added (x €1,000,000)	17	21		117
Sand extraction	Number of employees (x 1,000 fte)	P.M.	P.M.		P.M.
	Compensation of employees (x €1,000,000)	P.M.	P.M.		P.M.
	Production (x €1,000,000)	P.M.	P.M.		P.M.
	Intermediate consumption (x €1,000,000)	P.M.	P.M.		P.M.
	Value added (x €1,000,000)	P.M.	P.M.		P.M.
Wind energy	Number of employees (x 1,000 fte)				0
	Compensation of employees (x €1,000,000)				1
	Production (x €1,000,000)				13
	Intermediate consumption (x €1,000,000)				8
	Value added (x €1,000,000)				5
Total	Number of employees (x 1,000 fte)	4	5	0	5
	Compensation of employees (x €1,000,000)	152	193	0	255
	Production (x €1,000,000)	1114	1646	0	1929
	Intermediate consumption (x €1,000,000)	746	1097	0	1274
	Value added (x €1,000,000)	368	549	0	655

a) employment spillover for 1995 set equal to 2000

Annex K Time series for cargo tonne/km, transport activities by Dutch residents

road transport and railway transport (tonnekm)	1995	2000	2007
Delfzijl & Eemshaven	1051	1086	917
Harlingen	183	181	199
IJmuiden/Velsen	865	813	675
Amsterdam	2520	2709	2756
Rotterdam	11497	11660	12627
Dordrecht	593	582	725
Terneuzen/Axel	424	556	776
Vlissingen	730	680	831
Moerdijkgebied	1121	1298	1781
subtotal road transport and railway transport	18984	19565	21287
inland shipping (tonnekm)	1995	2000	2007
Delfzijl & Eemshaven	844	1019	1590
Harlingen	349	274	270
IJmuiden/Velsen	1250	1657	1764
Amsterdam	7124	9699	11852
Rotterdam	43816	35005	36145
Dordrecht	672	712	827
Terneuzen/Axel	1937	2234	2141
Vlissingen	2479	2385	2132
Moerdijkgebied	114	982	1886
subtotal inland shipping	58585	53967	58607
total transport (tonnekm)	1995	2000	2007
Delfzijl & Eemshaven	1895	2105	2507
Harlingen	532	455	469
IJmuiden/Velsen	2115	2470	2439
Amsterdam	9644	12408	14608
Rotterdam	55313	46665	48772
Dordrecht	1265	1294	1552
Terneuzen/Axel	2361	2790	2917
Vlissingen	3209	3065	2963
Moerdijkgebied	1235	2280	3667
total transport (tonnekm)	77569	73532	79894

Annex L Time series transport activities, total effects seaports

	Number of employees (fte)			Compensation of employees (x €1,000,000)			Production (x €1,000,000)			Value added (x €1,000,000)		
	1995	2000	2007	1995	2000	2007	1995	2000	2007	1995	2000	2007
road and railway transport												
Delfzijl & Eemshaven	1271	1365	1283	38	51	58	96	126	166	58	72	86
Harlingen	182	276	284	6	10	13	14	25	37	9	15	19
IJmuiden/Velsen	1296	1240	954	41	46	44	100	112	124	62	66	64
Amsterdam	3433	3890	3727	107	145	168	263	354	483	161	207	248
Rotterdam	14847	13983	13959	450	517	616	1126	1294	1806	679	738	915
Dordrecht	833	852	869	26	32	39	64	77	113	39	45	58
Terneuzen/Axel	568	834	1062	18	31	48	44	76	138	27	45	71
Vlissingen	952	893	1048	29	33	47	72	82	136	44	47	69
Moerdijk	1531	1905	2183	48	71	99	117	173	283	72	102	146
subtotal road and railway	*24913*	*25239*	*25368*	*761*	*937*	*1132*	*1895*	*2319*	*3286*	*1150*	*1337*	*1675*
inland shipping												
Delfzijl & Eemshaven	73	95	167	3	3	8	14	17	36	7	8	16
Harlingen	21	25	27	1	1	1	4	5	6	2	2	3
IJmuiden/Velsen	112	154	173	4	5	8	21	28	37	11	13	17
Amsterdam	607	900	1235	22	28	56	114	165	267	60	79	120
Rotterdam	3940	3249	3649	141	101	165	740	596	789	388	284	355
Dordrecht	59	66	71	2	2	3	11	12	15	6	6	7
Terneuzen/Axel	160	207	217	6	6	10	30	38	47	16	18	21
Vlissingen	223	221	241	8	7	11	42	41	52	22	19	23
Moerdijk	10	91	168	0	3	8	2	17	36	1	8	16
subtotal inland shipping	*5205*	*5010*	*5947*	*186*	*155*	*269*	*978*	*920*	*1286*	*512*	*438*	*579*
total transport												
Delfzijl & Eemshaven	1344	1459	1449	41	54	66	110	143	202	65	80	102
Harlingen	203	301	311	6	11	14	18	30	43	11	17	22
IJmuiden/Velsen	1408	1393	1126	45	51	51	121	140	161	73	80	81
Amsterdam	4040	4790	4962	129	173	224	377	519	750	221	286	368
Rotterdam	18787	17233	17608	591	618	782	1866	1890	2596	1066	1022	1270
Dordrecht	892	918	940	28	34	43	75	90	128	45	51	65
Terneuzen/Axel	728	1042	1279	23	38	58	74	114	185	43	63	92
Vlissingen	1175	1115	1289	37	40	57	114	123	188	66	67	92
Moerdijk	1541	1996	2351	48	74	107	119	190	320	73	110	162
total transport	30117	30248	31315	948	1093	1402	2873	3239	4572	1662	1775	2254

Annex M Indirect effects of seaports on transport activities

Indirect effect of sea ports on transport activities	1995				
	Employees (x1000 fte)	Compensation of employees (x €1,000,000)	Intermediate Consumption (x €1,000,000)	Production (x €1,000,000)	Value added (x €1,000,000)
road transport and railway transport (mln euro)					
Delfzijl & Eemshaven, Harlingen, Dordrecht, Terneuzen/Axel, Vlissingen, Moerdijkgebied	2.7	75.7	54.6	158.7	104.1
IJmuiden/Velsen	0.9	28.9	26.5	71.0	44.6
Amsterdam	2.4	77.5	71.9	189.2	117.4
Rotterdam	13.1	394.4	380.0	971.7	591.7
subtotal road transport and railway transport	19.1	576.6	533.0	1390.7	857.7
inland shipping (mln euro)					
Delfzijl & Eemshaven, Harlingen, Dordrecht, Terneuzen/Axel, Vlissingen, Moerdijkgebied	0.2	7.3	17.0	31.5	14.5
IJmuiden/Velsen	0.1	2.4	5.7	12.0	6.3
Amsterdam	0.6	20.5	51.2	107.2	56.0
Rotterdam	2.6	78.1	196.9	431.8	234.9
subtotal inland shipping	3.4	108.2	270.7	582.4	311.8
total transport (mln euro)					
Delfzijl & Eemshaven, Harlingen, Dordrecht, Terneuzen/Axel, Vlissingen, Moerdijkgebied	2.8	83.0	71.6	190.2	118.6
IJmuiden/Velsen	1.0	31.3	32.1	83.0	50.9
Amsterdam	3.0	98.0	123.0	296.4	173.4
Rotterdam	15.7	472.5	576.9	1403.5	826.6
total transport (mln euro)	22	685	804	1973	1169
	2000				
	Employees (x1000 fte)	Compensation of employees (x €1,000,000)	Intermediate Consumption (x €1,000,000)	Production (x €1,000,000)	Value added (x €1,000,000)
road transport and railway transport (mln euro)					
Delfzijl & Eemshaven, Harlingen, Dordrecht, Terneuzen/	4	143	122	312	190
IJmuiden/Velsen	1	32	31	75	44
Amsterdam	3	119	119	287	168
Rotterdam	12	442	458	1075	618
subtotal road transport and railway transport	20	736	731	1750	1020
inland shipping (mln euro)					
Delfzijl & Eemshaven, Harlingen, Dordrecht, Terneuzen/Axel, Vlissingen, Moerdijkgebied	0	-3	9	-3	-12
IJmuiden/Velsen	0	5	14	28	13
Amsterdam	1	27	84	160	76
Rotterdam	2	30	163	286	122
subtotal inland shipping	3	59	270	470	199
total transport (mln euro)					
Delfzijl & Eemshaven, Harlingen, Dordrecht, Terneuzen/Axel, Vlissingen, Moerdijkgebied	4	140	131	309	178
IJmuiden/Velsen	1	37	46	103	57
Amsterdam	4	146	203	447	244
Rotterdam	14	472	621	1361	740
total transport (mln euro)	23	795	1001	2220	1219
	2007				
	Employees (x1000 fte)	Compensation of employees (x €1,000,000)	Intermediate Consumption (x €1,000,000)	Production (x €1,000,000)	Value added (x €1,000,000)
road transport and railway transport (mln euro)					
Delfzijl & Eemshaven, Harlingen, Dordrecht, Terneuzen/Axel, Vlissingen, Moerdijkgebied	4	193	262	537	275
IJmuiden/Velsen	1	25	38	74	36
Amsterdam	3	134	160	351	191
Rotterdam	11	487	692	1397	704
subtotal road transport and railway transport	19	840	1152	2359	1207
inland shipping (mln euro)					
Delfzijl & Eemshaven, Harlingen, Dordrecht, Terneuzen/Axel, Vlissingen, Moerdijkgebied	0	19	52	88	36
IJmuiden/Velsen	0	8	20	36	16
Amsterdam	1	52	138	252	113
Rotterdam	2	76	214	376	162
subtotal inland shipping	4	155	425	752	328
total transport (mln euro)					
Delfzijl & Eemshaven, Harlingen, Dordrecht, Terneuzen/Axel, Vlissingen, Moerdijkgebied	5	212	314	625	311
IJmuiden/Velsen	1	33	58	110	52
Amsterdam	4	187	298	603	305
Rotterdam	13	563	906	1773	867
total transport (mln euro)	23	994	1577	3111	1535

Annex N Number of employees and employed persons in the Netherlands.

1 000 full time eq.	Employed Persons 1995	Employees 1995	Percentage Selfemployed 1995	Employed Persons 2000	Employees 2000	Percentage Selfemployed 2000	Employed Persons 2007	Employees 2007	Percentage Selfemployed 2007
Agriculture, forestry and fishing	237	81	66%	239	89	63%	209	92	56%
Mining and quarrying	10	9	2%	9	9	2%	7	7	0%
Manufacturing	948	906	5%	952	912	4%	844	805	5%
Manufacture of petroleum products; cokes, and nuclear fuel	7	7	0%	6	6	0%	6	6	0%
Manufacture of basic chemicals and man-made fibres	38	38	0%	32	32	0%	29	29	0%
Manufacture of basic metals	26	26	0%	25	25	0%	21	21	0%
Construction	410	359	13%	472	404	14%	462	372	20%
Wholesale trade (excl. motor vehicles/cycles)	394	341	13%	447	407	9%	443	405	9%
Retail trade and repair (excl. motor vehicles/cycles)	433	336	22%	480	389	19%	502	406	19%
Hotels and restaurants	181	135	25%	201	152	24%	203	153	25%
Transport, storage and communication	367	340	8%	425	397	7%	407	377	7%
Land transport	168	153	9%	182	168	8%	182	167	8%
Water transport	19	12	39%	20	13	35%	20	13	35%
Air transport	25	25	0%	30	30	0%	29	29	0%
Supporting transport activities	72	68	5%	82	78	5%	90	86	4%
Post and telecommunications	83	81	2%	111	108	2%	87	83	5%
Recreational, cultural and sporting activities	97	69	29%	118	86	27%	125	91	27%
Total all industries	*5,774*	*5,001*	*13%*	*6,534*	*5,750*	*12%*	*6,728*	*5,905*	*12%*

(Source: Labour Accounts, Statistics Netherlands)

Source	Compound	1995 (kg)	2000 (kg)	2005 (kg)	2007 (kg)
Fishing vessels corrosion anodes DCS	Aluminium and compounds (as Al)	797	773	625	623
	Cadmium and Compounds (as Cd)	2	2	1	1
	Zinc and Compounds (as Zn)	3,664	3,554	2,870	2,864
Fishing vessels coatings DCS	Dithiocarbamate	5	7	32	34
	Copper and Compounds (als Cu)	1,489	1,476	1,577	1,599
	Organotin Compounds	727	663	33	0
	Organotin Compounds (as Sn)	291	265	13	0
	Seanine (Kathon)	5	7	32	34
	Tin and Compounds (as Sn)	291	265	13	0
	Tolylfluanid	5	7	32	34
	Tributyltin Compounds	727	663	33	0
	Zinc pyrithione	5	7	32	34
	Zinc and Compounds (as Zn)	2	3	14	15
Seashipping vessels corrosion anodes DCS	Aluminium and compounds (as Al)	8,469	8,091	8,303	8,266
	Cadmium and Compounds (as Cd)	48	45	47	46
	Zinc and Compounds (as Zn)	95,010	90,764	93,140	92,726
Seashipping vessels coatings DCS	Dithiocarbamate	58	83	286	429
	Copper and Compounds (als Cu)	18,718	18,274	21,516	23,370
	Organotin Compounds	9,132	8,211	4,634	1,887
	Organotin Compounds (as Sn)	3,653	3,284	1,854	755
	Seanine (Kathon)	58	83	286	429
	Tin and Compounds (as Sn)	3,653	3,284	1,854	755
	Tolylfluanid	58	83	286	429
	Tributyltin Compounds	9,132	8,211	4,634	1,887
	Zinc pyrithione	58	83	286	429
	Zinc and Compounds (as Zn)	26	37	127	190

Includes both Dutch and international vessels (Source: The Pollutant Release & Transfer Register)

Annex P Summary of the results for selected activities on the DCS, in seaports and in the coastal zone (current prices)

Activity	Metric	DUTCH CONTINENTAL SHELF (DCS) 1995	2000	2007	INDIRECT (SPILLOVER EFFECT) 1995	2000	2007	TOTAL 1995	2000	2007
Seaports (-/- Seashipping in seaports)	Number of employees (x 1,000 fte)	121	117	116	81	79	76	202	196	192
	Compensation of employees (x €1,000,000)	4577	5122	6714	2651	3124	3835	7228	8246	10549
	Production (x €1,000,000)	30484	46051	76224	15037	20573	28775	45520	66625	104999
	Intermediate consumption (x €1,000,000)	20801	35290	59395	9872	14458	20545	30674	49749	79940
	Value added (x €1,000,000)	9682	10761	16828	5164	6115	8230	14847	16876	25058
Coastal Zone	Number of employees (x 1,000 fte)	23	24	25	13	15	15	36	40	40
	Compensation of employees (x €1,000,000)	495	642	787	303	404	491	798	1046	1278
	Production (x €1,000,000)	1810	2426	2901	1081	1485	1794	2892	3910	4695
	Intermediate consumption (x €1,000,000)	856	1160	1453	532	730	907	1388	1891	2361
	Value added (x €1,000,000)	955	1265	1447	549	755	887	1504	2020	2334
Sea shipping	Number of employees (x 1,000 fte)	7	7	6	3	4	3	10	11	10
	Compensation of employees (x €1,000,000)	274	303	357	132	170	174	406	473	531
	Production (x €1,000,000)	2626	3689	4588	1034	1546	1591	3660	5235	6179
	Intermediate consumption (x €1,000,000)	1996	2762	3380	707	1046	1084	2703	3808	4464
	Value added (x €1,000,000)	630	927	1208	326	501	506	956	1428	1714
Fisheries	Number of employees (x 1,000 fte)	0.5	0.3	0.2	0.2	0.2	0.3	0.7	0.5	0.5
	Compensation of employees (x €1,000,000)	20	18	14	8	9	8	28	27	22
	Production (x €1,000,000)	102	111	113	42	52	69	144	163	182
	Intermediate consumption (x €1,000,000)	41	53	69	17	25	42	58	78	111
	Value added (x €1,000,000)	61	58	45	25	27	27	86	85	72
Oil and Gas extraction	Number of employees (x 1,000 fte)	3.0	3.0	2.8	0.4	0.4	1.7	3.4	3.4	4.5
	Compensation of employees (x €1,000,000)	219	231	278	12	14	72	231	245	350
	Production (x €1,000,000)	2692	4306	7644	39	48	257	2731	4354	7901
	Intermediate consumption (x €1,000,000)	580	993	1777	22	26	140	602	1019	1917
	Value added (x €1,000,000)	2112	3313	5866	17	21	117	2129	3334	5983
Sand extraction	Number of employees (x 1,000 fte)	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.
	Compensation of employees (x €1,000,000)	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.
	Production (x €1,000,000)	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.
	Intermediate consumption (x €1,000,000)	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.
	Value added (x €1,000,000)	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.
Wind energy	Number of employees (x 1,000 fte)						0			0
	Compensation of employees (x €1,000,000)						1			1
	Production (x €1,000,000)			23			13			36
	Intermediate consumption (x €1,000,000)			13			8			21
	Value added (x €1,000,000)			11			5			16
Total	Number of employees (x 1,000 fte)	154	152	150	98	99	96	252	251	246
	Compensation of employees (x €1,000,000)	5586	6315	8150	3106	3721	4581	8692	10037	12732
	Production (x €1,000,000)	37714	56583	91492	17232	23704	32498	54946	80287	123991
	Intermediate consumption (x €1,000,000)	24274	40259	66088	11150	16286	22726	35424	56544	88813
	Value added (x €1,000,000)	13440	16324	25406	6082	7419	9773	19522	23743	35178

Annex Q Summary of the results for selected activities on the DCS, in seaports and in the coastal zone (fixed prices prices, pricelevel 2007)

Activity	Measure	DUTCH CONTINENTAL SHELF (DCS) Pricelevel 2007			INDIRECT (SPILLOVER EFFECT) Pricelevel 2007			TOTAL Pricelevel 2007		
		1995	2000	2007	1995	2000	2007	1995	2000	2007
Seaports (-/- Seashipping in seaports)	Compensation of employees (x €1,000,000)	6388	6209	6714	3704	3783	3835	10092	9993	10549
	Production (x €1,000,000)	58213	63632	76224	20917	25408	28775	79129	89039	104999
	Intermediate consumption (x €1,000,000)	46696	51980	59395	13760	17792	20545	60456	69772	79940
	Value added (x €1,000,000)	11517	11652	16828	7157	7615	8230	18674	19267	25058
Coastal Zone	Compensation of employees (x €1,000,000)	673	755	787	423	489	491	1097	1244	1278
	Production (x €1,000,000)	2392	2805	2901	1366	1735	1794	3758	4540	4695
	Intermediate consumption (x €1,000,000)	1189	1405	1453	691	871	907	1881	2276	2361
	Value added (x €1,000,000)	1202	1400	1447	674	864	887	1877	2264	2334
Sea shipping	Compensation of employees (x €1,000,000)	370	366	357	187	207	174	557	573	531
	Production (x €1,000,000)	2921	3787	4588	1418	1869	1591	4340	5656	6179
	Intermediate consumption (x €1,000,000)	2599	3169	3380	934	1244	1084	3533	4412	4464
	Value added (x €1,000,000)	322	618	1208	485	625	506	807	1243	1714
Fisheries	Compensation of employees (x €1,000,000)	27	21	14	12	10	8	38	32	22
	Production (x €1,000,000)	130	115	113	57	63	69	188	178	182
	Intermediate consumption (x €1,000,000)	75	72	69	22	30	42	98	102	111
	Value added (x €1,000,000)	55	43	45	35	33	27	90	77	72
Oil and Gas extraction	Compensation of employees (x €1,000,000)	323	294	278	17	18	72	340	312	350
	Production (x €1,000,000)	6119	7341	7644	53	58	257	6172	7398	7901
	Intermediate consumption (x €1,000,000)	902	1262	1777	29	32	140	930	1294	1917
	Value added (x €1,000,000)	5217	6079	5866	25	26	117	5242	6105	5983
Sand extraction	Compensation of employees (x €1,000,000)	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.
	Production (x €1,000,000)	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.
	Intermediate consumption (x €1,000,000)	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.
	Value added (x €1,000,000)	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.
Wind energy	Compensation of employees (x €1,000,000)									1
	Production (x €1,000,000)			23			13			36
	Intermediate consumption (x €1,000,000)			13			8			21
	Value added (x €1,000,000)			11			5			16
Total	Compensation of employees (x €1,000,000)	7782	7646	8150	4343	4508	4581	12124	12154	12732
	Production (x €1,000,000)	69775	77680	91492	23811	29132	32498	93587	106812	123991
	Intermediate consumption (x €1,000,000)	51462	57888	66088	15436	19968	22726	66897	77856	88813
	Value added (x €1,000,000)	18314	19792	25406	8376	9164	9773	26690	28956	35178

Annex R Summary of the price indices for selected activities on the DCS, in seaports and in the coastal zone (prices indices (2007=100))

Activity	Price index	DUTCH CONTINENTAL SHELF (DCS)			INDIRECT (SPILLOVER EFFECT)			TOTAL		
		1995	2000	2007	1995	2000	2007	1995	2000	2007
Seaports (-/- Seashipping in seaports)	Compensation of employees price index (2007=100)	72	82	100	72	83	100	72	83	100
	Production price index (2007=100)	52	72	100	72	81	100	58	75	100
	Intermediate consumption price index (2007=100)	45	68	100	72	81	100	51	71	100
	Value added price index (2007=100)	84	92	100	72	80	100	80	88	100
Coastal Zone	Compensation of employees price index (2007=100)	74	85	100	72	83	100	73	84	100
	Production price index (2007=100)	76	86	100	79	86	100	77	86	100
	Intermediate consumption price index (2007=100)	72	83	100	77	84	100	74	83	100
	Value added price index (2007=100)	79	90	100	81	87	100	80	89	100
Sea shipping	Compensation of employees price index (2007=100)	74	83	100	71	82	100	73	83	100
	Production price index (2007=100)	90	97	100	73	83	100	84	93	100
	Intermediate consumption price index (2007=100)	77	87	100	76	84	100	77	86	100
	Value added price index (2007=100)	196	150	100	67	80	100	118	115	100
Fisheries	Compensation of employees price index (2007=100)	75	84	100	71	82	100	74	84	100
	Production price index (2007=100)	78	96	100	73	83	100	77	92	100
	Intermediate consumption price index (2007=100)	54	74	100	76	84	100	59	77	100
	Value added price index (2007=100)	111	134	100	71	82	100	96	111	100
Oil and Gas extraction	Compensation of employees price index (2007=100)	68	78	100	71	82	100	68	79	100
	Production price index (2007=100)	44	59	100	73	83	100	44	59	100
	Intermediate consumption price index (2007=100)	64	79	100	76	84	100	65	79	100
	Value added price index (2007=100)	40	55	100	70	81	100	41	55	100
Sand extraction	Compensation of employees price index (2007=100)	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.
	Production price index (2007=100)	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.
	Intermediate consumption price index (2007=100)	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.
	Value added price index (2007=100)	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.	P.M.
Wind energy	Compensation of employees price index (2007=100)			100			100			100
	Production price index (2007=100)			100			100			100
	Intermediate consumption price index (2007=100)			100			100			100
	Value added price index (2007=100)			100			100			100
Total	Compensation of employees price index (2007=100)	72	83	100	72	83	100	72	83	100
	Production price index (2007=100)	54	73	100	72	81	100	59	75	100
	Intermediate consumption price index (2007=100)	47	70	100	72	82	100	53	73	100
	Value added price index (2007=100)	73	82	100	73	81	100	73	82	100

Annex S SBI 1993 Industry Classes Correspondencetable

Northsea (NAMEA)	Northsea description	SBI_93	SBI_93 description
1	Arable farming	01	Agriculture, hunting and related service activities
2	Horticulture	01	Agriculture, hunting and related service activities
3	Live stock	01	Agriculture, hunting and related service activities
4	Other agriculture	01	Agriculture, hunting and related service activities
		02	Forestry, logging and related service activities
5	Fishing	05	Fishing, fish farming and related service activities
6	Crude petroleum and natural gas production	11	Extraction of crude petroleum and natural gas; service activities incidental to oil and gas extraction, excluding surveying
7	Other mining and quarrying	10	Mining of coal and lignite; extraction of peat
		14	Other mining and quarrying
8	Manufacture of food products, beverages and tobacco	15	Manufacture of food products and beverages
		16	Manufacture of tobacco products
9	Manufacture of textile and leather products	17	Manufacture of textiles
		18	Manufacture of wearing apparel; dressing and dyeing of fur
		19	Tanning and dressing of leather; manufacture of luggage, handbags, saddlery, harness and footwear
10	Manufacture of paper and paper products	21	Manufacture of pulp, paper and paper products
11	Publishing and printing	22	Publishing, printing and reproduction of recorded media
12	Manufacture of petroleum products; cokes, and nuclear fuel	23	Manufacture of coke, refined petroleum products and nuclear fuel
13	Manufacture of basic chemicals and man-made fibres	24	Manufacture of chemicals and chemical products
14	Manufacture of chemical products	24	Manufacture of chemicals and chemical products
15	Manufacture of rubber and plastic products	25	Manufacture of rubber and plastic products
16	Manufacture of basic metals	27	Manufacture of basic metals
17	Manufacture of fabricated metal products	28	Manufacture of fabricated metal products, except machinery and equipment
18	Manufacture of machinery and equipment n.e.c.	29	Manufacture of machinery and equipment n.e.c.
19	Manufacture of electrical and optical equipment	30	Manufacture of office machinery and computers
		31	Manufacture of electrical machinery and apparatus n.e.c.
		32	Manufacture of radio, television and communication equipment and apparatus
		33	Manufacture of medical, precision and optical instruments, watches and clocks
20	Manufacture of transport equipment	34	Manufacture of motor vehicles, trailers and semi-trailers
		35	Manufacture of other transport equipment
21	Manufacture of wood and wood products	20	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials
22	Manufacture of other non-metallic mineral products	26	Manufacture of other non-metallic mineral products
23	Other manufacturing	36	Manufacture of furniture; manufacturing n.e.c.
24	Recycling	37	Recycling
25	Electricity and gas supply	40	Electricity, gas, steam and hot water supply
26	Water supply	41	Collection, purification and distribution of water
27	Construction of buildings	45	Construction
28	Civil engineering	45	Construction
29	Building installation and completion	45	Construction
30	Trade and repair of motor vehicles/cycles	50	Sale, maintenance and repair of motor vehicles and motorcycles; retail sale of automotive fuel
31	Wholesale trade (excl. motor vehicles/cycles)	51	Wholesale trade and commission trade, except of motor vehicles and motorcycles
32	Retail trade and repair (excl. motor vehicles/cycles)	52	Retail trade, except of motor vehicles and motorcycles; repair of personal and household goods
33	Hotels and restaurants	55	Hotels and restaurants
34	Land transport	60	Land transport; transport via pipelines
35	Water transport	61	Water transport
36	Air transport	62	Air transport
37	Supporting transport activities	63	Supporting and auxiliary transport activities; activities of travel agencies
38	Post and telecommunications	64	Post and telecommunications
39	Banking	65	Financial intermediation, except insurance and pension funding
40	Insurance and pension funding	66	Insurance and pension funding, except compulsory social security
41	Activities auxiliary to financial intermediation	67	Activities auxiliary to financial intermediation
42	Real estate activities	70	Real estate activities
43	Renting of movables	71	Renting of machinery and equipment without operator and of personal and household goods
44	Computer and related activities	72	Computer and related activities
45	Research and development	73	Research and development
46	Legal and economic activities	74	Other business activities
47	Architectural and engineering activities	74	Other business activities
48	Advertising	74	Other business activities
49	Activities of employment agencies	74	Other business activities
50	Other business activities	74	Other business activities
51	Public administration and social security	75	Public administration and defence; compulsory social security
52	Defence activities	75	Public administration and defence; compulsory social security
53	Subsidized education	80	Education
54	Health and social work activities	85	Health and social work
55	Sewage and refuse disposal services	90	Sewage and refuse disposal, sanitation and similar activities
56	Recreational, cultural and sporting activities	92	Recreational, cultural and sporting activities
57	Private households with employed persons	95	Activities of households as employers of domestic staff
58	Other service activities n.e.c.	91	Activities of membership organizations n.e.c.
		93	Other service activities

Annex T Glossary

Employed persons: are all persons who are working for a business unit or private household residing in the Netherlands.Employed persons include all persons who:

– have a paid job for at least one hour a week.

– perform a job of which the payment is withheld from registration of tax and/or social insurance authorities, while the work itself is legal.

– are temporarily not working (due to illness, bad weather, etc.), but who continue to receive their remuneration.

– have taken a temporarily unpaid leave.

Employed persons may either be employees or self-employed.

Employee: Resident or non-resident who is employed under contract and who receives wage as compensation. This excludes self-employed individuals. Managing directors of limited companies are considered to be employees.

Self-employed: individual that earns his/her income by performing labour on his/her own (company, profession) or who cooperate in the business of their family. The latter are not counted as self-employed if there is an employment contract

Compensation of employees: The total remuneration paid by employers to their employees in return for work done. Even if they are actually withheld by the employer and paid directly to tax authorities, social security schemes and pension schemes Compensation of employees is distinguished between wages and salaries and employers' social contributions.

Full-time equivalent job: Labour input in full-time equivalent jobs is calculated by expressing all jobs (be it full-time, part-time or flexible) to full-time equivalents. The full-time equivalent is obtained by dividing the annual contractual hours of the job by the annual contractual hours considered full-time (in the same branch of industry). Two half-time jobs thus add up to one full-time equivalent. For self-employed (mostly not included in the figures in this paper) the full-time equivalent is the quotient of the usual weekly work hours of that job and the average weekly work hours of self-employed with 37 or more normal weekly hours (in the same branch of industry).

Production / Output: The value of all goods produced for sale, including unsold goods, and all receipts for services rendered.

Intermediate consumption: All goods and services used up in the production process in the accounting period, regardless the date of purchase. This includes for example fuel, raw materials, semi manufactured goods, communication services, cleansing services and audits by accountants.

Value added: The difference between output and intermediate consumption.

Annex U References and Internet sources

RebelGroup Advisory mtbs /Buck Consultants International, 2009, *Economische betekenis van Nederlandse zeehavens; Tabellenboek Havenmonitor 2007.* Available in Dutch at: http://www.havenraad.nl/images/Havenmonitor%202007_tcm226-259784.pdf

Brouwer, R., S. Schenau, R. van der Veeren, 2005, *Integrated river basin accounting in the Netherlands and the European Water Framework Directive.* Available at : http://iospress.metapress.com/content/aqlb27drhnn243fn/

Canadian Economic Observer, *Multipliers and Outsourcing: how industries interact with each other and affect GDP*

Nijdam M., van der Lugt L., van der Biessen B., 2010, *Havenmonitor 2008: De economische betekenis van Nederlandse zeehavens.* Available in Dutch at: http://www.havenraad.nl/images/Tabellenboek%20HM%202008%20finaal_tcm226-280856.pdf

Ministry of Economic Affairs, TNO (research institute), 2008, *OLIE EN GAS IN NEDERLAND Jaarverslag Opsporing en Winning 2007.* Available at: http://www.sodm.nl/Publicaties/Overige_Publicaties/Doelmatige_winning/Olie_en_gas_in_Nederland_Jaarverslag_opsporing_en_winning_2007

Statistics Netherlands, 2007, *National accounts of the Netherlands 2007.* Available at: http://www.cbs.nl/NR/rdonlyres/A27D2849-AEA1-47C8-8271-978CE9BEACA5/0/NationalaccountsoftheNetherlands2007New.pdf

Statistics Netherlands, 2010a, NAMWA2010, water in de Nationale rekeningen.

Statistics Netherlands, 2010b, The National accounts of the Netherlands

CBS (2011), Transport Statistics, internal data

CBS (2011), National accounts, internal data

TNO (research institute), 2004, *Case study Inlandports of Drechtsteden,* Available at http://havens.binnenvaart.nl/publicaties

van Rossum, M. and Kulig, A. (2008). *Economic indicators for: resource management activities in the Dutch environmental goods and services sector*, Statistics Netherlands, The Hague. Available at: http://epp.eurostat.ec.europa.eu/portal/page/portal/environmental_accounts/documents/NL%20494%20EGSS.pdf

Voet, L. (Royal Haskoning), B. Budding (Rebel Group), 2008, Verkenning van economische en ruimtelijke ontwikkelingen op de Noordzee. Available in Dutch at: http://www.noordzeeloket.nl/Images/Verkenning%20van%20economische%20en%20ruimtelijke%20ontwikkelingen%20op%20de%20Noordzee%20(VERON)_tcm14-3836.pdf

Wissen van, L., *Het LISA, VVK Handelsregister en CBS Bedrijvenregister met elkaar vergeleken.* Available in Dutch at: http://ursi.eldoc.ub.rug.nl/FILES/root/ResRep/2004/306/306.pdf

Eurostat (2008). *Manual of Supply, Use and Input-Output Tables,* Eurostat methodologies and working papers.

Statistics Netherlands, 2010, *Environmental accounts of the Netherlands 2009.*
Available at: http://www.cbs.nl/nl-NL/menu/themas/macro-economie/publicaties/publicaties/archief/2010/2010-milieurekeningen-pub.htm

Miller, R.E., Blair, P.D. (2009) *Input-Output Analysis. Foundations and Extensions.* Cambridge University Press 2009.

Canadian Economic Observer, Multipliers and Outsourcing: how industries interact with each other and affect GDP, *by Philip Cross and Ziad Gha*
Available at: http://www.statcan.gc.ca/pub/11-010-x/00106/9000-eng.htm

Internet sources:

Statline: http://statline.cbs.nl/statweb/?LA=en

National Ports Council: http://www.havenraad.nl/english

Port of Rotterdam Authority: http://www.portofrotterdam.com/en

Port of Amsterdam: http://www.portofamsterdam.nl

Port of Eemshaven: http://www.eemshaven.com

Port of Vlissingen: http://www.zeeland-seaports.com

Compendium voor de leefomgeving:
http://www.compendiumvoordeleefomgeving.nl/

The Pollutant Release & Transfer Register: http://www.emissieregistratie.nl/

European Commission: http://ec.europa.eu/environment/water/marine/index_en.htm

Helpdesk water/NAMWA: http://www.helpdeskwater.nl/onderwerpen/water-ruimte/economische_aspecten/namwa/