W.P. Davidse (coordinator)
J.P. Boude, F. Daures, P. le Floc'h (FR)
E. Oakeshott, M. Duran (UK)
C.L. Jensen (DK)
M.H. Smit, C. Taal, M.O. v. Wijk (NL)

Onderzoekverslag 158

RETURN ON CAPITAL IN THE EUROPEAN FISHERY INDUSTRY

September 1997

Agricultural Economics Research Institute (LEI-DLO)
Sydjysk Universitetcenter (DIFER)
Ecole Nationale Supérieure Agronomique de Rennes (ENSAR)
Seafish Industry Authority (SFIA)

This study has been carried out with financial assistance from the Commission of the European Communities.

REFERAAT

RETURN ON CAPITAL IN THE EUROPEAN FISHERY INDUSTRY
W.P. Davidse (coordinator), J.P. Boude, F. Daures, P. le Floc'h (FR), E. Oakeshott, M. Duran (UK), C.L. Jensen (DK), M.H. Smit, C. Taal, M.O. van Wijk
The Hague, Agricultural Economics Research Institute (LEI-DLO), 1997
Onderzoekverslag 158
ISBN 90-5242-409-8
126 p., tab., fig., appendices

The main objective of this study is to consider the level of Return on Capital (ROC) of fishing vessels in Denmark, France, the Netherlands and the United Kingdom and to analyse factors influencing this return. Samples of costs and earnings of fishing vessels in these four countries have been the basis for this profitability indicator.

Developments of the average ROC are shown for the period 1991-1996. The study analyses the impact of public policies and of other factors, such as prices, on the economic performances of the vessels. The influence of innovative techniques on the profitability is indicated in a separate chapter.

The report also includes the outcomes of a brief enquiry amongst vessel owners, bankers and accountants in the four countries, to assess the perceptions in the industry with respect to the economic performance of fishing vessels.

Economic performance/European fishery/Profitability indicator/Return on Capital

CONTENTS

FOREWORD

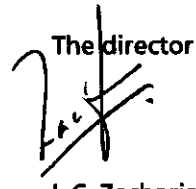
This is the final report to the Commission of the European Union, Directorate-General for Fisheries, as a result of the work done for contract BIOECO /93/14. This report contains average costs and earnings and the return on capital per vessel in Denmark, France, the Netherlands and the United Kingdom.

The study has been carried out by the four participants in this project:

- Agricultural Economics Research Institute (LEI-DLO), Fisheries Division, The Hague.
- Ecole Nationale Superieure Agronomique de Rennes, Dept. Halieutique, Rennes.
- Seafish Industry Authority, Fisheries Economics Research Unit, Edinburgh.
- Sydjysk Universitetcenter, Danish Institute of Fisheries Economics Research, Esbjerg.

Interim reports on this project have been submitted by December 31st 1994 and December 31st 1995.

The director



The Hague, September 1997

L.C. Zachariasse

SUMMARY

The main objective of this study is to consider the level of Return on Capital (ROC) of the fishing vessels in Denmark, France, the Netherlands and the United Kingdom and to analyse factors influencing this return.

Samples of vessels

The information on the return on capital (ROC) and on the costs and earnings in this study has been based upon samples of fishing vessels in the four countries. The samples contain 365 vessels totally, representing fleets totalling some 1,700 vessels (1993).

The Danish sample concentrates on the port of Thyboron, in the northwest of Jutland, and contains trawlers, Danish seiners and gill netters. The French sample regards vessels of the (semi) industrial fleet in the ports Concarneau, Lorient and Le Guilvinec. Beam trawlers are the most important fleet segment in the Dutch sample. The other segments represented in this sample are shrimpers and multi-purpose vessels, the latter mostly in the 221 kW class. Scottish vessels form the main part of the UK sample. Demersal trawlers and seiners and nephrop trawlers are included. Furthermore, beam trawlers are represented in the English sample.

These samples for 1993 are a continuation of the ones of 1991 and 1992. In general, the data bases are rather constant.

Developments in the period 1994-1996

The Danish trawlers from Thyboron improved their returns in 1995, compared with the previous year. Earnings in the industrial and in the cod fishery increased. The cash flow of the small trawlers was depressed by higher operational costs, whereas the increased earnings resulted in substantial higher cash flows for the larger trawlers. Lower plaice quota resulted in decreases of the cash flow of the seiners in 1995. The owners of the gill netters could compensate more or less these lower quota by higher earnings in the cod fishery.

The quota situation in 1996 indicates a continuation of the development in 1995. Earnings of the larger trawlers in the industrial (reduction) fishery are uncertain so far, but there are good possibilities to get higher earnings in the cod fishery. This fishery will probably also lead to higher earnings for the gill netters, whereas the seiners are affected negatively by the lower plaice quota in 1996.

The French vessels from Le Guilvinec and Concarneau improved their results substantially in 1994. Target species became more available and reductions of the (semi-)industrial fleet diminished the competition for the quota

species. Economic data about 1996 were also available for the Guilvinec fleet and this indicates a further improvement of the returns. However, the cash flows remained too low to allow for investment activities. The ownership of the 33m and 55m vessels from Lorient changed in 1994 and 1995 through take-overs by a Spanish company and by a French group. These new owners have reduced their fleets and the residual fleet has been modernized. Simulation of this development in a vessel model suggests a substantial improvement of the average cash flow in 1996 through the removal of vessels with the lowest returns.

The returns of the Dutch vessels in the cutter fishery show ups and downs in 1994, compared with 1993. Increases occurred for the shrimp vessels and for the larger beamers (size class 1,101-1,470 kW). On the other hand, the largest beamers show a declining tendency as to the gross earnings and net profit. Favourable price developments (sole) and a lower fuel price resulted in a modest improvement of the returns in 1995. These positive factors have compensated the lower availabilities for sole and plaice in 1995. Major decreases of flatfish quotas (sole -21.5%, plaice -32%) in 1996 were more or less compensated by higher prices of these flatfish species. However, a higher fuel price in the second half of 1996 affected the returns of the beamers negatively. Estimations for the main beam trawler groups for 1996 indicate cash flow decreases of 18-25% on average compared with 1995.

The substantial lowering of the flatfish quotas led to the prediction, in the beginning of 1996 that the Dutch co-management groups would not hold. However, the groups succeeded in reducing the fishing effort (number of days at sea) and the higher flatfish prices are an indication of the reason of existence of these management groups.

Decommissioning of vessels in the period 1991-1995 has led to a decrease in number of vessels from 533 to 457 and a kW reduction of 10%.

The economic environment of the UK fishery made further marginal improvements in 1994 and 1995. The gross earnings of the demersal fleet were at a 3.5% higher level in 1995 compared with 1993, apart from changes in the Ecu rate. Increased quay-side prices in 1996 indicate a much sharper up-turn in this year. Historically low fuel prices have contribute to these developments, although there have been upward movements in the second half of 1996.

Fleet reductions in the period 1993-1995 have resulted in a 4% lower GRT and 10% lower kW total.

Developments of the Return on Capital

The ROC is defined in this study as 'the net profit plus interest as a percentage of the insured value of the vessel'. Thus, this is an indication for the reward of the capital invested in the vessel. This seems a useful measure since fishing is a rather capital intensive activity. Though the indicator is hardly used in the industry, it is useful to compare the economic performance of fleet segments and to identify economic trends in the fisheries.

An adequate ROC requires a level of 8% or more, depending on the interest rate for borrowings. From this viewpoint, the ROC has been very low for the

fleet segments involved in this study in the period 1991-1995. Only smaller Danish seiners and gill netters and some Dutch beamer size groups show this or a higher level of the ROC. This occurred mainly in 1991 and 1992. On the whole, the Danish and Dutch vessel groups had the least worse level of the ROC in the period 1991-1995, with the majority of the size groups between one and seven percent ROC. Most of the UK and French vessel groups had a negative ROC in this period, whereby the values of the French (semi-)industrial vessels from Lorient seem to be disastrously low.

The average ROC per size group has developed differently in the period 1991-1995 in the four countries. The profitability of the Danish trawlers improved in 1994/1995, whereas a deterioration occurred for the seiners and gill netters in these two years. The ROC indicates a low point in 1993 for the French (semi-)industrial vessels and improvements for the Guilvinec and Concarneau trawlers afterwards. Data about the Lorient trawlers were not available after 1993, but they probably had the same upwards trend. The ROC decreased in most cases for the Dutch beam trawl groups after the relatively high level in 1991 and 1992. The very low (negative) ROC of the British demersal fleet shows marginal improvements in 1993. In the case of the Scottish samples estimated ROCs in 1995 are above the corresponding levels in 1991-1994. There are also indications of a similar trend in the case of the English beam trawlers.

Impact of public policies and other major factors on the ROC

The following aspects of public policies have mainly influenced the ROC of the Danish vessels:

- Quota changes. The decrease of the cod quota in the period 1991-1993 has depressed the returns of the gill netters and the seiners. The cod price development could not compensate these lower quota. Quota increases of these species brought the availability again at the 1991 level, but the (nominal) cod price has decreased by nearly 30% for the period 1991-1995. Plaice is most important for the Danish seiners and this quota decreased by 29 and 7% in 1995 and 1996, after a stable pattern in 1991-1994. An investigation of the effect of quota changes in 1996 on the ROC, through a vessel model, learns that mostly the gill netters and the seiners show positive developments. The ROC could increase in 1996 from 4.9-10.4% for the gill netters and from a level of 4% to 6.5% for the seiners. The trawlers are more sensitive to changes in abundance of 'reduction' fish. A 5% increase of this abundance may increase the ROC for the largest trawlers from 4.3% in 1995 to 6.1% in 1996, all else equal.
- Decommissioning. Mainly the seiners and smaller trawlers decreased in number (by 50% or more) in the period 1990-1995. Decommissioning has had on the one hand a statistical effect on the average ROC in that an improvement arises since the vessels with the lowest ROC mostly have left the fleet. A decommissioning of e.g. 5% causes a (statistical) increase of the ROC of 0.2-0.3% On the other hand, decommissioning has more impact on the longer run since there is less competition between the remaining vessels for the quota species.

It has to be kept in mind that the calculation method, i.e. the depreciation system, may have a major impact on the ROC. Danish vessels are mostly very old and a less harder depreciation system than the common one in this study seems to be more suited for the Danish situation. Such a depreciation which follows the decrease of the insured value, would higher the ROC by 2-4% for the Danish vessels.

Major impacts on the decreasing ROCs of the French industrial fleet have been:

- lower prices in the period 1991-1994 (20-30% for the most important species), which seem to have been the most important determinant of the ROC deterioration;
- quota changes. Cod, saithe and anglerfish became less available in the period 1991-1993 and had , on the contrary, an upward trend afterwards. The doubling of the haddock quota in the period 1991-1996 meant a positive factor for the ROC of the industrial vessels. A sensitivity analysis turned out that a 5% quota increase of the main species results in a ROC improvement, varying from 0.9-3.8%. The more specialized 33m vessels of Lorient are most sensitive to such a quota increase;
- decommissioning. The 33% decrease in number of the French industrial stern trawlers will have an important positive structural effect on the profitability. The decommissioning of the vessels with the lowest ROC turned out to have a minor (statistical) effect on the average ROC.

Public policies have had the following impacts on the ROC of the Dutch beam trawlers:

- decreases of the flatfish quotas have depressed the profitability of this fleet in 1995 and 1996. A sensitivity analysis for the most important size group, 1101-1470 kW, turned out that the lower plaice and sole quotas in 1996 will lower the average ROC of these vessels from 5.6% (1995) to 0.8%, all else equal. However, substantial increases of the sole and plaice prices may improve this ROC again to 3.6%;
- decommissioning has removed some 90,000 kW from the cutter fleet, which has resulted in better catching possibilities for the remaining fleet. It has to be emphasized that higher catches do not accrue for free to the operating vessels. The vessel owners have to pay a high price for the ITQs, if they purchase them from the owners who leave the fishery;
- the horsepower licence scheme, implemented in 1985, has stopped the investment mechanism that resulted in capacity increases (10-20%) after profitable years. In particular, this scheme has prevented such increases after the profitable years 1991 and 1992. Investments in ITQs even exceeded the investments in vessels in these years.

The fuel price for the Dutch vessels came at a much higher level (some 50% compared with the 1995 average price) in the second half of 1996. Such a cost increase will have a major impact on the profitability of the beamers. This means a cash flow reduction by ecu 75,000 on an annual basis for a larger

beamer, whereas the ROC effect would contain a decrease from the expected 3.6% in 1996 to 1.8%, all else equal.

The impacts of public policies on the economic out-turns for the UK fleet can, like for the three other countries, also be considered for the conservation and for the structural measures:

- conservation measures proved to have had positive and negative impacts. For example, in the case of the Scottish haddock fishery recorded landings were virtually halved between 1988 and 1990 as a result of sharply reduced TACs. But over this period quayside prices increased by over 70%, so that gross earnings from the fishery fell by less than 10%. Conversely, an increase of these landings by 60% in the period 1991-1993 led to a price fall of almost 40%, resulting in virtually unchanged gross earnings. But the ROC came at a lower level in most cases because of higher costs for the increased quantities landed;
- structural measures, i.e. decommissioning, has led to the withdrawal of 122 (Scottish) vessels in the period 1993/94-1995/1996. The majority of these were nephrop trawlers so that the direct impacts on the residual demersal fleet have been too small to measure.

Impact of innovative techniques

Innovations were only of minor importance to the economic performance of the Danish fishing vessels. Improvement of productivity has mainly been the result of decommissioning in that the least productive vessels have been withdrawn. Minor annual productivity may lead to substantial increases of catching capacities over a longer period, e.g. 1991-1996. Assuming a 2% annual efficiency improvement could result in a 12.5% higher catch per day-at-sea in this period, all else equal. Such a development would nearly have doubled the ROC for the investigated vessel groups of Thyboron.

So far, there are no indications for such a large increase in the productivity of Danish vessels. But in the event this would happen, it makes clear that an increased pressure for restructuring the fleet would arise to prevent an excessive pressure on the fish stocks.

Most of the vessels of the French (semi-)industrial fleet have been modernized since the beginning of the nineties. Innovations contained:

- technical innovations, mainly regarding fishing gears to target on new species. Furthermore, electronic equipment has been modernized and containerisation of the fish on board has been implemented;
- organizational innovations. A strategy of sea products valorization has lead to a better handling of the fish on board by using ice machines etc. and the freshness of the fish has been enhanced by the choice of new landings sites to shorten the fishing trips.

Innovations in the Dutch cutter fleet can be summarized as follows:

- technical innovations. New buildings of vessels have been on a modest scale in the nineties and mostly regarded vessels with engines on the 300 and 2,000 HP maximum. New vessels (<9 years) of the latter category

seem to generate a much higher cash flow (+44%) compared with older (>9 years) vessels with the same engine power, as shown by an investigation of the LEI-DLO costs and earnings database. The ROC is also higher (4.6% compared with 3.6%). Maximizing the vessel's horsepower stimulates the optimization of technical parameters that are not limited. For example a larger propeller has made horsepower more effective. Other technical innovations on board mainly regard electronic equipment;

- organizational innovations. The co-management groups, established in 1993, have changed the external organization of the cutter fishery. A more efficient use of ITQs is possible by hiring and renting of rights within the group and between management groups. Furthermore, the quality aspect is getting more attention through a better handling of fish on board of the vessels. Exchange of information between vessels at sea and the auction is also developing.

A continuous improvement of efficiency can e.g. result in catching the same fish quantity in fewer days or a higher quantity in the same number of days at sea. The latter strategy leads to a higher ROC for a larger beam trawler, as has been investigated through a vessel model. However, efficiency improvement is hampered in the latter strategy by the need to acquire or lease additional fishing rights (ITQs).

Innovations in the UK fleet can be summarized as follow:

- technical innovations. New types of vessels have been designed, such as deep-draughted vessels, to target on deep water species, 'pocket' (under 10m) beam trawlers and under 10m vessels on the 'catamaran' principle. Innovations on fishing gear has been a more widespread use of multiple rigs, starting practising pair seining and developing of 'rock hopping' gear for use e.g. in the vicinity of marine pipelines. Finally, there has been a progressive increase in the use of static gear, i.e. gill nets. These innovations have resulted in productivity improvements that exceed the rate of 'technical creep', estimated at 2% per year, in the previous interim report;
- organizational innovations. These include technical improvements on board such as more sophisticated radar, plotting of vessels and gear and better fish finding equipment. Other developments include reductions to crew sizes, through mechanisation of fish handling. Finally, it is important to note that there have been significant improvements in fisheries infrastructure, such as new auctions (e.g. Grimsby), and also fishing harbours/-quayage have been expanded. This has enabled a number of vessels to reduce the improductive steaming operations.

Perceptions in the industry on the return on capital and on related issues

Interviews with vessel owners, accountants and staff members of banks have been held in the four countries to:

- identify financial indicators that are used by vessel owners and to investigate if the ROC is of importance in the industry;

- investigate if the applied methodology of calculating profits does result in financial returns that correspond to out-turns as perceived by the industry itself;
- learn which factors are considered to have mainly affected the returns;
- investigate which have been the main technical innovations implemented by the industry over the survey period and thereafter.

The number of respondents needed to be limited so that the results should be interpreted carefully. However, most of them have a key position in the fishery sector so that their answers regard a wider part of the industry.

Conclusions from the Danish interviews with staff members from banks and accountants are:

- the ROC is theoretical relevant as a measure for the economic performance but they do not use this indicator. Vessel owners would not take account of the ROC and moreover, the invested capital is difficult to measure;
- the net profit and the ROC resulting from this study mean an underestimation of the economic performance of the Danish vessels. In particular the depreciation costs according to the common methodology cause this difference with the perception in the industry;
- the available fish quotas and the abundance of fish seem to have the major importance for the level of returns of the Danish vessels. Another important impact is the re-financing reform, implemented by the Danish government in 1993, which has positively affected the returns of the vessels.

Managers of fishing companies in South Brittany and also captains of vessels in this region have been interviewed or approached through questionnaires. Conclusions from this inquiry are:

- the level of returns in this study correspond roughly with the perceptions in the industry on profitability. The recovery after 1993 has been emphasized and this also appears in the cash flows and net results of the Guilvinec and Concarneau vessels shown in this study. The depreciation calculation in the common methodology covers a longer period (25 years) than the usual French methods;
- a kind of ROC, a return on investment, is annually calculated by fishing companies. Apart from this, numerous indicators are periodically used since the adverse economic situation in the beginning of the nineties. The ROC in this study, based on the insurance value, may lead to an underestimation of the economic performance in the perception of the fishery managers since they use the lower book value as a basis;
- a major change has occurred in the investments behaviour of the fishing companies in that the policy of replacing a vessel every ten or fifteen years has stopped.

Vessel owners, staff members from banks and accountants have been interviewed in the Netherlands. The main conclusions from the in-depth interviews are:

- the ROC indicator is not known under vessel owners and not used by accountants and bankers;
- the perception of vessel owners, accountants and bankers on the returns in the period 1993-1995 are rather in line with the outcomes in this study, whereby vessel owners seem to be somewhat more positive than the other two types of respondents;
- the amount of weekly gross earnings is the main financial indicator for skipper owners. This has been supplemented more and more by a weekly survey of quota uptake, provided by the co-management groups. The use of this statement and of other indicators (prices, fuel consumption) by skipper owners indicates that their behaviour is changing from hunters for fish towards managers of quotas;
- returns of the vessels are mainly influenced by quotas and prices. A new influencing factor thereby include speculative decisions about leasing and hiring of ITQs. The speculative element contains the moment of leasing/hiring (price differences over time) and the quantity to lease/hire (uncertainties about catchability);
- a minority of the fifteen interviewed vessel owners had implemented innovations on board, such as equipment for better catch treatment, adaptations of gear etc., to start fishing on non-quota species;
- vessel owners, accountants and bankers emphasized that a kind of a freeze of the fleet had arisen in the nineties as a result of all the regulations.

The UK programme of interviews included discussions with the industry itself (fishermen/vessel owners, fishing/fish selling companies) and with related institutions, notably Producer Organizations, Commercial Banks and Insurance Companies. Conclusions from these interviews are:

- the role of financial indicators is related with ownership structures. At one extreme there are few public companies who maintain a sophisticated regime of financial monitoring, including target ROCs. At the other extreme there are large numbers of individual fishermen who have no idea of ROC as such and whose indicators are related to cash flows. Fish Selling companies, an important system of ownership in Scotland, use Discounted Cash Flow (DCF) and ROC calculations for financial appraisals relating to options to e.g. invest in a new vessel;
- banks do not use the ROC. They seem to be content with cash flow projections in relation to investments;
- the perceptions in the industry with respect to gross earnings/cash flows has been broadly in agreement with the trends indicated in this study, e.g. a general deterioration in the period 1990-1993, which has since been followed by an upward trend, enhanced by higher quay-side prices;
- an interview with the most important British Insurance Cy for fishing vessels learned that there is a rather close relationship between the actual

market value of a vessel and its insured value, apart from time lags in adjustment of the latter one.

Developments in the period 1991-1993

Detailed costs and earnings data of sample vessels in the period 1991-1993 have been included in this and in the previous two interim reports.

The average cash flow of most of the Danish vessels from the port of Thyboron could cover the (imputed) depreciation and interest costs in the period 1991-1993. Hence, a net profit remained for the different size groups, except for the larger trawlers. These industrial vessels faced major decreases of sandeel landings, in particular in 1993. Lower plaice landings caused a worsening for the Danish seiners, whereas the owners of the gill netters could compensate lower earnings in the cod fishery by cost reductions in 1993.

The economic situation of the French (semi-)industrial fleet worsened in the period 1991-1993 in most cases. Only the 24m trawlers from Le Guilvinec had a positive cash flow in this period. The 33m and 55m trawlers from Lorient show an average cash flow shortage which threatens the continuity of the vessels. The improvement of the returns of the Lorient 55m trawlers in 1993, as a result of cost reductions, is a positive development. Continuous price decreases of the main target species have been the main cause of these worsening of the economic situation.

The Dutch beam trawlers had their best year in 1991, as a result of favourable flatfish prices. The returns decreased in the two subsequent years but a net profit remained in most cases. Smaller shrimp vessels had the same declining tendency which resulted in net losses in 1993 1).

The UK fishery experienced mixed conditions in 1993. Haddock quotas went up importantly and on the other hand, fish prices continued to weaken due to increased availabilities. The English beam trawlers and the Scottish demersal seiners show an improvement of returns in 1993, whereas the economic situation for the Scottish demersal trawlers worsened in that year. Cash flows of the demersal vessels where mostly insufficient in the period 1991-1993 to cover the capital costs. This seems to be a threat for long-run financial viabilities, except for the larger Scottish seiners which had only a small shortage in 1993. The nephrop trawlers indicate relatively strong financial out-turns in the period 1991-1993. Cash flows could not cover the (imputed) depreciation and interest fully, but net losses remained limited.

---

1) All amounts in this report are expressed in ecu. It has to be kept in mind that ecu exchange rates changed substantially in 1992. This means e.g. an 'improvement' of the Dutch vessel returns in 1993 measured in ecu, whereas the UK ones were depressed by a 6% higher ecu rate with respect to £ Sterling.

1. OBJECTIVE

The main objective of this study is to consider the level of return on capital of fishing vessels in Denmark, France, the Netherlands and the United Kingdom and to analyse factors influencing this return, with special focus on:

a. the fisheries management policy of the European Union;
b. national fisheries management measures;
c. innovative techniques.

This objective results from the Terms of Reference in the Call for tenders for studies in the fisheries sector (1993).

2. INTRODUCTION

Costs and earnings of fishing vessels have been studied during the EU FAR project 'Costs and Earnings of fishing fleets in four EC countries'. This FAR project has resulted in a common publication of the four participating institutes 1). Costs and earnings of fishing vessels in 1989 and 1990 have been subject of study in this project.

This 'Return on Capital' project starts with the financial year 1991 and considers also the subsequent years 1992-1995. Moreover, estimations have been made on the economic performances in 1996.

This study focuses more on the return on capital whereas the previous FAR project concentrated on the costs and earnings of fishing vessels and on the harmonisation of the profit calculations in the four countries (Denmark, France, the Netherlands and the United Kingdom).

The methodology of calculating the return on capital has been developed in the previously mentioned FAR-project; thus, the figures expressing the return on capital in this report are calculated in the same manner for fishing vessels in Denmark, France, the Netherlands and the United Kingdom.

Whilst each country may have particular national management measures, especially in coastal areas, fishing vessels of the four countries are subject to the same measures resulting from the Common Fisheries Policy (CFP), such as Total Allowable Catches (TACs), technical measures with respect to mesh size, closed areas etc. Moreover, they fish the same fish stocks to an important extent. Therefore, analysis of the impact of different management measures on the profitability of the fleets could provide valuable information for those involved in fisheries management policies.

In many cases this impact of fisheries policies will be of somewhat relative importance, because other factors such as fish prices may also influence the return on capital of the vessels importantly. This influence of other factors has also been considered in this study.

---

1) W.P. Davidse et al. (1993) 'Costs and Earnings of fishing fleets in four EC countries', LEI-DLO report OV 110.

3. MATERIALS AND METHODS

Costs and earnings data of fishing vessels in the period 1991-1995 have been the basis for calculation of the return on capital in this report.

The Danish part of the study is based on local costs and earnings studies, which are undertaken by the Fishery Associations in the ports of: Thyborøn, Hirtshals and Skagen (1991 and 1992). Only data from Thyborøn were available for 1993 and subsequent years.

In 1991 293 questionnaires were returned by the vessel owners, which means that about 70% of the vessels in these three ports are involved in the previously mentioned costs and earnings studies. Detailed data of 116 vessels from Thyborøn became available regarding the year 1993.

The French study is based on profit and loss accounts and balance sheets which are collected directly from the trawler firms. This sample is representative for the French industrial stern trawler fleet. In 1991 this fleet consisted of 114 vessels and financial data of 60 of these vessels (53%) are included in the sample. This fleet has been reduced to 97 vessels by the end of 1993. The sample for that year includes 48 vessels. The data collection has been completed by information from other participants in the industrial fishing sector like insurance companies (to estimate the insured value of the vessels), suppliers of vessels and engines (to estimate replacement values) and management of Affaires Maritimes for more general information.

For the Dutch part of the study costs and earnings data have been collected by the Fisheries Division of the Dutch Agricultural Economics Research Institute (LEI-DLO). The method of data collection consisted of visiting the fishermen or their accountants and extracting the data from the accounts of the participating fishing enterprises. The 1991 sample for this study contains 114 vessels, representing the Dutch cutter fleet which totalled 491 vessels at the end of 1991 (23% represented). The beam trawler section is the main component of this fleet, accounting for some 85 % of the landings value. The representation was higher for 1993, since the number of sample vessels remained the same (115), representing less (426) vessels.

The UK financial statistics are based on annual survey data collected by Scottish Office (SOAFD) and Seafish. These are voluntary surveys, the response to which may vary from one year to the next, and do not reflect e.g. random stratified sampling procedures. Previous experience has however confirmed that this type of survey data is generally indicative of the situation in the industry as a whole.

The Scottish sample consists of three sectors: demersal trawlers, demersal seiners and nephrops trawlers. The sample of the 1991 survey (78 vessels) represents some 820 vessels (9.5%). The Scottish trawler and seiner fleets normally account for over 90% of the total value of landings of demersal species in Scot-

land. The nephrops trawler fleet similarly accounts for upwards of 50% of the value of total landings of shellfish. The 1993 sample includes 86 vessels, representing some 900 vessels (Scottish trawlers and seiners and nephrop trawlers).

The English survey is limited in this case to a sample of 19 vessels from the beam trawler fleets (1991-1993). This represents some 10% of the beam trawler sector in England/Wales, which normally accounts for some 25% of all landings of demersal species (in England & Wales) and also lands elsewhere in EU.

Average profit and return on capital per vessel shown in chapters 5 and 7 have been calculated on the basis of estimated real economic costs of production. The main difference with conventional fiscal profits is a cost amount for (imputed) wage of the skipper-owner and a depreciation based upon the replacement value in the economic calculations. Thus, this 'economic' profit is much lower than the fiscal one. The 'economic' net profit can be considered as a reward for entrepreneurship. It should be added however that fishing enterprises, like agricultural holdings, are family enterprises so that 'normal' economic criteria for profit levels cannot be applied blindly to this kind of enterprises.

When the interest amount is added to the net profit an amount appears that expresses the reward for the capital invested in the vessel.

Chapter 5 contains average costs and earnings figures for fishing vessels in Denmark, France, the Netherlands and the United Kingdom presented in uniform tables. All amounts are presented in ecu so that the level of costs and earnings can be compared between the four countries.

Some items in these uniform tables are explained hereafter.

Labour, share, wages

Costs of all labour is included. For the skipper-owner an imputed amount is calculated in cases (mostly) a salary is not paid to him. This imputed amount equals the share of a crew member.

Common depreciation system

Depreciation allowances are often a major component of a fishing vessel's financial accounts. Different systems may lead to big differences in net results per vessels. Therefore uniformity in this respect is very important to get comparable returns per vessel in the four countries involved in this project. Part of the previously mentioned FAR costs and earnings study has been the development of a uniform system of depreciation. The basis of this system is the replacement value of the vessel, this value is equal to the current building costs of a similar new vessel.

The hull of the vessel is depreciated in 25 years, 4% per year (straight-line) on the basis of the replacement cost and after this period 2% of the replacement value is depreciated as an estimate for improvements on these older vessels.

Engines with heavy use are depreciated in ten years, 10% per year and 4% after this period. In cases of more light use the depreciation period is 15 years, 6.7% per year and 2.5% after this period; all percentages based upon the replacement cost.

Interest

Interest costs per vessel will differ widely in practice due to differences in the level of loans. To eliminate these differences an imputed interest has been calculated for all vessels. This imputed interest reflects the opportunity costs of the capital invested in the vessel and is hence independent of the way the vessel is financed. This makes it possible to assess relative performance on the basis of fishing activity as such.

The basis for the calculation of the imputed interest is the (nominal) book value of the vessel, which is derived from the previously mentioned replacement value and the depreciation system described above.

The real interest rate has been calculated as the difference between the rate for Government Bonds and the inflation rate in each country.

Gross cash flow

This is the residual balance after the deduction of all operating expenditures from gross earnings. This indicator shows the amount available for interest payments and repayments of loans.

Return on capital

This is the key-indicator used in this report. It is represented by a percentage, resulting from the formula:

$$\frac{\textit{net profit + imputed interest}}{\textit{insured value of the vessel}} * 100$$

It should be kept in mind that the value of available fishing rights is not included in this return on capital figure. This concerns mainly Dutch and UK fishing vessels, owning more or less individualised fishing rights (individual transferable quota, licences). The value of these rights is not included in the insured value of the vessel so that this measure of the capital value might be a low estimate in relevant cases. No costs of fishing rights (such as depreciation and interest) are included in the total annual costs of the vessels.

4. PROCEDURE

This return on capital project is coordinated by LEI-DLO. The contract between the Commission of the European Union and LEI-DLO was signed on December 10, 1993. ENSAR, Rennes, participates in this project but has agreed a separate contract with the Commission. The workprograms of both contracts contain the same methodology for this project.

The methodology, developed in the FAR costs and earnings project (MA 2.589), has been used for calculating the return on capital.

The coordinator has made proposals for the different parts of the work, during the three years period of this project, on the basis of the workprograms.

The costs and earnings figures of the four participating countries and the contents of the interim reports have been harmonized during meetings in Rennes (1994), Portsmouth and Edinburgh (1995) and the Hague (1996).

LEI-DLO has composed the interim reports and the final report from the four country contributions.

5. EARNINGS AND NET PROFIT PER VESSEL, IN DENMARK, FRANCE, THE NETHERLANDS AND THE UNITED KINGDOM IN THE PERIOD 1991-1996

5.1 Sample of the fleets in 1993

5.1.1 Sample of the Danish fleet

The Danish cost and earnings sample for 1993 is based on the local study undertaken by the Fishery Association in the port of Thyborøn. In 1992 there has also been access to studies undertaken by the Fishery Associations in the ports of Hirthals and Skagen. But unfortunately there is not undertaken any costs and earnings studies for these ports in the period 1993-95. However, when focusing on Thyborøn, we have a reasonable representation of the vessels operating in Denmark. In particular it has to noted that there is high representation in the groups of Danish Seiners of more than 30 GRT and the group of large trawlers larger than 200 GRT.

Table 5.1 Danish sample in 1993, containing the port of Thyborøn

Size group	Total number a)	Number in sample b)	Represented %
Trawler 0-50 GRT	19	4	21
Trawler 50-120 GRT	13	10	77
Trawler 120-200 GRT	25	17	68
Trawler >200 GRT	19	17	89
Danish Seine <30 GRT	9	9	100
Danish Seine >30 GRT	68	49	72
Gill net	118	10	8

a) Number of vessels in the district of Lemvig based on the Danish Ministry of Fisheries;
b) Number of answered questionnaires in the costs and earnings study.

5.1.2 Sample of the French fleet

The French fishing fleet is usually divided into categories based on several criteria whereby mainly used is the length of the vessel. Generally, the coastal fleet concerns the vessels less than 16 metres and the high seas fleet the other ones. The coastal fleet represents the main part of the French fleet (90% of the total number of vessels and 60% of the total number of kilowatts).

As in 1992 and 1991, the French investigation in this study concerns just a part of the total fleet which is called the 'industrial' fleet. The industrial ves-

sels are generally up than 24 metres and are representing nearly 35% of the total quantities of fresh fish landed in France in 1993. The main characteristic of this fleet is that the vessels are owned by fishing companies and not by individual fishermen. Those 'industrial' vessels are all trawlers and they are fishing demersal species in fishing areas regulated by the EU.

The availability of some individual vessel accounts provided by those companies have enabled an investigation of the evolution of the performance of this fishing sector and the determining factors of such an evolution. As the target species differ with the length of the vessel and the registered harbor, those criteria have been maintained to categorize the industrial fleet in this study.

Table 5.2 Sample of French (semi) industrial fleet in 1993

Harbors	Total number	Number in sample	Represented %
Boulogne	13	0	
Dieppe Fecamp	2	0	
Lorient	14	8	57
La Rochelle	5	0	
Concarneau	33	25	76
Etel (Lorient)	10	8	80
Le Guilvinec	20	7	35
Total	97	48	49

Source: Comptes GERMES: Etat de la flotte, ed. by UAPF.

In March 1991, the French government implemented a decommissioning plan (called 'the Mellick Plan') to incite the vessels to leave the fleet and then achieve the objectives fixed by the POP. This Plan concerned the entire French fleet and have been useful for the industrial feet. The diminution of the number of the vessel due to the Mellick Plan is effective in 1993. Thirteen vessels left the industrial fleet in one year and this fact concerns all the length categories except the 24 metres. Globally, it is consistent with the diminishing trend of economic results registered by the industrial fleet in France since 1990. The greatest diminution is observed in the category of 33 metres of Etel (more than 50%) which have registered the worse economics results for many years. The representativity of the sample is nearly the same as 1992.

5.1.3 Sample of the Dutch fleet

The fishing activity of the Dutch cutter fleet is almost completely concentrated on the North Sea.

In het Dutch sample the vessels are classified into groups according to their power and the type of fisheries and therefore with the structure of the company.

Four type of vessels can be distinguished:

- smaller vessels up to 190 kW. Almost all of them are specialized on shrimp fisheries. Their fishing area is the Wadden Sea but also the shallow coastal waters along the Dutch and Danish coast (depending on the season);
- the smaller vessels with engines between 191 and 220 kW. Most of these ships practise several types of fisheries during the year e.g. shrimp (autumn and winter), flatfish (spring) and cod (summer);
- medium (-size) vessels (295-440 kW) targeting cod and whiting or beam trawling on demersal species like sole and plaice;
- big vessels above 810 kW. Almost all of these ships are specialized in beam trawling on flatfish.

Table 5.3 Sample of the Dutch fleet in 1993

Region and size group (in kW)	Total number	Number in sample	Represented %
Region North			
110 - 150	43	4	9
151 - 190	47	12	26
191 - 220	75	16	21
295 - 440	17	10	59
810 - 1,100	28	8	29
1,101 - 1,470	61	14	23
>1,470	48	15	31
Region South			
191 - 220	49	15	31
810 - 1,100	9	6	67
1,101 - 1,470	23	5	22
>1,470	26	10	38

Source: Ministry of Agriculture, Nature Management and Fisheries; LEI-DLO.

The sample is divided in two regions: 'North' are ships with their home port north of Scheveningen, 'South' refers to the opposite.

There is no specific regional specialization in the Netherlands, except for the smaller shrimp vessels which are concentrated in the region North.

5.1.4 Sample of the UK fleet

The figures relating to 1993 are based on annual surveys as in 1990-92. In the case of the Scottish vessels, however, the samples reflect a new system of data collection based on returns made available by The Fishsalesmen's Association (Scotland) Ltd. (FAS) in relation to vessels under their members' management.

In general this has altered the balances of the samples (e.g. the demersal trawl sector is more strongly represented than before). It should also be noted that the operations of the FAS's membership are very largely confined to vessels based on the North East mainland of Scotland. This is of course the main centre of the Scottish demersal fleet; but there are important centres elsewhere (notably in the Shetland Isles) which are not represented.

In line with the above, the figures derived from these samples are generally unlikely to provide more than a broad indication of out-turns in relation to the relevant sectoral populations. It should also be noted that the changes in the balances of the Scottish samples imply that comparisons as between out-turns for 1993 and earlier years are liable to be misleading (especially in relation to apparent marginal changes/trends).

The Scottish samples cover the same three sectors as in the 1990 and 1992 surveys; i.e. demersal trawlers, demersal seiners and nephrops trawlers.

Table 5.4 Scottish sample in 1993

Sector	Total number	Number in sample	Represented %
Demersal Trawlers	376	42	11
Demersal Seiners	191	26	14
Nephrops Trawlers	335	18	5

Note: The population figures exclude vessels under 20 GRT for demersal trawlers and seiners; and under 10 GRT for nephrops trawlers.

The sample in the case of demersal trawlers is larger than before (23 in 1992) and now represents 11% (7%) of the population. The nephrop trawlers are unchanged (in terms of vessel numbers) relative to 1992; but there are fewer demersal seiners.

The English survey is limited in this case to a sample of 19 vessels from the beam trawler fleet. This is in effect a sub-sector representing vessels mainly fishing in the North Sea the out-turns of which are unlikely to correspond to those relating to other sub-sectors e.g. in the South West of England.

5.2 Earnings and Net Profit per vessel in 1991, 1992 and 1993 in Denmark, France, the Netherlands and the United Kingdom

5.2.1 Danish vessels of Thyborøn

The development in the economic performance of the operating vessels from 1992 to 1993 has been dominated by decreases in the earnings of sandeel and plaice. The drop in the sandeel landings has affected the trawlers larger than 50 GRT, whereas the plaice fisheries has had the consequence of reducing the earnings for the Danish seiners.

When looking at the separate vessels categories, it can be noted that the Danish seiners have been able to reduce the operating costs. This development is in line with the decrease in the fishing activity in the plaice fishery. On the other hand it has to be noted that the seiners have not been able to reduce the operating costs at the same rate as the drop in the earnings. As a consequence the net profits have developed negatively for Danish seiners between 1992 and 1993.

Looking at the gill netters, which are depending on the cod fish, the year 1993 gave a decrease in this fisheries. However, it is important to note that the netters have been able to reduce the costs of salary, gear and maintenance in general. This means that between 1992 and 1993 the gill netters have been able to reduce their operating costs with 21%, and thereby increasing the net profit in 1993.

There are operating only a few trawlers smaller than 50 GRT in the port of Thyborøn. This category of small trawlers is the only group of vessels that have increased their average earnings between 1992 and 1993. These small trawlers have been able to keep the operating cost constant between 1992 and 1993 so that the increase in earnings has completely resulted in an increase in the net profit of the operating vessels.

The earnings of the small trawlers between 50 and 120 GRT have been stabilized in the years 1992 and 1993. There has been a decrease in the landings of sandeel, but the small trawlers have been able to compensate the decrease in the reduction fisheries by an increase in the earnings of plaice and cod. Moreover, it has to be noted that the small trawlers have been able to reduce the operating costs with approximately 2%. The final result for the small trawlers between 50 and 120 GRT is that they have improved the net profit between 1992 and 1993.

In 1992 and 1993 economic performance of the medium size (120-200 GRT) and large trawlers (> 200 GRT) has been affected by a decrease in the reduction fisheries. The sandeel is the most important catch for these trawlers, and in 1993 the catch value of the sandeel was reduced by respectively 44% for the large trawlers and 27% for the medium size trawlers. The medium and large trawlers have been able to reduce the operating costs as a consequence of the recession in the sandeel fisheries. However, it has not been possible for the trawlers to neutralise the decrease in the earnings. As a consequence both the gross cash flow and the net profit was reduced in 1993.

Table 5.5 Average costs and earnings per vessel in Denmark in 1993, port of Thyborøn, district of Lemvig (ecu)

Size group	Trawler 50-120	Trawler 120-200	Trawler >200
Number	10	17	17
kW a)	305,6	544,9	829,2
GRT a)	75,1	159,7	310,3
M	*	*	*
Days-at-sea	*	*	*
Earnings			
Reduction	99,500	388,750	607,625
Consumption	148,125	145,000	289,250
Total earnings	247,625	533,750	896,875
Running costs			
Fuel and lube oil	27,125	78,625	135,250
Costs of selling fish	27,125	67,625	109,250
Other running costs	*	*	*
Total running costs	55,500	146,250	244,500
Labour, social insurance	94,125	161,500	256,750
Vessel costs			
Repairs, hire, maintenance	20,750	59,375	87,875
Other vessels and general costs	39,125	85,000	151,125
Total vessels costs	59,875	452,125	740,250
Total costs/expenses	209,500	452,125	740,250
Gross cash flow	38,125	81,625	156,625
Depreciation b)	25,973	84,800	156,967
Interest c)	2,179	13,689	20,621
Net profit or loss (-)	9,973	-16,865	-20,963
Special earnings d)	6,875	10,625	8,875
Net profit or loss (-) after spec. earnings	16,848	-6,240	-12,088

*) Information not available; a) KW, GRT are not available but based on average figures of the Ministry; b) Imputed see appendix 1; c) Imputed see appendix 1; d) Special earnings: capital gains, interest income etc.
Note: Exchange rate DKK/ecu is assumed fixed 8 DKK per Ecu in 1990-1993.
Source: Fishery Association in Thyborøn.

Table 5.6 Average costs and earnings per vessel in Denmark in 1993, port of Thyborøn,district of Lemvig (ecu)

Size group	Gill net 0-30 GRT	Danish Seine >30 GRT	Danish Seine 0-50 GRT	Trawler
Number	10	9	49	4
kW a)	99,6	100,2	161,5	175,1
GRT a)	16,2	24,7	42	20,8
M	*	*	*	*
Days-at-sea	*	*	*	*
Earnings				
Reduction	0,000	0,000	0,000	7,875
Consumption	151,250	120,000	186,375	162,500
Total earnings	151,250	120,000	186,375	170,375
Running costs				
Fuel and lube oil	5,250	5,000	9,750	13,625
Costs of selling fish	17,750	16,125	22,625	20,750
Other running costs	*	*	*	*
Total running costs	23,000	21,125	32,375	34,375
Labour, social insurance	61,125	53,375	81,375	68,875
Vessels costs				
Repairs, hire, maintenance	10,875	12,125	18,875	17,500
Other vessels and general costs	31,625	16,375	27,375	24,500
Total vessels costs	42,500	28,500	46,250	42,000
Total costs/expenses	126,625	103,000	160,000	145,250
Gross cash flow	24,625	17,000	26,375	25,125
Depreciation b)	6,318	8,458	14,178	11,153
Interest c)	1,361	1,374	1,950	1,354
Net profit or loss (-)	16,946	7,168	10,247	12,618
Special earnings d)	2,250	4,250	5,500	3,125
Net profit of loss (-) after spec. earnings	19,196	10,772	15,747	15,743

*) Information not available; a) kW, GRT are not available but based on average figures of the Ministry; b) Imputed see appendix 1; c) Imputed see appendix 1; d) Special earnings: capital gains, interest income etc.
Note: Exchange rate DKK/ecu is assumed fixed 8 DKK per ecu in 1990-1993.

Table 5.7 Average returns per vessel in Denmark in 1991, 1992 and 1993, port of Thyborøn, district of Lemvig (ecu)

Return by vessel group	1991	1992	1993
Trawler 0-50 GRT			
Total earnings	285,500	157,375	170,375
Gross cash flow	36,000	13,375	25,125
Net profit (or loss) a)	20,990	-851	12,618
Trawler 50-120 GRT			
Total earnings	325,500	250,750	247,625
Gross cash flow	41,250	34,500	38,125
Net profit (or loss a)	-8,097	2,071	9,973
Trawler 120-200 GRT			
Total earnings	634,375	601,375	337,505
Gross cash flow	121,500	102,375	81,625
Net profit (or loss a)	11,409	-13,887	-16,865
Trawler >200 GRT			
Total earnings	1,149,625	1,117,000	896,875
Gross cash flow	243,750	246,375	156,625
Net profit (or loss a)	36,263	42,247	-20,963
Danish seine 0-30 GRT			
Total earnings	152,000	145,750	120,000
Gross cash flow	26,625	26,625	17,000
Net profit (or loss a)	16,590	16,682	7,168
Danish seine >30 GRT			
Total earnings	213,625	208,375	186,375
Gross cash flow	34,125	34,250	26,375
Net profit (or loss a)	17,443	16,930	10,247
Gill netters			
Total earnings	213,125	176,625	151,250
Gross cash flow	22,125	21,625	24,625
Net profit (or loss a)	13,290	12,404	19,946

a) Gross cash flow minus imputed amounts for depreciation and interest.
Note: The net profit is exclusive special earnings and is calculated according to the common method of depreciation and interest imputation.

5.2.2 French vessels of 24 metres and over

Table 5.8 Average costs and earnings per vessel, 1993 (ecu)

	Le Guilvinec	Concarneau	Lorient	Lorient
Metres	24	34	33	55
kW	442	619	610	2139
GRT	100	233	234	645
Age	9	10	22	19
Days-at-sea	258	261	240	278
(Days fishing)	192	183	194	176
Total earnings	536,308	892,447	862,387	2,181,250
Running costs				
Fuel and lube oil	75,803	137,311	124,849	285,404
Costs of selling fish	48,338	110,423	52,379	138,746
Other running costs	9,621	54,230	27,020	16,635
Total Running costs	133,762	301,964	204,248	440,785
Labour, Social insurance	234,151	366,616	370,600	753,134
Vessel costs				
Repairs, hire, maintenance	60,112	168,731	175,604	433,705
Vessel insurance	16,005	31,873	31,873	71,526
Other vessels and general costs	40,743	69,940	213,331	496,771
Total vessel costs	116,860	270,544	420,808	1,002,002
Total costs/expenses	484,773	939,124	995,657	2,195,921
Gross cash flow	51,535	-46,677	-133,270	-14,671
Depreciation	56,237	123,381	108,969	348,810
Interest	41,994	88,205	25,736	99,830
Net profit or loss (-)	-46,696	-258,264	-267,976	-463,312

Source: Individual vessel cost and earning accounts.

Earnings differ with the size of the vessel but also with the target species. In Lorient, the industrial fleet concentrates its activity on 'abundant' species, while in Concarneau and Guilvinec, 'noble' species (in terms of market value) are more searched for. If in 1993, the earnings of Concarneau's 34 metres and Lorient's 33 metres are almost the same, it does not allow to conclude a similarity of strategies (in terms of target species).

Economic results are influenced by the fishing strategies of vessels but also by their characteristics. The differences of travel days between the Lorient's 33 m. average vessel and the Concarneau's one is mainly due to the generalization of the new landing sites (near fishing areas) utilization for the Lorient's fleet, while this option is only occasionally used by the Concarneau's vessels in 1993. However, the fuel and lube oil costs do not differ so largely. This is not the case for costs of selling fish which are almost twice as high for Concarneau's vessel than Lorient's one. With the new landing sites, the fish is now landed by the crew. This allows to reduce the costs of selling fish which were mainly composed by costs for the landings.

The age of vessel may also play an determining role. The port of Lorient concentrates older vessels than Concarneau and Guilvinec and this is may be the explanation of the high level of vessel costs for the first ones.

In terms of gross cash flows and net returns, Guilvinec's vessels are comparatively more profitable. However, Lorient's 55 m. average vessel registered better gross cash flow than the 30 m. vessels, so that the variable costs are not proportional to the size of the vessel. Based on our calculation of theoretical depreciation and interest costs, the net results of Lorient are the worst and show that the viability of this kind of vessel is largely endangered due to the importance of the costs of capital.

Table 5.9 Average returns per vessel in 1991, 1992 and 1993 (ecu)

Return by vessel group	1991	1992	1993
Trawler (24 m., 442 kW, 100 GRT, port of Guilvinec)			
Total earnings	581,578	575,131	536,308
Gross cash flow	86,411	73,093	51,535
Net profit (or loss) a)	-21,970	-36,824	-46,696
Trawler (34 m., 630 kW, 229 GRT, port of Concarneau)			
Total earnings	963,558	968,063	892,447
Gross cash flow	14,903	-6,578	-46,677
Net profit (or loss) a)	-194,197	-224,040	-258,264
Trawler (33 m., 631 kW, 248 GRT, port of Lorient)			
Total earnings	910,667	807,256	862,387
Gross cash flow	-73,266	-125,650	-133,270
Net profit (or loss) a)	-212,866	-281,269	-267,976
Trawler (55 m., 2165 kW, 649 GRT, port of Lorient)			
Total earnings	1,996,397	2,243,774	2,181,250
Gross cash flow	-64,785	-153,491	-14,671
Net profit (or loss) a)	-545,867	-634,055	-463,312

a) Gross Cash Flow minus imputed amounts for depreciation and interest (see appendix 2).

None of the categories of vessels are able to cover their depreciation and interest costs in 1993. While the 24 metres of Guilvinec were able to cover its depreciation cost in 1991 and 1992, the cash flow registered by this average vessel is not sufficient in 1993. However, if the renewal of the industrial fleet has really been difficult for several years, two trends can be seen between 1991 and 1993. An increasing trend in economic results for the 33 metres and 55 metres of Lorient and a decreasing one for the 34 metres of Concarneau and the 24 metres of Guilvinec.

Earnings

The comparison between the evolution of earnings of the vessels of the same category of length from ports of Concarneau and Lorient appears very interesting. It seems that in 1993, the difference in the earnings between those two categories of vessels have been reduced strongly. While the quantity landed by Concarneau's average vessel has been increased between 1992 and 1993 (+11%), the decrease in all the species price has strongly affected this diversified fleet. However, Lorient's 33 m. average vessel concentrates its catches on whiting (55% of total catches in quantity) and cod (23%).

The specialization of this fleet on two species may lead it to develop new kind of market relationships in the form of selling contracts with the processing industry or distributors which search for stability of the supply. This kind of market contracts allows them to reduce the risk due to the variability of the market prices and is more and more usual in the industrial fishing sector now. So that the fishing strategy of industrial vessels reflects more and more the evolution implemented backwards in the fishing sector. The availability of the fish (in terms of abundance in the fishing areas) becomes then the main problem.

The relative scarcity of the marine resource seems to have affected the 24 metres of Guilvinec, which have registered a great diminution of their earnings. It seems that the decreasing prices of their target species could not have been compensated by a sufficient increase of catches.

The 55 metres of Lorient have faced a decrease in the price of saithe one of its target species of 29% between 1992 and 1993. The low prices seem not to have been fully compensated by the augmentation of quantity landed (+19%).

Gross cash flows and Net value Added

The evolution of the gross cash flows is linked with the net value added 1) one, because of the remuneration system which is globally based on the economic results (net earnings for the biggest vessels and net earnings minus running costs for the others, see appendix 2). For the first time since the beginning of the study, the 55 metres of Lorient are almost able to cover their 'variable' costs. This is due to a great reduction in the running costs which represent 20% of the total earnings in 1993 while it represented 33% in 1991. The imple-

---

1) Net value added: total of profit, interest and wages.

mentation of new landing sites near fishing areas have lead to a reduction of fuel and landing costs.

The same remark can be made for the 33 metres of Lorient but there, the diminution of the proportion of running costs in earnings have been compensated by an increase in vessel costs as can be seen in the following table.

Table 5.10 Running costs/earnings and vessel costs/earnings

Lorient - 33 metres	Running costs/earnings (%)	Vessel costs/earnings (%)
1991	44	28
1993	24	49

The evolution of gross cash flow for the Concarneau and Guilvinec fleets are globally linked with the evolution of their earnings. The costs structure of those vessels is not really changed during the period (1991-1993). The decreasing trend of prices coupled with a relative scarcity of the marine resource in the fishing areas are then the major determining factors.

Net Profit

All the net profits are negative and largely negative so that the renewal of the industrial fleet in the future is doubtful. The gross cash flow registered by all the categories of vessels is not sufficient to insure the renewal of the industrial fleet because of the importance of capital costs (long term costs) in this sector, and particularly for the big trawlers. So the decrease of the real interest rates during our investigation period (see appendix 2) would not have any effect, faced to the poor perspectives of profitability of the activities.

However, the innovations implemented by the fishing companies during the crisis have lead to the reduction of some kind of costs, which is a good perspective for the future. For the moment, those investments (material or immaterial) permit to maintain some attractiveness of the fishing activity for the crew because they are mainly concentrated on the reduction of running costs which has influenced the crew wages positively.

It seems that the decreasing trend of the fish prices, which has affected all the European fleet in the beginning of 1990s, is the main cause of the deterioration of the vessels' economic results. The French fishing fleet has faced a strong crisis and the decreasing trend of economic results between 1990 and 1993 has affected the entire French fleet. The decreasing trend of the fish prices is keeping on now, while the economic results of the French industrial fleet seems to be globally better these recent years.

Table 5.11 Average fish (per kg) price in France (ecu)

	1990	1991	1992	1993	1994	1990-94
Cod	2.28	2.53	2.24	2.02	1.86	-18%
Saithe	0.90	1.05	1.00	0.70	0.75	-16%
Whiting	1.29	1.35	1.19	1.03	0.89	-31%
Hake	3.93	4.13	4.24	4.04	3.05	-22%
Rat-tail	-	1.07	1.01	0.96	0.97	-9%
Anglerfish	3.92	4.49	4.63	4.01	3.62	-8%
Rough fish	-	1.97	2.57	2.78	2.80	42%

Source: 'Rapports sur la production de l'industrie des pêches maritimes' ed. annually by the Comité Central des Pêches Maritimes.

5.2.3 The Dutch cutter fleet

The Dutch cutter fleet showed stable gross earnings in 1993 measurement in ecu. However, in natural guilders, gross earnings were 6% lower than in 1992 and net profits dropped sharply 1). Earnings decreased mainly because of a drop in prices for most of the species but probably also due to a decrease of the landings.

Running costs increased by 3% due to an increase of the number of days-at-sea. Labour costs went down 9% because of lower earnings.

Decreasing earnings were reported for four of the ten size-groups involved in the study. Especially the size-group 810-1,000 kW showed a considerable decrease (north -/-9%, south -/-20%). Four size-groups showed a very small increase of the earnings with only 1 or 2%. Only two-size groups managed to increase their earnings significantly (south 191-220 kW and South >1470 kW) probably because of a further concentration of fishing rights to these vessels.

Net profits decreased in 1993 for eight of the ten vessel groups. Only the small and the big vessels from the south managed to increase their profits.

For the smaller sized vessel groups (<220 kW) the total earnings were more or less stable. Only the group South 191-220 kW showed a significant increase in earnings. For all the groups the running costs increased while the vessel costs increased for the three north groups. As a result the total costs/expenses increased for all the four groups of small vessels. Gross cash flow was lower for the North Sea cutters. For the smaller vessels from the south the increase in earnings outperformed the increase of the costs/expenses so that the gross cash flow also improved. The sum of depreciation and interest increased for the North groups but decreased slightly for the smaller vessel from the South.

1) This different development was caused by the change in exchange rate of the ecu between 1992 and 1993: 1991 and 1992 ecu = NLG 2.31, 1993, 2.17.

Table 5.12 Average costs and earnings per vessel in the Netherlands in 1993 (ecu)

Size group	Region North			South
kW	110-150	151-190	191-220	191-220
GRT	30-60	30-60	50-70	40-80
M	16-20	16-21	20-24	18-24
Days-at-sea	108	137	154	154
Total earnings	95,769	154,414	351,504	360,000
Running costs				
Fuel and lube oil	7,301	11,739	35,294	38,388
Costs of selling fish	6,120	10,770	23,391	23,022
Other running costs	7,805	9,420	11,538	11,073
Total running costs	21,226	31,929	70,223	72,483
Labour, social insurance	36,083	62,748	124,685	118,331
Vessel costs				
Repairs, hire, maintenance	18,647	24,915	61,603	55,860
Vessel insurance	3,111	5,282	13,242	15,135
Other vessel and general costs	6,489	7,504	22,087	25,782
Total vessel costs	28,247	37,701	96,932	96,777
Total costs/expenses	85,556	132,378	291,840	287,591
Gross cash flow	10,213	22,036	59,664	72,409
Depreciation	13,517	25,344	35,623	42,620
Interest	1,492	6,757	12,717	17,127
Net profit or loss (-)	-4,796	-10,065	11,324	12,662

Source: Fishery Accounting Data Network of LEI-DLO.

Net profit decreased for the Northern vessels but improved for the vessels from the South. The two smallest size groups from the North showed an average negative net profit in 1993.

All the vessels of size-group 191-220 spent more days-at-sea.

Table 5.13 Average costs and earnings per vessel in the Netherlands in 1993 (ecu)

Size group	Region North		South
kW	295-440	810-1,100	810-1,100
GRT	80-135	190-270	170-270
M	23-29	30-38	30-35
Days-at-sea	161	195	157
Total earnings	356,089	853,674	750,422
Running costs			
Fuel and lube oil	34,093	169,978	119,233
Costs of selling fish	28,225	56,871	41,260
Other running costs	14,521	18,808	14,052
Total running costs	76,839	245,657	174,545
Labour, social insurance	129,650	232,620	227,854
Vessel costs			
Repairs, hire, maintenance	65,321	131,909	114,831
Vessel insurance	17,043	34,677	37,518
Other vessel and general costs	19,538	45,530	43,883
Total vessel costs	101,902	212,116	196,232
Total costs/expenses	308,391	690,393	598,631
Gross cash flow	47,698	163,281	151,791
Depreciation	41,417	119,141	97,040
Interest	7,969	16,724	14,473
Net profit or loss (-)	-1,688	27,416	40,278

Source: Fishery Accounting Data Network of LEI-DLO.

Total earnings increased slightly for the medium-sized vessels (295-440 kW). The increase of the total costs/expenses, however, exceeded the increase of the earnings. As a result gross cash flow dropped with 12%.

Total earnings decreased for the other two groups of medium sized (810-1,100 kW) vessels, both North and South. This decrease was sharper (-/- 20%) for the vessels from the South than for the Northern vessels (-/- 6%). Costs were higher for the northern cutters but lower for the Southern cutters. Net profits dropped sharply for all vessel groups. The net profit of the size group 295-440 kW turned out to be negative in 1993. The vessels of region North spent more days-at-sea, the vessels from region South less.

Table 5.14 Average costs and earnings per vessel in the Netherlands in 1993 (ecu)

Size group	Region North		South
kW	1,101-1,470	>1,470	>1470
GRT	270-390	290-430	260-380
M	35-42	36-43	35-41
Days-at-sea	196	207	178
Total earnings	1,112,037	1,424,935	1,512,945
Running costs			
Fuel and lube oil	222,280	304,870	281,686
Costs of selling fish	70,929	89,811	100,370
Other running costs	20,565	20,649	20,957
Total running costs	313,774	415,330	403,013
Labour, social insurance	291,659	361,086	383,963
Vessel costs			
Repairs, hire, maintenance	133,603	197,389	232,889
Vessel insurance	39,579	42,638	48,032
Other vessel and general costs	58,130	51,283	72,883
Total vessel costs	231,312	291,310	353,804
Total costs/expenses	836,745	1,067,726	1,140,780
Gross cash flow	275,292	357,209	372,165
Depreciation	157,545	237,461	221,411
Interest	55,422	58,300	43,868
Net profit or loss (-)	62,325	61,448	106,886

Source: Fishery Accounting Data Network of LEI-DLO.

Total earnings in the large size-groups (>1,100 kW) were stable for the North groups and increased for the South groups (+10%). Total costs were higher than in 1992 mainly due to higher total running costs. Vessel costs remained more stable while costs for labour and social insurance were lower for the North but higher for the South due to the increased earnings. The increase of the running costs was caused by the fact that all the vessels spent more days-at-sea compared to 1992. Net profits remained positive for all size-groups but Northern vessels in the 1,101-1,470 kW group saw their profits more than halved. Large vessels from the South (>1,470 kW) improved their profit significantly with an increase of more than 100%.

Table 5.15 Average returns per vessel in 1991, 1992 and 1993 (ecu) a)

	1991	1992	1993
North 110-150 kW			
Total earnings	112,495	97,169	95,769
Gross cash flow	21,005	15,578	10,213
Net profit (or loss b)	4,486	930	-4,796
North 151-190 kW			
Total earnings	153,500	152,123	154,414
Gross cash flow	22,762	25,845	22,036
Net profit (or loss b)	-2,360	-4,336	-10,065
North 191-220			
Total earnings	391,727	342,329	351,504
Gross cash flow	95,409	70,810	59,664
Net profit (or loss b)	48,046	25,512	11,324
North 295-440			
Total earnings	443,838	352,111	356,089
Gross cash flow	105,457	54,038	47,698
Net profit (or loss b)	53,420	8,983	-1,688
North 810-1,100			
Total earnings	1,057,497	904,529	853,674
Gross cash flow	331,039	231,419	163,281
Net profit (or loss b)	205,120	96,146	27,416
North 1,101-1,470			
Total earnings	1,299,745	1,143,048	1,112,037
Gross cash flow	418,995	315,551	275,292
Net profit (or loss b)	222,757	133,680	62,325
North >1,470			
Total earnings	1,394,650	1,403,651	1,424,935
Gross cash flow	402,847	373,081	357,209
Net profit (or loss b)	95,545	77,661	61,448
South 191-220			
Total earnings	331,552	331,601	360,000
Gross cash flow	65,145	60,241	72,409
Net profit (or loss b)	2,181	-2,792	12,662
South 810-1,100			
Total earnings	994,388	933,054	750,422
Gross cash flow	279,400	251,240	151,791
Net profit (or loss b)	146,837	123,062	40,278
South >1,470			
Total earnings	1.453,511	1,369,826	1,512,945
Gross cash flow	431,549	325,867	372,165
Net profit (or loss b)	154,130	45,683	106,886

a) Exchange rate ecu: 1991 and 1992, NLG 2.31, 1993 NLG 2.17; b) Gross cash flow minus imputed amounts for depreciation and interest.

5.2.4 The United Kingdom, trawlers and seiners

In terms of changes affecting the industry's inputs and outputs, UK fishery experienced mixed conditions in 1993 relative to the previous year. In particular, there were spectacular increases in haddock quotas (North Sea up by 80%; West of Scotland up by 40%) and more modest increases elsewhere (e.g. North Sea plaice up by 10%).

These increases in stock abundances were broadly reflected in the industry's catch rates, which in the case of e.g. the Scottish demersal trawlers improved by some 20% 1). On the other hand, quayside prices continued to weaken in the face of these generally increased availabilities. In the case of haddock for example, average quayside prices were some 15% down on the previous year.

On balance, the net result of these changes was an overall increase of some 10% in aggregate gross earnings by the UK demersal fleet. Gross earnings in the Scottish nephrop fishery were up by 16% relative to the previous year. Prices for the industry's main commodity input (marine gas oil) weakened marginally as the year progressed.

The overall balances of these changes are broadly reflected in out-turns as indicated by the sample surveys, when these are expressed in £ Sterling. As between 1992 and 1993, however, average £ Sterling/ecu exchange rates changed from ecu 1.362 to EC 1.285 and this has had the effect of depressing apparent out-turns (when measured in ecu) below the real levels to the extent that the overall improvement is generally difficult to identify.

The results for this sector indicate a reduction in sample average gross earnings relative to 1992; and hence a continuation of the downward trend since 1991. Much of this is, however, attributable to the change in the value of the ecu; in the absence of which the reduction would have appeared much more marginal (3%).

This result may seem counter-intuitive given the increase in the UK quota for North Sea plaice and the increase in quayside prices for this species. It may, however, be noted that in the event the additional availabilities were not fully fished (total landings were marginally lower than in 1992). The figures have also been affected by changes in the composition of the sample (fewer larger vessels).

At gross cash flow levels, the figures indicate a marginal improvement relative to the very tight position of the previous year. This can generally be attributed to operational efficiencies, the increase in quayside prices referred to above and the effects of lower fuel prices.

The 'net profit' figures remain very negative although they would have indicated a marginal improvement relative to 1992 in the absence of the ecu change.

---

1) As measured by reported landings per hour fished (Source: Scottish Sea Fisheries Statistical Tables, 1994).

Table 5.16 Sample average costs and earnings per vessel in 1993 (ecu)

Size group	English beam trawlers a)		
GRT	160-430	180-225	240-430
kW	820-1,350	820-1,350	900-1,350
Metres	32-39	33-39	32-39
Days-at-sea	208	233	193
Total Earnings	610,760	605,306	613,941
Running Costs			
Fuel & Lube Oil	133,791	133,519	133,949
Costs of Selling Fish	30,289	33,267	28,552
Other Running Costs	25,804	26,575	25,355
Total Running Costs	189,884	193,360	187,856
Labour, Social Insurance	159,166	158,098	159,788
Vessel Costs			
Repairs, Hire, Maintenance	137,331	131,243	140,882
Vessel Insurance	31,559	31,442	31,882
Other Vessel Costs	68,281	60,058	73.078
Total Vessel Costs	237,171	222,742	245,587
Total Costs/Expenses	586,220	574,201	593,231
Gross Cash Flow	24,540	31,106	20,710
Depreciation	110,757	77,575	130,113
Interest	48,768	15,368	68,251
Net Profit or Loss (-)	-134,985	-61,837	-177,654

a) First column contains averages of both subsegment size groups.
Source: Costs and earnings investigation of Sea Fish.

Negative returns 'below the line' on this scale are of course inconsistent with long-run financial viabilities, which require that the value of the capital invested should be fully maintained and rewarded. It may, however, be noted that in the absence of borrowings the relevant allowances for depreciation and interest do not represent a cash flow. Short-run financial viabilities can hence be maintained provided (as in this case) cash flows are sufficient to cover the relevant operating costs.

Table 5.17 English beam trawlers, average returns per vessel: 1991-1993 (ecu)

Size Range	1991	1992	1993
160-430 GRT			
Total Earnings	774.3	699.3	610.8
Gross Cash Flow	57.92	5.1	24.5
Net Profit (or loss a)	-71.3	-128.8	-128.8
180-225 GRT			
Total Earnings	658.9	566.8	605.3
Gross Cash Flow	17.5	13.4	31.1
Net Profit (or loss a)	-68.0	-70.8	-61.8
240-430 GRT			
Total Earnings	841.7	753.1	613.9
Gross Cash Flow	81.4	-1.6	20.7
Net Profit (or loss a)	-83.4	-176.3	-177.7

a) Gross cash flow minus imputed amounts for depreciation and interest.
Note: The size ranges into which the sub-sectors have been divided relate to the 1993 sample. The sub-sectors in earlier years are marginally different.

At sub-sectoral levels the figures indicate a generally better financial out-turn for the smaller vessels. This has subsequently been reflected in a significant measure of restructuring in this sector including the decommissioning of several of the older and larger vessels.

Scottish demersal trawlers

This is the largest sector of the Scottish demersal fleet in terms of vessel numbers (280 vessels over 10m at December 1993) and covers a wide range of vessel sizes (sample range 14/25m; 24-130 GRT) and power (samples range 130-700 kW). The vessels in this sample are mainly based in the North East of Scotland (notably at Peterhead and Fraserburgh) and have a mixed fishery (mostly cod and haddock) in the North Sea and West of Scotland.

Table 5.18 indicates that (allowing for the change in ecu values) the vessels in the 1993 sample achieved out-turn earnings marginally higher than the 1992 sample 1). This is consistent with the out-turn for this sector as a whole, where average earnings increased by 10% (sample increase 5%) 2).

This marginal improvement in earnings may not have been achieved by the larger vessels (as seems suggested by out-turns for the 80-130 GRT sub-sector) though this is uncertain due to changes in the sample mix.

1) As already indicated, the 1992 sample was smaller and included a different mix of vessel sizes.
2) Source: Scottish Office Sea Fisheries Statistical Tables (1994).

Gross cash flows in all sub-sectors were positive, but in no case appear to have approached the levels needed to cover estimated depreciation let alone capital charges as a whole (i.e. imputed interest plus depreciation).

Similar comments apply to these results as in the case of the sample of English beam trawlers; in brief, they are not consistent with long-term financial viability but could in principle support continued operations on a marginal cost basis.

Table 5.18 Sample average costs and earnings per vessel in 1993 (ecu)

Size Group	Scottish demersal trawlers a)			
GRT	24-130	24-41	47-54	81-130
kW	130-700	110-275	170-485	310-700
Metres	14-25	14-19	16-23	23-25
Days-at-Sea	218	177	214	239
Total Earnings	429,878	178,231	371,369	588,348
Running Costs				
Fuel & Lube Oil	46,640	17,477	35,464	69,280
Costs of Selling Fish	34,798	12,495	30,761	48,025
Other Running Costs	38,424	20,240	35,450	48,787
Total Running Costs	119,862	50,213	101,674	166,091
Labour, Social Insurance	132,044	54,243	121,086	174,391
Vessel Costs				
Repairs, Hire, Maintenance	80,413	32,541	67,533	113,448
Vessel Insurance	25,474	12,887	22,949	32,709
Other Vessel Costs	40,229	16,611	27,259	62,028
Total Vessel Costs	146,116	62,039	117,741	208,186
Total Costs/Expenses	398,022	166,495	340,502	548,667
Gross Cash Flow	31,856	11,736	30,867	39,681
Depreciation	54,689	23,648	42,118	78,879
Interest	24,335	7,277	15,349	39,667
Net Profit or Loss (-)	-47,168	-19,190	-26,600	-78,865

a) First column contains averages of the three subsequent size groups.
Source: Cost and earnings investigation of Scottish office and Sea Fish.

Table 5.19 Scottish demersal trawlers, sample average returns per vessel: 1990-1993 (x 1,000 ecu)

Size Range	1991	1992	1993
24-130 GRT			
Total Earnings	385.9	433.2	429.9
Gross Cash Flow	45.3	48.7	31.9
Net Profit	-21.8	-28.9	-47.2
24-41 GRT			
Total Earnings	181.3	173.2	178.8
Gross Cash Flow	22.7	22.7	11.7
Net Profit	-7.0	-6.1	-19.2
47-54 GRT			
Total Earnings	350.0	395.7	371.4
Gross Cash Flow	28.7	40.5	30.9
Net Profit	-26.0	-23.6	-26.6
81-130 GRT			
Total Earnings	562.3	87.6	588.3
Gross Cash Flow	75.5	83.8	39.7
Net Profit	-30.0	-55.6	-78.9

Note: The vessel sub-sectors relate to the 1993 sample. The sizes ranges in the sub-sectors in earlier years are marginally different.

Table 5.20 Scottish demersal seiners sample average returns per vessel: 1990-1993 (x 1,000 ecu)

Size Range	1991	1992	1993
24-125 GRT			
Total Earnings	498.7	432.9	395.5
Gross Cash Flow	66.9	26.3	46.3
Net Profit	-17.7	-64.0	-19.5
24.5-50 GRT			
Total Earnings	321.3	312.5	350.1
Gross Cash Flow	35.4	12.5	-39.4
Net Profit	-14.9	-35.6	-105.8
50-75.5 GRT			
Total Earnings	987.1	457.9	473.0
Gross Cash Flow	79.5	50.3	56.5
Net Profit	-6.3	-39.1	-13.1
76-125 GRT			
Total Earnings	615.0	491.9	491.3
Gross Cash Flow	78.4	23.1	68.7
Net Profit	-34.1	-92.5	-19.0

Note: The size ranges of the sub-sectors reflect the 1993 sample. The size ranges in the sub-sectors in earlier years are marginally different.

The seiners are the second largest tranche of the Scottish demersal fleet in terms of earnings and vessel numbers, a notable trend in recent years being the development of pair-seining (22 vessels in 1993; 62 in 1994). This sector is mainly based in North East Scotland and the Shetland Islands (not represented in the sample) and works a mixed demersal fishery (mainly cod and haddock) in the North Sea.

Average gross earnings per vessel by the 1993 sample amounted to almost ecu 0.4 mln. (ecu 0.425 mln. at 1992 exchange rates). This is in the event close to the corresponding out-turn in the case of the 1992 sample; though as has been noted the two samples are not identical.

The average gross cash flows corresponded to some 11% of earnings at which levels estimated depreciation charges were almost fully covered but not imputed interest in addition.

Table 5.21 Sample average costs and earnings per vessel in 1993 (ecu)

Size Group	Scottish demersal seiners a)			
GRT	24-110	24-50	61-70	78-110
kW	80-640	80-350	170-500	330-640
Metres	14-25	14-22	22-25	22-25
Days-at-sea	194	224	193	218
Total Earnings	395,544	350,079	472,960	491,326
Running Costs				
Fuel & Lube Oil	34,792	30,156	40,523	46,340
Costs of Selling Fish	31,821	26,534	38,670	39,689
Other Running Costs	37,227	44,336	44,900	42,624
Total Running Costs	103,839	101,027	124,093	128,652
Labour, Social Insurance	126,278	112,562	151,352	151,379
Vessel Costs				
Repairs, Hire, Maintenance	60,222	101,918	74,425	66,232
Vessel Insurance	27,920	37,690	31,628	33,746
Other Vessel Costs	30,948	36,236	34,955	42,651
Total Vessel Costs	119,090	175,845	141,008	142,629
Total Costs/Expenses	349,208	389,433	416,453	422,660
Gross Cash Flow	46,336	-39,354	56,508	68,666
Depreciation	49,769	48,614	53,901	61,190
Interest	16,100	17,851	15,665	26,450
Net Profit or Loss (-)	-19,533	-105,819	-13,058	-18,975

a) First column contains averages of the three subsequent size groups.
Source: Cost and earnings investigation of Scottish office and Sea Fish.

This suggests out-turns broadly consistent with long-run financial viabilities; especially having regard to the depressing effects on the averages of the relatively poor performance of the 24-50 GRT sub-sample, which is probably unrepresentative 1).

1) Vessel costs relating to 'Repairs, Hire and Maintenance' in the case of this sub-sample were much higher than the sectoral average, which of course includes the larger vessels. They are also some 50% above the levels for the corresponding sub-sample in 1992.

Table 5.22 Sample average costs and earnings per vessel in 1993 (ecu)

Size Group	Scottish nephrops trawlers a)		
GRT	23-51	23-25	39-51
kW	110-400	130-270	110-400
Metres	15-22	15-17	15-22
Days-at-sea	202	209	190
Total Earnings	233,863	201,023	274,912
Running Costs			
Fuel & Lube Oil	27,939	26,692	29,497
Costs of Selling Fish	18,729	15,888	22,279
Other Running Costs	19,483	17.546	21,905
Total Running Costs	66,151	60,126	73,682
Labour, Social Insurance	66,611	56,592	79,134
Vessel Costs			
Repairs, Hire, Maintenance	32,785	28,628	37,982
Vessel Insurance	17,199	15,884	18,843
Other Vessel Costs	19,367	19,696	18,956
Total Vessel Costs	69,352	64,208	75,781
Total Costs/Expenses	202,113	180,926	228,597
Gross Cash Flow	31,750	20,098	46,315
Depreciation	27,818	22,912	33,950
Interest	8,746	5,679	12,581
Net Profit or Loss (-)	-4,814	-8,493	-215

a) First column contains averages of both subsegment size groups.
Source: Cost and earnings investigation of Scottish office and Sea Fish.

The nephrops trawlers are by far the largest sector of the Scottish shellfishing fleet in terms of vessel numbers (318 vessels in 1993) although the total has fallen sharply in recent years (from 392 in 1990 to 298 in 1994). It also makes a significant contribution to the earnings of the Scottish fishery as a whole (e.g. 12% of total in 1994). The vessels are mainly based on the East and West Coast and in addition to the directed fisheries for nephrops obtain earnings from related bycatches of demersal species.

Table 5.23 Sample average returns per vessel: 1991-1993 (x 1,000 ecu)

Size range	Scottish nephrops trawlers		
	1991	1992	1993
10-50 GRT			
Total Earnings	148.7	194.3	233.9
Gross Cash Flow	16.2	30.8	31.8
Net Profit	-10.7	-5.7	-4.8
10-25 GRT			
Total Earnings	137.9	176.7	201.0
Gross Cash Flow	20.9	23.4	20.1
Net Profit	-1.5	-2.9	-8.5
25-50 GRT			
Total Earnings	159.6	207.1	274.9
Gross Cash Flow	11.5	36.1	46.3
Net Profit	-19.9	-7.8	-0.2

Gross earnings by this sector (including twin/multiple trawls) increased by some 15% in 1993 relative to the previous year and this improvement is reflected in the sample out-turns which indicate average gross earnings up by 20% (27% allowing for the change in ecu values).

Average gross cash flows were relatively strong (13.5% of earnings) and more than fully covered depreciation charges, the residual balance contributing to (imputed) interest. In terms of sub-sectors, the larger vessel group (39-51 GRT) were particularly successful and in this case gross cash flows at 17% of earnings virtually covered all capital charges including interest.

The overall results for this sector indicate relatively strong financial outturns virtually fully consistent with long-run financial viabilities at 1993 levels of costs and prices etcetera.

The year 1993 turned out on balance to be a more favourable year for the industry's economics and can now be seen as marking an end to the generally negative overall trend over the period 1990-1992. In particular, opportunities were expanded by increases in TACs/UK quotas, notably in the case of North Sea haddock as a consequence of which total landings by UK vessels of demersal species increased by over 30,000 tonnes (11%) relative to 1992.

Other favourable trends included significant improvements in catch rates (e.g. up by 20% in the case of demersal trawlers) reflecting the enhancement of stock abundances associated with the increases in TACs. In addition, oil prices remained soft against a generally stable macro-economic environment including low rates of inflation/little change in interest rates.

In the event these favourable trends were to a large extent offset by the continued weakening of quayside prices for most demersal species which in the case of haddock fell by some 15%, no doubt partly as a reflection of the in-

creases in supply. Quayside prices for nephrops were, however, marginally higher, and this is reflected in the relatively more favourable results in the case of the nephrop trawlers.

In line with the above, and with the exception of the demersal trawler sector (as represented by our sample), there were generally marginal improvements in financial out-turns in 1993 and this is reflected in the estimates of ROC. Meanwhile it may be noted that any improvement in quayside prices relative to 1993 levels may be expected (in the absence of unfavourable developments elsewhere) to have a marked impact on gross cash flow.

Table 5.24 UK average quayside prices (ecu/kg) for selected species: 1990-1995

Species	1990	1991	1992	1993	1994	1995
Cod	1.78	1.94	1.83	1.50	1.50	1.25
Haddock	1.69	1.65	1.18	0.94	0.98	0.91
Plaice	1.32	1.72	1.47	1.53	1.58	1.47
Whiting	0.97	0.80	0.75	0.66	0.70	0.66
Saithe	0.67	0.85	0.71	0.58	0.60	0.64
Anglers	3.01	3.47	3.51	3.09	3.09	2.73
Dover Sole	6.64	6.13	6.43	6.54	6.49	6.53
Turbot	8.88	7.89	7.36	6.85	7.28	7.45
Nephrops	2.67	2.79	2.41	2.43	2.67	2.30

Note: £ Stg out-turn (money-of-the-day) prices converted to ecu at the following rates:

Year	*ecu = £ 1.0 Stg*
1990	1,400
1991	1,425
1992	1,362
1993	1,285
1994	1,293
1995	1,220

5.3 Developments of earnings and Net Profit per vessel in the period 1994-1996

5.3.1 Danish vessels of Thyborøn

The development in the economic performance of the Danish vessels in 1994 and 1995 was affected by a growth of the cod and reduction fisheries, whereas there has been a decline in the plaice fisheries. Looking at the earnings in the different vessel categories, it is clear that the Danish seiners have been affected negatively by the development in the plaice fisheries. On the other hand there is a positive tendency for the large trawlers due to development in the cod and reduction fisheries.

When looking at the single vessel categories, it appears that the Danish seiners have been able to compensate the fall in the landings of plaice by an increase in the landings of cod. However, in the general perspective the earnings of the seiners are lower in 1995 compared to 1994. Moreover it is noted that the seiners has been able to reduce the labour costs, but the cost reduction has been too small to prevent a fall in the gross cash flow in 1995.

The economic performance of the gill netters in 1994 and 1995 can be characterised by a stable development. The net profit in 1995 was a little lower than in 1994 and this tendency is caused by a decline in the plaice fisheries in 1995.

When looking at the development of the small trawlers smaller than 50 GRT, it is noted that the earnings have been constant in 1994 and 1995. On the other hand the small trawlers faced an increase of the cost of gear and maintenance in general which has increased the total operating costs with about 6%.

A general tendency for the trawlers larger than 50 GRT is that the reduction fisheries in general is improved in 1995 compared to 1994. The small trawlers in the range between 50 and 120 GRT have 35-40% of their income in the consumption fisheries. In 1995 it is in particular the cod fisheries that increased the earnings for the small trawlers. On the other hand it is important to note that there has been a large increase in the maintenance costs for the small trawlers. In general, the operating cost increased by 22% in 1995. Finally, the imputed depreciation cost for the outcomes of the trawlers in the category (50-120 GRT) is nearly halved from 1994 to 1995. The reason for the fall in depreciation costs is due to fact that the average age of the vessels is increased from 24 years in 1994 to 26 years in 1995.

The trawlers larger than 120 GRT have in 1995 been able to increase their earnings in the reduction fisheries compared to 1994. Moreover, in 1995 the large trawlers were able to maintain their earnings in the consumption fisheries and moreover to keep their operating costs at a low level. In this sense, the increase in the reduction fisheries combined with costs awareness is explaining the positive development for the large trawlers in 1995.

Table 5.25 Danish (average) prices in ecu per kilo for some species (ecu/kg)

Species	1993	1994	1995	% Change 1995/1994
Cod	1.41	1.36	1.18	-13.9
Plaice	1.39	1.45	1.42	-2.2
Sole	6.11	6.14	5.92	-3.6
Herring	0.21	0.21	0.17	-16.2
Shrimps	1.80	2.05	1.95	-4.6
Reduction	0.07	0.07	0.07	1.9

Note: Exchange rate ecu = 8 DKK.
Source: Fiskeriets bruttoindtjening (Danish Ministry of Fisheries).

Table 5.26 Average returns per vessel in Denmark in 1994 and 1995, port of Thyborøn, district of Lemvig (ecu)

Return by vessel group in 1995	1994	1995	% change
Trawler 0-50 GRT			
Total earnings	156,250	156,250	0,0
Gross cash flow	31,500	24,000	-23,8
Net profit	22,064	15,497	-29,8
Trawler 50-120 GRT			
Total earnings	345,250	369,000	6,9
Gross cash flow	66,250	38,500	-41,9
Net profit	18,155	9,973	-45,1
Trawler 120-200 GRT			
Total earnings	666,000	719,125	8,0
Gross cash flow	135,750	156,125	15,0
Net profit	30,621	62,664	104,6
Trawler >200 GRT			
Total earnings	1008,125	1155,125	14,6
Gross cash flow	212,375	255,000	20,1
Net profit	15,803	72,084	356,1
Danish seine 0-30 GRT			
Total earnings	144,625	121,625	-15,9
Gross cash flow	26,500	15,000	-43,4
Net profit	15,699	5,057	-67,8
Danish seine >30 GRT			
Total earnings	232,625	202,375	-13,0
Gross cash flow	39,625	24,625	-37,9
Net profit	21,728	7,898	-63,8
Gill netters			
Total earnings	134,125	129,500	-3,4
Gross cash flow	16,375	13,000	-20,6
Net profit	6,964	4,366	-37,3

Note: The net profit is exclusive special earnings and is calculated according to the common method of depreciation and interest imputation.

There isn't any available information indicating costs and earnings for vessels in 1996. But in order to give an indication of the expected development in 1996, we can give a prediction based on the available fishing quotas for the Danish vessels in 1996. In table 5.27 we have outlined the selection of fishing quotas that have particular importance for the vessels covered in the Costs and Earnings study.

Table 5.27 Total Danish fishing quotas on selected species in EC fishing zone and third country fishing zone 1994-1996

	Cod 1)	Plaice 2)	Sole 3)	Haddock 4)	Hake 5)	Lobster 6)	Sandeel 7)	Sprat 8)
1994	52865	44608	3040	13890	2900	4275	142500	100350
1995	76765	31836	3770	11910	2630	4275	104500	127455
1996	92930	29580	2765	12740	2460	4345	123500	79480

1) ICES 3a+b+c+d, 4,2a + Swedish fishing zone 3D
2) ICES 3A+B+C+D,4,2A
3) ICES 3A+B+C+D,4,2A
4) ICES 3A+B+C+D,4,2A
5) 3A+B+C+D,4,2A
6) ICES 3A+B+C+D,4,2A
7) ICES 4 Norwegian fishing zone
8) ICES 3A,3B,3C,3D,4,2A,7D+E

In 1996 the economic performance of the Danish seiners is expected to be determined by the level of the quota on plaice. It is seen in table 5.27 that the quota on plaice is reduced compared to 1995. The economic performance of the Danish seiners was poor in 1995, and the performance in 1996 is depending critically on the seiners ability to compensate the low quotas of plaice by a increase in the landings of cod.

The economic performance of the gill netters is in general depending on the fact that about 50% of the earnings are based on the cod fisheries. Given that the abundance of cod in the North Sea is increased in 1996 compared to 1995, it is expected that the economic performance of the gill netters will also develop positively in 1996.

When looking at the trawlers, it is expected that the vessels less than 50 GRT will have a increase in the earnings 1996 compared to 1995. The positive expectations for 1996 is based on fact that the cod quota is increasing in 1996.

It is difficult to use the Danish quotas to predict the economic performance of the vessels that have a large share of the earnings in the reduction fisheries, because the reduction fisheries in general is not expected to be restricted by the level of the quotas. Instead the reduction fisheries is expected to be restricted simply by the abundance of reduction species. This means that when we use the fishing quotas to predict the economic performance, we have to be aware that this method is uncertain in particular with respect to the vessels segments targeting fish for reduction. Given this general reservation of using the quotas, we will anyway give a indication of the development in the performance for the large trawlers in 1996.

The trawlers between 50 and 120 GRT generate between 35% and 45% of the earnings in the reduction fisheries. Moreover it has to be noted that cod and plaice are also important for this fleet segment, the revenue shares of cod and plaice is respectively 25% and 15%. In general the impression is that trawl-

ers between 50 and 120 GRT should be able to increase the earnings in 1996 compared to 1995 because of the increase in the cod quota. Moreover trawler between 50 and 120 GRT have had relatively large cost of maintenance in 1995. In 1996 is it expected that it is possible to reduce these costs so that the net profit in 1996 could be increased compared to 1995.

The trawlers in the range between 120 and 200 GRT in general have between 60% to 80% of the earnings in the reduction fisheries. Before 1992 the cod fisheries contributed with about 20% of the earnings for the medium size trawlers (120 to 200 GRT). However, after 1992 there have been rather low cod quotas, and this has caused the revenue share of cod to fall to 5% for the medium size trawlers. Looking at 1996 the cod quota is even higher than in 1991, and this development could eventually increase the earnings of the medium size trawlers.

The economic performance of the trawlers larger than 200 GRT is dominated by the abundance of species for reduction and in this sense it is difficult to predict the economic prospect in 1996. However, it has to be noted that even if the reduction fisheries is decreasing in 1996, the large trawlers are very flexible and are able to change to targeting species for consumption.

5.3.2 French vessels of 24 metres and over

The availability of economic accounts for the years 1994 and 1995 only concerns the 24 metres of Guilvinec and the Concarneau's fleet (in average for the 1994's year). For the other categories, it has not been possible to obtain those data. However, the interviews provided insight into the evolution of the economic results after 1993.

Table 5.28 Average returns per vessel in 1994 and 1995 (ecu)

	1993	1994	1995
Trawler (24 m., 442 kW, 100 GRT, port of Guilvinec)			
Total earnings	563,308	569,677	593,178
Gross cash flow	51,535	79,092	82,355
Net profit (or loss) a)	-46,696	-22,860	-18,226
Trawler (34 m., 630 kW, 229 GRT, port of Concarneau)			
Total earnings	892,447	921,918	.
Gross cash flow	-46,677	14,003	.
Net profit (or loss) a)	-258,264	-203,839	.

a) Gross Cash Flow minus imputed amounts for depreciation and interest.

While the trend for the prices is still decreasing, the two categories distinguished in table 5.28 have registered an improvement of their economic results after 1993. In the case of the Guilvinec's fleet this recovery appears to be linked

with a relative recovery of the abundance of their target species (as they explain it during the interviews). The inversion of the decreasing trend of the quota since 1993 coupled with the diminution of the global capacity of the industrial fleet have reduced the competition for a higher quota. However, based on our calculation of depreciation and interests costs, the level of the net profits is insufficient for investments in new vessels. However, this fact is refuted for the category of 24 metres (Guilvinec) where a new vessel (built in 1995) have integrated the fleet in 1996.

For the two categories of Lorient, there are no economic data available for the two recent years, mainly due to a major restructurationing of this fleet. The biggest fishing company of this port (which owned vessels of 33 metres and 55 metres) was taken over by a big Spanish group in 1994. the same happened to another company (second in terms of vessels owned). This company was taken over by a French group. Those new owners reduced their fleet and started the modernization of the vessels left, so that the activity of the Lorient fleet was strongly reduced during those two years.

However, it has been interesting to evaluate the short term effects on the gross cash flow of this fleet reduction using a simple model. It assumes that the vessels which registered the worst performance left firstly the fleet and that there is no other exogenous change which could affect the profitability of the vessels. Half the vessels in each category are supposed to leave the fleet, which is almost corresponding to the reality.

Table 5.29 Effects on gross cash flow of decommissioning 50% of the vessels in Lorient's industrial fleet

	1993	Estimation 1996
Trawler (33 m., 631 kW, 248 GRT, port of Lorient)		
Gross cash flow	-133,270	-87,462
Trawler (55 m., 2165 kW, 649 GRT, port of Lorient)		
Gross cash flow	-14,671	71,639

5.3.3 The Dutch cutter fleet

The year 1994

The returns of the cutters in 1994 show ups and downs compared with 1993 (table 5.31). Increases occurred for the shrimp vessels and for the larger beamers in the size class 1,101-1,470 kW. On the other hand, the largest beamers (>1,470 kW) show a declining tendency as to the gross earnings and the net profit. The same applies for the 191-220 kW cutters (the 'Euro cutter'). However, this did not lead to an adverse economic situation for these size groups.

On an aggregate basis, the gross earnings and net profit of the cutter fishery were on the same level in 1994 compared with 1993 1).

The price of the main fish species, sole, decreased by 4%, whereas the average price of plaice went up by almost 7% in 1994 (table 5.30).

The quota situation did not change very much. Only the plaice quota decreased somewhat (by 6.5%).

Table 5.30 Average fish price (per kg) in the Netherlands (ecu)

	1991	1992	1993	1994	1995
Sole	6.31	6.90	6.29	5.67	6.54
Plaice	1.78	1.35	1.47	1.56	1.56
Cod	2.35	1.84	1.78	1.57	1.31
Whiting	1.03	0.81	0.80	0.75	0.78
Turbot	7.87	7.97	7.36	7.40	7.73
Shrimps	2.23	2.50	2.88	2.56	2.87

Source: Fish Commodity Board; LEI-DLO.

The year 1995

Most of the studied groups show increasing returns in 1995. Decreases in earnings and net profit that occurred remained limited (table 5.31).

The price development was rather favourable, due to the 9% increase of the sole price. Another positive factor was the decrease of the fuel price in 1995 that contributed substantially to cash flow improvements.

These positive developments of the fish- and fuel prices have compensated the lower availabilities for sole (quota -6%) and plaice (quota -27.5%).

The capacity of the cutter fleet was at a lower level by the end of 1995 compared with 1990. The number of vessels decreased from 464 to 457 during this period, whereas the total engine power decreased by 10% to 360,000 kW.

1) LEI-DLO annual report 'Fishery in Figures', year 1995, page 20.

Table 5.31 Average results per vessel in 1994 and 1995 (ecu)

	1994	1995	% change 1995/1994
North, 110-150 kW			
Total earnings	92,100	126,700	+ 37.6
Gross cash flow	18,400	31,400	+ 70.7
Net profit	1,600	14,600	
North, 151-190 kW			
Total earnings	172,700	167,100	-3.2
Gross cash flow	28,100	26,800	-4.6
Net profit	-4,900	-6,200	
North, 191-220 kW			
Total earnings	314,800	348,100	+ 10.6
Gross cash flow	43,900	61,900	+ 41.0
Net profit	-8,600	9,400	
South, 191-220 kW			
Total earnings	341,200	403,800	+ 18.3
Gross cash flow	64,800	93,300	+ 44.0
Net profit	7,500	36,000	
North, 295-440 kW			
Total earnings	375,900	434,300	+ 15.5
Gross cash flow	58,500	79,800	+ 36.4
Net profit	-4,600	16,700	
North, 810-1,100 kW			
Total earnings	778,000	756,900	- 2.7
Gross cash flow	153,400	145,300	- 5.3
Net profit	14,900	6,800	
North, 1,101-1,470 kW			
Total earnings	1,168,100	1,211,900	+ 3.7
Gross cash flow	314,800	326,800	+ 3.8
Net profit	73,200	85,200	
South, 1,101-1,470 kW			
Total earnings	1,366,700	1,354,800	- 0.9
Gross cash flow	398,200	408,600	+ 2.6
Net profit	153,800	164,200	
North, >1,470 kW			
Total earnings	1,363,900	1,332,400	- 2.7
Gross cash flow	311,100	300,000	- 3.6
Net profit	27,600	16,500	
South, >1,470 kW			
Total earnings	1,477,300	1,602,400	+ 8.5
Gross cash flow	377,700	410,100	+ 8.6
Net profit	117,100	149,500	

Source: Fishery Accounting Data Network of LEI-DLO.

The year 1996

Major decreases of the flatfish quotas threatened the continuity of a substantial number of firms in the cutter fishery in the beginning of 1996.

It was also predicted at that time that the co-management system would not hold, because of the considerable tension between quotas and capacity. This system has been in operation in the cutter fishery since 1993. Eight different groups manage the fishing rights (ITQs) of their members. The Board of each group is responsible for the total of the individual member quotas. At this time (December 1996) the observation is that the groups have succeeded this year in limiting the fishing effort of their member vessel so that the quota uptake was rather on scheme in October 1996.

Favourable price developments for the flatfish species and also the cost reductions have more or less compensated the lower quota. The average sole price was 19% higher in the period January-August compared with the 1995 average and this increase amounted to 12% for plaice.

On the other hand, the rise of the fuel price in the second half of 1996 has depressed the returns.

Table 5.32 shows the results of an exploration of the developments in 1996 through an enterprise model. This includes the vessel groups that have been affected mostly by the quota decreases.

The assumptions are:

% change compared with 1995

Sole quota	-21.5
Plaice quota	-32
Price of sole	+19
Price of plaice	+12
Price of fuel	+ 25
Number of days-at-sea	- 20

Table 5.32 indicates that price increases did not fully compensate the lower quota in 1996. Moreover, the higher fuel price has seriously affected the cash flows. A substantial number of enterprises must have difficulties to meet all the financial obligations, since the average cash flow seems to equal roughly the total of repayment of loans and interest 1).

1) LEI-DLO annual report 'Fishery in figures', 1995, p. 31 contains the financial obligations (interest and repayments of loans) for larger beam trawlers.

Table 5.32 Estimated returns per vessel in 1996 (ecu) a)

Size group	Region North		South
kW	1101-1470	>1470	1101-1470
GRT	270-330	290-430	256-488
M	35-41	36-42	34-40
Total earnings	1,048,100	1,185,000	1,196,000
% change compared with 1995	(-10.3)	(-11.1)	(-11.7)
Gross cash flow	239,000	235,400	334,000
% change compared with 1995	(-24.1)	(-21.5)	(-18.3)
Net profit	-20,200	-59,200	69,100
Amount in 1995	(85,200)	(16,500)	(164,200)

a) Estimates made in November 1996.

5.3.4 The United Kingdom, trawlers and seiners

The economic environment of the UK fishery, which as already indicated turned marginally more favourable in 1993, made further marginal improvements in 1994 and 1995 and there are indications of a much sharper up-turn in the current year, mainly driven by the first significant increases in quayside prices for many years.

At industry levels, these marginal further improvements may be illustrated by the trends in output (volume and value of landings) of the demersal fishery over the period 1993-1995 as indicated below.

Table 5.33 UK demersal fishery: 1993-1995 (UK vessels landing into UK and abroad)

	1993	1994	1995
Gross Earnings (x 1,000 £ Stg) a)	356.4	364.8	369.4
Landings (000 Tonnes) b) (live weight)	359.2	371.6	386.0
Ecu rate £ Stg	1.285	1.293	1.22

a) Constant (1993) ecu/£ Sterling exchange rate; b) Excludes unrecorded landings which are known to have been substantial.

Meanwhile prices for the industry's main commodity input (marine gas oils) have remained low by historical standards although there have recently been indications of hardening in response to international political developments.

In terms of capital inputs, and as a reflection of policy initiatives to reduce the size of the fleet, there have been overall reductions in aggregate fleet GRT and kW over this period (total recorded GRT down by 4%; kW down by 10% between December 1993 and December 1995).

As indicated before, the only sample survey data available in the case of 1994 relates to the English beam trawlers but there is complete sample coverage on the same basis as for the period 1990/91-1994 in relation to 1995 and this is summarized hereafter.

Table 5.34 Sample averages per vessel (ecu)

	1993	1994	1995
1. English Beam Trawlers			
Total Earnings	610,800	619,100	N/A
Gross Cash Flow	24,500	53,700	N/A
Imputed Capital Charges	159,500	157,400	N/A
Net Profit	-135,000	-103,700	N/A
2. Scottish Demersal Trawlers			
Total Earnings	429,900	N/A	465,700
Gross Cash Flow	31,900	N/A	61,400
Imputed Capital Charges	79,000	N/A	68,200
Net Profit	-47,200	N/A	-6,800
3. Scottish Demersal Seiners			
Total Earnings	395,500	N/A	483,900
Gross Cash Flow	46,300	N/A	60,600
Imputed Capital Charges	65,900	N/A	62,600
Net Profit	-19,600	N/A	-2,000
4. Scottish Nephrop Trawlers			
Total Earnings	233,900	N/A	399,500
Gross Cash Flow	31,800	N/A	75,300
Imputed Capital Charges	36,600	N/A	27,300
Net Profit	-4,900	N/A	48,000

As indicated in table 5.34, 1995 sample average out-turns in the case of the three Scottish sectors were significantly higher than those of the corresponding samples in 1993 in terms of earnings, gross cash flows and net profits and this is reflected in the estimate of the related ROC as set out in table 5.35.

These figures do not call for detailed further elaboration. It may be noted, however that in the case of the Scottish samples estimated, ROC in 1995 are above the corresponding levels in 1990/91 and through 1991-1994 and that there are indications of a similar trend in the case of the English beam trawlers (for which sample returns for 1995 are not yet available).

Table 5.35 Estimated ROC (%)

	1993	1994	1995
English Beam Trawlers	-6.2	-4.3	N/A
Scottish Demersal Trawlers	-4.3	N/A	1.5
Scottish Demersal Seiners	-0.7	N/A	1.9
Scottish Nephrop Trawlers	1.3	N/A	15.5

6. PERCEPTIONS IN THE INDUSTRY OF THE RETURN ON CAPITAL AND RELATED ISSUES

6.1 Denmark

Seven interviews with auditors and representatives of the commercial banks were undertaken in August 1996. The interviews were organized as in-depth interviews whereby the respondents answered spontaneously. In general the talks focused on three aspects of the financial operation of the fishing vessels. First of all the task is to show whether the ROC in general is used by the auditors and the commercial banks. Second, there is asked for alternative measures of evaluating the performance in the fisheries. Finally, the aim is to get insight into the views of the auditors and bankers on factors which restrict the economic performance of the operating vessels. In addition to the last question the auditors and banks are asked about their perceptions which part of the fisheries policy is having the largest effect on the economic performance of the fishing vessels.

The general result of the interviews is that the auditors and commercial banks are admitting that the ROC is theoretically relevant to measure the economic performance. However, in practise neither the auditors nor the banks are actual using the ROC. There are different arguments against using ROC to evaluate the fishing enterprises.

The auditors in general do not use the ROC, because in their view it only gives a rough indication of the development of the fisheries. Moreover it is mentioned that the vessel owners would not take account of the ROC measure. Another point of the ROC is that it is difficult to measure invested capital of the enterprises. The majority of auditors recommend a procedure of comparing the economic performance of the single vessel with the average performance for related vessels, this information is outlined in the local costs and earnings study undertaken by the Fisheries Association. In this sense the local costs and earnings study gives a important input to the local vessels owners in Thyborøn. The minority of auditors that uses the ROC measure are using the actual insurance value as an indicator of the invested capital, which is analogue to the intension of the Danish method used in this study.

The banks in general consider the ROC a relevant measure. However, it is noted that the banks do no put much emphasis on the ROC in the credit giving. It is expressed by the banks that the ROC is an historical measure, moreover there is a lot of uncertainty involved in financing the fisheries due to change in fishing quotas of the consumption species and bycatch regulations in the reductions fisheries. Therefore the banks in general are emphasising the importance of the anticipated regulation in the future. Secondly, the knowledge of the skippers' track records is important to the banks, when giving credit to the operating fishing enterprises.

The general conclusion regarding the ROC is that the measure is not widely used neither by the auditors nor by the commercial banks. The measure is seen to be too rough, because it does not take account of the uncertainty in the sector in the future. The general impression is that the common method of imputing depreciation and interest expenses gives a misleading indication of the vessels owners of the perceptions of the vessel owners perception of the economic performance in the fisheries. Moreover the gross cash flow is seen to give a better indication of the sectors perception of the economic performance in the later years. This means that the ROC in general under estimate the economic performance in the Danish fishing fleet compared with the perceptions in the sector.

When turning to the perceptions auditors and banks of the conditions which are restricting the economic performance of the operating vessels, the general impression is that the available fishing quotas and the abundance of fish is seen is seen to be of major importance to the operating vessels. Secondly the re-financing reform implemented by the Danish Government in 1993 is seen to have affected the economic performance of the Danish fishing vessels positively. The intension of the re-financing reform was that the vessels owners got the opportunity of converting existing loans into loans issued by the Fisheries Bank (Government Institution). The result of the re-financing reform is that the interest burden of the operating fishing vessels was reduced. Finally, when addressing the decommissioning scheme neither the auditors nor the banks think that this regulation had any impact on the economic performance of the operating vessels. It is emphasized that the decommissioning scheme to some extent reduces the financial risk of the commercial banks, as creditors. That is, the decommissioning grants are partly used to redempt the loans to commercial banks 1) (Frost et al., 1995). In this sense the commercial banks chance of loss on bad operating fishing vessels is decreased after the implementation of the decommissioning scheme. In the way that, when the bad operating vessels are leaving the fisheries the decommissioning grant will go to the commercial banks, as a repayment of the loan.

The conclusion is that the auditors and the commercial banks see the restrictions of the available fish resources as the single most important factor affecting the economic performance of the fishing fleet. At the present time the abundance of plaice, as the most important restrictions, which will affect the economic performance of the Danish seiners. When turning to the reduction fisheries, the economic performance in future will by affected by the implemented bycatch regulations. Moreover, it should be noted that the auditors and representatives from the banks pointed out that the re-financing reform has in general decreased the interest burden of the operating vessel. On the other hand, the decommissioning scheme is not seen to have any effect on the fisheries operations in the short run.

---

1) Frost et al. (1995); An appraisal of the Effects of the Decommissioning Scheme in the Case of Denmark and the Netherlands. Danish Institute of Fisheries Economic Research (DIFER). *Report issue 16/95.*

6.2 France

Fishing companies of South Brittany were investigated by means of questionnaires. One questionnaire was directly addressed to the manager of the company and another questionnaire had been addressed to vessel captains. Each company of South Brittany (twelve left in 1996) received the questionnaires (one for the manager and two or three for the vessel captains, depending on the number of the vessels the company owns).

Banks were also investigated by means of questionnaires: the Credit Maritime, which is the main financial institution in the fishing sector in France, and some private banks, which participates in the investment finance of the industrial fishing sector.

The rate of answers to the questionnaires

- No answer from the banks. The period investigation had an impact on the rate of answers. First, the investigation took place in a period of 'restructuring' of the entire fishing sector when the government tried to find a solution with the banks (and particularly the Credit Maritime) to the running into debts of the individual vessel owners, put in light with the conclusion of the Mettling Report published in 1995. Second, the lack of investment in new vessels for many years in the industrial fishing sector has led to somewhat disinterest of financial institutions for this sector. Third, everybody adopt an expectative position faced to the restructuring of the industrial fishing sector, due to the entry of big groups.
- Fishing companies and vessel captains: 5 managers have responded to the questionnaire. The questionnaires addressed to the vessel captains have all been transmitted by the managers but they are sorry that nobody answers. Anyway, two captains have answered the questionnaires and one wished to meet us to discuss on it.

Perceptions on the returns, do they correspond to our calculations?

A synthesis of the results of the ROC study was sent with all questionnaires and it has been asked to compare it with their perceptions of the evolution of the profitability of their activities. Globally, the perception of the evolution of the returns is the same but the results put in light by the ROC study seems to be somewhat more weak than their own results. The recovery after 1993 is confirmed by all the managers whatever their 'métier'. Some argue that it is due to the recovery of the fish and others put in light the benefits of the innovations they have implemented in the crisis period.

The calculation of the depreciation costs was hardly discussed and it seems that the linear method employed in the ROC study does not correspond to reality. Particularly, the duration of life which determines the annual depreciation costs (25 years in the study) is in reality 'shorter' and a digressive calculation appears more appropriate. However, the replacement of the vessels by new ones seems not to be possible actually for the majority of companies.

Globally, if they agree about the trend of economic results between 1991 and 1993, the vessel captains we met were not as enthusiastic about the evolu-

tion of the industry as the companies. Particularly, the accent is put on the decreasing trend of prices and the competition of cheap and bad quality fish while the management forces them to implement on their vessels new working methods directed on the quality of fish.

It has to be noted that they underline the great difference in economic results between one vessel and another, working in the same 'métier', and this difference was noted by company managers too. Some argue that it may be explained by the technical means which differ between companies but everyone agrees with the role of the vessel captain and the 'competence' of the crew.

Relevant economic indicators

The economic indicators used by the companies to evaluate the profitability of their investment are numerous and periodically calculated. After each fishing trip for some activity indicators are used (weight earnings). Every year financial indicators are usually calculated by a company in any sector (for each vessel and for the overall fleet). Moreover, all the companies belong to an association which makes a synthesis of all the economic data transmitted by each company every year. Those data are presented by category (depending on the size of the vessel and the harbor of the company, as we have made in the ROC study).

However, some companies admitted that the need for numerous calculations to evaluate the profitability of the activity is recent and is related to the period they cross. Particularly for the beginning of the 1990s, the scarcity of the fish coupled with a decreasing trend of the prices have changed their behaviour. The uncertainty of the evolution of the economic environment have made them very 'careful' about their investment decisions.

The relevance of the ROC as the main financial indicator has been discussed. In fact, a Return on Investmentsis calculated for each vessel every year. But this calculation is based on the historical price of the vessel. We asked then about the relevance of the insured value to estimate the value of the capital and calculate the ROC. In fact, the insurance value takes account of the investment made by the companies on the vessel, but also of the replacement of the vessel, in case of damage, by a 'best vessel'. For example, a manager estimates that the market value of a 33 m. vessel (built in the 1980s) is now about 500,000 to 600,000 ecu while its insurance value in 1993 is nearly 1,000,000 ecu. Globally, the insurance value is overestimated with regard to the market value so that the ROC is underestimated in our study.

Investments and finance

At the beginning of the 1990s, only one vessel built in the fishing industry sector. The importance of the financial capital required the building of a new fishing vessel and the lack of building grants provided by the EU explain this fact. So the investment behaviour of companies, which used to replace their vessel every ten or fifteen years, has been changed. Companies argue that old vessels place a severe constraint on the recovery of the situation. For example, a new vessel is an important determinant for the motivation of the crew.

However, during this period, many vessels have been modernized with the help of public grants. The dependence of companies on external finance is very variable and is not 'a priori' based on the size of the company.

6.3 The Netherlands

6.3.1 Perceptions of vessel owners

In-depth interviews with vessel owners have been held to:

- identify the main indicators that vessel owners use for the management of their enterprise;
- consider if the ROC is known and used;
- investigate if the applied methodology of calculating profits does result in outcomes that correspond with perceptions in the industry about the level of returns;
- learn which factors are considered to have mainly affected the returns;
- get insight into the innovations that vessel owners have implemented.

This section gives the views of the vessel owners on these issues, whereas sections 6.3.2 and 6.3.3 contain those of the bankers and the accountants. Section 6.3.4 gives the conclusions from the interviews.

Fifteen vessel owners were interviewed in the period November 1995-October 1996 1). Twelve of them live in northern ports and three in southern ones. The size of their vessels ranges from 130-3000 HP. Appendix 3 shows the main characteristics of the vessels.

It is clear that the number of interviewed vessel owners is small but this is unavoidable for in-depth interviews. Though the outcomes are not fully representative for the fishery as a whole, good impressions can be given regarding the management of fishing enterprises, the perception of the returns and the attitude towards innovations. The answers show a certain consistency, in particular compared with the ones of bankers and accountants. Moreover, the issues regard also more or less general tendencies in the fishery. Therefore, the conclusions in section 6.3.4 have a much wider scope than the situation for fifteen enterprises.

Main indicators for managing of the enterprise

The main financial indicators that the interviewed vessel owners use turned out to be:

- The gross earnings per fishing trip, received from the auction. Eleven of the fifteen interviewed owners mentioned this indicator spontaneously as the most important one. There was no clear distinction between owners of bigger and of smaller vessels.

---

1) See questionnaire in appendix 3.

- The 'figures' from the accountant, i.e. the profit and loss account and the balance sheet (mentioned eight times). This report is explained by the accountant of the fisherman in most cases.
- The weekly information about the quota uptake from the management groups 1) or resulting from a specific computer programme. This was mentioned five times. This kind of information mostly contains the indicators:
  - landed quantity per species in a certain week;
  - total of landings per species up to this week;
  - percentage of quota uptake so far;
  - gross earnings in a certain week;
  - number of allocated days-at-sea;
  - number of days-at-sea spent so far;
  - fish prices.
- The LEI-DLO annual financial report, mentioned seven times as an important indicator. This is biased by the fact that only participants to the LEI-DLO costs and earnings panel have been interviewed.

A variety of other indicators was mentioned: 'the bank account' (2), the weekly calculation of shares for the crew (2) that gives insight in the variable costs 2), 'information' from the fishery association (1), prices (1), 'costs' (1),and 'the bottom line figure' i.e. the profit or loss (1).

The use of information on quota uptake indicates a shift from a hunting behaviour towards the attitude of a calculating manager. Vessel owners are faced with new considerations and decisions compared with the situation before the ITQ system became effective. Examples of this:
- shall I catch the plaice when the fish is abundant (low cost) or reserve a large part for the end of the year, when prices may be better?
- shall I lease extra sole quota and if so, when? at which price?
- shall I rent a large part of my flatfish quota and concentrate more on shrimp fishery?

The financial report from the accountant

The annual financial report from the accountant of the vessel owners is usually prepared for fiscal purposes in the first place. However, an important number of such reports also contain commercial/economic data, such as profit after deduction of the owner's (imputed) salary and interest cost for the owners' capital. Some accountants also provide information about variable costs (fuel) compared with the previous year. The balance sheet and the profit & loss account of the enterprises in the cutter fishery may be complicated in particular

---

1) By far the most vessel owners are member of the eight co-management groups which are responsible for the compliance with the total group quota, which is the total of the quotas of their members.

2) Variable costs such as fuel costs are deducted from the gross earnings so that a balance remains (the 'net earnings) that is indicative for the covering of fixed costs and for the wages (shares).

when the firm has been transformed into a limited liability company 1). A number of accountants uses to explain their financial report annually with their client.

'Do you usually consult the annual financial report / balance sheet of the enterprise?'

Has been a separate question during the interviews with the vessel owners. Twelve of the fifteen owners answered 'yes' and three 'no'. Nine of those who answered 'yes' said that an explanation was given by the accountant. It appeared that in a number of cases also the sons, be it or not co-owner, were involved in this explanation. This is of course a good opportunity to consider the position of the enterprise and to discuss future activities.

It has to be kept in mind that enterprises in the cutter sector are real family firms which means that the owners are also involved with their labour, either as a skipper or a 'skipper ashore'. Consequently, the annual discussion of the financial report from the accountant may be sometimes a kind of a 'family council'.

Those owners who did not consult the financial report found it too complicated and the accountant does not explain the financial information.

Perception of profitability by vessel owners

This ROC study is based upon a sample containing some 25% of the vessels of the Dutch cutter fishery. Though the calculated average returns on capital per vessel group give a reliable picture of profitability the vessel owners may have another perception of profitability of the fishery. Arbitrary measures have been applied for the profit calculation. This could result in a return that may differ from the reality as observed by the vessel owners. Therefore, one of the questions during the interviews was:

'What is in general your impression about the returns in the fishery you are involved in, in the period 1993-1995?'

The answers reveal a clear trend of diminishing returns in this period as table 6.1 shows.

Table 6.1 Qualification of returns in the Dutch cutter fishery by vessel owners

	1993	1994	1995
Good	9	7	5
Moderate	6	8	10
Bad	0	0	0

1) Reasons for this transformation into a limited liability company are described more in detail in 'Strategic responses of Dutch fishermen to limiting measures and property rights', Davidse, 1996, paper to the workshop of the Social Science Network, Seville, 5-7 September 1996.

There was no clear distinction in the answers between owners of bigger and owners of smaller vessels. It is of course only a small sample. Consequently, the outcomes may not be quite reliable in this respect.

The declining tendency of returns observed by the respondents does not fully comply with the sectoral returns published annually by LEI-DLO in 'Fishery in Figures' (1996). These aggregate returns show also a (small) decline in 1994 but an improvement in 1995. However, the returns in 1995 in this publication show opposite developments on individual size group level. Seven out of fifteen groups that have been investigated show a declining and eight an improvement net profit. Hence, no clear tendency appears from the economic results in 1995 on size group level.

This ROC study provides detailed costs, earnings and profitability figures for 1993. It appears that seven out of ten vessel groups show a positive net result (profit) and three of these groups had a loss in that year (chapter 5). This is somewhat less positive than the observations of the vessel owners.

The reason for this may be that vessel owners are more oriented on the gross earnings or the cash flow and they do not have probably a clear perception on the necessary depreciation for their vessels. Some owners mentioned a weekly break-even gross earnings figure that they have in their mind. This proved to be a good cash flow approach since it just allowed repayments of loans but not a full economic depreciation.

The interviews revealed that the perception of the profitability of the own vessel was less favourable than the impression that the skipper-owners had with respect to other comparable vessels. They mentioned as causes factors such as 'bad luck' and extra costs of repairs of e.g. the engine. It is assumable that these factors play an important role in the perception of the own returns, whereas the skipper-owners may be more impressed by the positive returns of comparable cutters.

Influences on the returns

'Prices' and 'quotas' are most often mentioned in reply to the question 'Which factors have mainly affected the results of your enterprise?' Owners of small vessels mentioned 'low shrimp prices' and those of medium size vessels complained about low prices for cod and whiting. Increased imports of cod from Eastern Europe have caused these low prices in their view.

Prices did not only negatively affect the returns. A 'good sole price' has been mentioned as a positive influence in 1995. Regarding the quota situation, especially the shortage of plaice quota (1995) has been mentioned by owners of bigger beamers as a negative effect on their returns. High costs of repairs and 'bad luck' have been also mentioned as influencing factors, but less frequently than 'prices' and 'quotas'. In spite of these negative influences that were mentioned, the years 1993-1995 were rather good in the perception of the vessel owners who have been interviewed. The answers mentioned in the previous section support this conclusion.

Though the sample is small, there is no reason to assume that the vessel owners who have been interviewed will have a quite different perception of the returns than the majority of the owners. In particular the consistent ab-

sence of the qualification 'bad' in the answers indicates that the majority of vessel owners will have the perception of 'rather good' years with respect to the period 1993-1995.

Innovations implemented or planned

Nine of the fifteen vessel owners who have been interviewed answered that they had implemented one or more innovations on their vessel. These investments consisted of fish storage (tubs), deck equipment, a more efficient screw and fishing gear or adjustments on it.

Also five owners (mostly other ones) have plans for innovations that may lead to the same type of investments: equipment for fish treatment and fishing gear, either new or adjustments on it. Some owners intend to target more on non-quota species which requires adaptation of fishing gear. Limited catch possibilities seem also to lead to more attention for a better catch treatment which requires some innovative investments.

The impossibility for new building and the lack of a second handed market for vessels proved to be a general complaint during the interviews. All the regulations result in a kind of a 'freeze' of the fleet, in the opinion of the vessel owners. Formerly, there used to be a good second hand market for the beamers which enabled those who invested in a new vessel to get a high price for their 'old' one. On the other side, skippers who could not obtain the financial means for new building, could acquire a rather good second hand vessel. This is no longer possible, since the horsepower licences put a ceiling on the fleet capacity. Moreover, selling second hand vessels to foreign skippers has been blocked by intensified regulations, such as in the United Kingdom. Most of the vessel owners who were interviewed expressed their concern with the aging of the fleet. Major renovations of vessels are more and more carried out to keep the cutter in a good shape. Some skippers fear that new building will meet increasing difficulties since the gap between the value of the current vessel and the cost of new building will continually increase.

Two comments can be made on these renewal problems:

1. from the viewpoint of fisheries management it can be observed that the capacity regulations are successful. The former investment mechanism, resulting in capacity increases after profitable years, has been removed;
2. the observation of a widening gap between the vessel's actual value and the cost of new building that cannot be narrowed indicates that the skippers are not fully aware of the necessary depreciations. When the earnings cover the full depreciation amount, savings for new buildings are indeed safeguarded. However, investments in fishing rights (individual transferable quota) have withdrawn a part of the depreciation fund for a number of enterprises since they require extra money for repayment of loans for such investments in 'intangibles'. Hence, new buildings may be more difficult in these cases.

6.3.2 Policy of banks

Interviews have been held with staff members of three different banks 1) to obtain insight into the policy of banks with respect to:

- the use of financial indicators such as the return on capital;
- the financing of investments.

Moreover, the bankers have been asked for their observations regarding:

- the level of returns of the cutter fleet;
- the level of debts of fishing enterprises;
- the possibilities for modernization.

The three banks that have been involved in the interviews provide the major part of the loans to the fishing enterprises. It has to be emphasized that these enterprises are financed by commercial banks, under the normal banking terms. National subsidies are not provided since the abolition of the special Law of tax allowances for investments (1987).

Financial indicators

Banks use to consider (fishing) enterprises mainly from the viewpoint of financing of investments. This determines which indicators are most important. The main indicators seems to be the solvability, i.e. the level of debts related to the total value of the assets. The cash-flow, defined as repayment capacity of the firm, has about the same importance as the solvability, as proved from the interviews. The solvability may be of main importance in case of financing a vessel or another investment. Banks use therefore certain rules such as a debt maximum of e.g. 60% of the value of the vessel. An investment in fishing rights, e.g. an ITQ, may be financed as well in some cases. This depends on the

---

1) This means more than three interviews since in one case interviews have been held in the local and in the head office of the bank. Eight persons have been involved in these interviews.

policy of the concerning bank, whereby some differences occur with respect to the financing of ITQs. Considering the value of the rights only 'pro memorie' also occurs.

The cash-flow indicator may be more important when the financial position of the concerning firm is evaluated. In particular the repayment capacity will be considered, possibly in the light of changes in the economic environment.

'Profitability', 'pay-back period' and 'individual quota' were mentioned less frequently as indicators by the bankers.

The 'return on capital' is clearly not used as an indicator by banks. Ascertaining a reliable value of the capital is very difficult. What to do with the value of the quota? The ROC will be useful when to comparing the fishing industry with other industries, as one of the respondents stated.

Some bankers stressed in this respect the useful role of the co-management groups 1). They create a kind of stability in the cutter sector, which is of course strongly in the interest of the banks.

The importance of indicators in the policy of banks should not be overestimated. The capacity of the entrepreneur, proved in the past or judged in other ways, always plays an important role when the financing of an investment is considered.

Financing of investments

Enterprises in the cutter fishery depend on the normal banking terms for the financing of investments, as has been said before. Financing occurs in the form of a mid-term loan, a bank credit on the account or a combination of both. This is always a mortgage in case of financing a vessel or a new engine. Fishing rights are included as a collateral for a loan.

Fishing enterprises have always had a rather good access to this financial market. Subsidies did not play a role in this respect, generally spoken 2). There is a long term established relationship between the banks and many of their clients in the fishery sector. This could result in a less rigid policy, i.e. extension of repayment periods, when liquidity problems occurred.

The mid-term finance means repayment periods for new vessels of 10, in some cases up to fifteen years. For second hand vessels and for engines this period is mostly eight years, in the latter case five or six years is also stipulated. Loans for fishing rights (ITQs) have to be paid back within five or eight years. It is important for banks in this respect that more certainty will arise as soon as possible regarding the possible review of the CFP in 2002.

---

1) These groups were established in 1993. Their main task is to manage the fishing rights of their members.

2) Only the EU FEOGA subsidies were of importance in the eighties for a number of 300 HP cutters, the 'Euro cutters'.

The level of returns and debts in the cutter fleet

The perception about the returns in the period 1993-1995 of staff members of banks proved to be rather in line with those perceptions in the industry. Qualifications as 'bad' (returns) were not expressed. The respondents expressed 'good' and 'moderate' both in the same frequency, whereby the level of returns is somewhat declining in their views. This was also the perception of the industry-respondents. It must be added that bankers seem to be somewhat less optimistic than the vessel owners since the qualification 'moderate' was of more importance instead of 'good'. Nevertheless, the returns in the cutter fishery in the period 1993-1995 were reasonably good, according to the bankers.

There was no common view on the debt situation among the bankers who have been interviewed. A decreasing level of debts seems to be mostly observed, whereas increasing and stabilizing developments were also expressed by the respondents.

These different views are understandable when the investment situation in the fishery is considered. On the one hand investments have decreased as a result of the limitations (section 6.3.1) and on the other hand investments in fishing rights have substantially increased since the early nineties. A different investment behaviour of their clients and, in relation with this, a different policy of the banks towards financing of rights, explain the different observations of the debt developments.

Modernization of the fleet

The bankers expressed that there are no or only few possibilities for modernization of the fleet. They also referred to the limiting measures (horsepower licences, individual quotas) and the lack of a second hand market for vessels. This observation is the same one as the statements of the vessel owners about the 'freeze' of the cutter fleet. Financial means that eventually are available may be absorbed by necessary investments in fishing rights. This will complicate future replacement investments. Current investments mainly concern renovation of the vessel, re-engining and fishing rights (ITQs).

6.3.3 Accountants

Two accountants having a substantial number of fishing firms among their clients have been interviewed to:

- get more insight into their considerations behind their reporting methods;
- compare their observations regarding profitability with the outcomes of this study;
- consider their views on possibilities for modernization of the vessels.

The two accountants annually provide extensive financial information in the reports to their clients. The balance sheet and the profit & loss account are of course the main part of this. Moreover, financial indicators like the current

ratio 1) and the solvability are included and in one case also more operative indicators like earnings per day-at-sea. Both accountants also provide a statement showing the sources of finance and the spending in the form of investments and repayments of loans etc. (statement accounting for variations in capital). The ROC is not used by both accountants. They stressed the problem of an arbitrary capital valuation, like the bankers. One of these accountants provides an economic annual account, apart from the fiscal one. The main differences are the vessel's value on the balance sheet and, hence, the capital amount, and the depreciations on the profit & loss account.

The level of returns in the cutter fishery were qualified for 1993 and 1994 for each year, as 'good' and 'moderate' by both accountants. This is in line with the observations of the bankers. One of the accountants judged 1995 as 'bad', whereas the other thought it was 'good/moderate'. These observations of the accountants mean that they consider the returns in the period 1993-1995 less positive than the skipper-owners. However, the interview samples are too small to draw strong conclusions in this respect. The outcomes may be biased by important regional differences in the level of returns.

The opinions of the accountants regarding possibilities for modernization of the fleet do allow strong conclusions since they confirm the opinions of the vessel owners and the bankers: renewal is hardly possible and renovation of vessels is increasing.

6.3.4 Conclusions

The interviews result in the following conclusions with respect to the perceptions and decisions of:

a. *The vessel owners:*
   1. The indicator 'return on capital' is not known among the skipper owners.
   2. Vessel owners seem to have become more managers of individual quotas than hunters for fish, as they formerly used to be.
   3. Attention seems to be focused mainly on the proceeds and too little on the cost side.
   4. Cost awareness could be improved by using the 'net earnings' ,which is the basis for the weekly (wage)share calculation, as a separate indicator.
   5. The returns were rather good in the period 1993-1995, where a declining trend was seen.
   6. This perception of the returns lies somewhat above the returns of the Dutch part of this study. This may be caused by a more cash-flow oriented approach of the vessel owners.

---

1) A measure for liquidity, i.e. a ratio expressing the relationship between current assets and current liabilities.

7. The returns have been influenced increasingly by (speculative) decisions regarding spread of the quota uptake over the year and leasing/renting of ITQs.
8. 'Quota' and 'prices' have mainly influenced the returns.
9. A minority of the interviewed vessel owners had implemented innovations. The limiting regulations seem to have induced most of these innovations, since they regard better treatment of the limited catch and adjustments for other fisheries on non-quota species.
10. Most vessel owners complained about a 'freeze' of the cutter fleet due to all the regulations.

b. The bankers and the accountants:

11. The banks that have the largest part of the skipper owners among their clients do not use the ROC as an indicator. 'Solvability' and 'cash-flow', defined as repayment capacity, are the main financial indicators for them.
12. Bankers and also accountants who have been interviewed have a less positive perception of the returns than vessel owners have. Consequently, these observations of bankers and accountants are more in line with the return levels resulting from this study.
13. The bankers and accountants have the same observation of a 'freeze' of the fleet as the skipper owners.
14. Future renewals of the fleet will be hampered by draining of depreciation funds on behalf of investments in fishing rights (ITQs).
15. Accountants do not include the ROC as an indicator in their annual reports to the vessel owners.

6.4 The United Kingdom

The UK programme of interviews was undertaken in three main phases over the period February-August 1996. It included discussions with the Industry itself (fishermen, vessel owners, fish selling companies) and with related institutions, notably Producer Organizations, commercial banks and insurance companies.

The first two phases were held in the Shetland Isles (February 14-15) and North East Scotland (March 13-14). A third phase was centred on North East England and Humberside (June 19-21) and a single but important interview was held in South East England (September 9). The total number of interviews amounted to 15 (appendix 4).

With the exception of South West England these Regions may be regarded as representing the main concentrations of fishing activity in the UK. In the case of Scotland, for example, the Shetland Isles and North East Scotland together accounted for upwards of 50% of all landings of demersal fish in Scotland in 1994 in terms of quayside values and for over 80% of the corresponding values of pelagic fish.

In the case of England the North East and Humberside together accounted (1994) for some 35% of the total quayside values of all demersal species landed in England and Wales and the South East of England another 10%. Most of the balance is landed in the South West (notably at Brixham and Newlyn) which as indicated above were not included in the programme (this was mainly for contingent reasons e.g. complications arising via foreign ownership of many vessels.)

In line with all the above the programme may safely be regarded as covering a good sample of the main tranches of the UK Industry (aside from the South West of England). It should, however, be noted that no attempt has been made to obtain information relating to the under 10m sector, this being considered to be impracticable. This sector is, however, of some significance e.g. 70% of the total UK fleet in terms of vessel numbers and 30% of total fleet kW (1994).

The general aim of the interviews has been to obtain additional guidance from the Industry and related institutions on the following central issues:

1. Which financial indicators are used by the vessel owners? Is ROC of importance?
2. Do the levels of financial returns and associated trends etc. as indicated by the sample surveys, correspond to out-turns as perceived by the Industry itself?
3. What are the main technical innovations that have been implemented by the Industry over the survey period and thereafter?

In addition and where relevant the opportunity was generally taken to obtain the Industry's comments on certain technical aspects of our analysis e.g. the interview with Sunderland Marine (insurers of the main tranches of the UK fishing fleet) was primarily intended to obtain their views on the assumption that insured values can generally be regarded as a reasonable proxy for the corresponding capital values.

In order to provide a structure for the interviews, these issues and related ideas were set out as a questionnaire as shown in appendix 4. It was of course understood that certain questions would be more relevant in some cases than in others and in general the aim of the schedule was to serve as an 'aide-memoire' rather than as a survey document. This, together with a brief description of the Project, was normally sent to the relevant individuals in advance of the interviews themselves.

Our discussions suggest that the role of financial indicators in the UK Industry's management may partly depend on ownership structures. At one extreme for example there are a few public companies whose interests include the ownership and operation of fishing vessels and whose financial out-turns are exposed to public scrutiny. In line with the corporate sector in general, these generally maintain a sophisticated regime of financial monitoring including target ROC.

At the other extreme, there are large numbers of individual fishermen owning and operating small vessels who have no idea of ROC as such and whose only operational indicators are related to cash flows.

The bulk of the UK Industry is situated somewhere between these extremes. In the case of ambitious and successful inshore vessel owners for example it appears that the main financial indicators are often related to gross earnings and new investment is driven by a desire to maintain/increase gross earnings to match levels known to have been achieved by the best performers in the relevant sector.

In such cases ROC as conventionally measured is barely considered in either appraisals (ex-ante) of optional new investment, or in (ex-post) assessments of financial performance. Instead 'returns' in both cases tend to be assessed in relation to overall value-added i.e. capital invested in a new fishing vessel is often regarded as in effect laid out to purchase a future living as a fisherman.

The concept of ROC as such also seems to be largely ignored in the case of small privately-owned companies operating only a few vessels, especially if the owners are ex-fishermen themselves in which case financial objectives etc. are likely to be similar to those outlined above.

The situation is different again in the case of Fish Selling Companies having minority shares in vessels otherwise owned by fishermen a relatively widespread system of ownership in Scotland and parts of the North of England. In such cases it appears that financial appraisals relating to options to e.g. invest in a new vessel in partnership with fishermen may well be supported by textbook style computer-model DCF calculations in which estimates of ROC are a prime indicator in the overall assessment. Out-turn ROC on the other hand are not normally evaluated provided results are broadly consistent with expectations in terms of gross earnings/net cash flows but might be examined more closely in exceptional circumstances.

As indicated before, aside from the ownership-sector relating to public companies (represented in the interviews but not in the statistical survey) the UK industry does not appear to estimate out-turn ROC as such. It has hence been impossible to compare our figures with the corresponding industry estimates.

In the case of other financial indicators such as gross earnings/gross cash flows etc., the most that can be said is that the Industry has been broadly in agreement with the trends indicated by our survey i.e. a general deterioration over the period 1990-1993 (which has since been followed by an upward trend recently enhanced by higher quayside prices and increases in the value of licences and quota entitlements).

The interviews were also used to attempt to clarify the Industry's approach for accounting purposes to the capital values of licences of minor significance over the survey period but more recently becoming increasingly important.

We found that at present the situation is somewhat confused. In the case of one public company for example such values are estimated and identified as separate items in the balance sheet. These values are then depreciated on an annual basis, but being 'intangible' assets without attracting capital allowances.

One of the private fishing companies by contrast advised us that the values of licences/quotas etc. are generally ignored in their balance sheet, so that for example they have a vessel with a 1995 book value of £ 1.5 mln. which has an estimated market value (with licence etc.) in excess of £ 2.5 mln.

More generally it appears that at present the capital value of licences etc. is often effectively ignored for accounting purposes. In cases for example where a new investment has been made in a 'vessel and licence' no attempt is made to distinguish between the value of the vessel as such and the value of the licence.

Also a visit has been made to Messrs. Sunderland Marine (SM) in order to obtain comments on the use of 'insured values' as a proxy for capital values as measured in principle by market prices.

SM, who currently cover some 80% of the UK fleet said that the starting point for insured values in their case is always the price paid for it by the owner, which sets the level in the initial year. This figure is then retained (there is no automatic annual depreciation) until it is regarded as no longer realistic in comparison with the prices of sales/purchases of similar vessels which are carefully monitored.

SM confirmed that they do not knowingly insure vessels for more than they believe them to be worth. Complications can arise if the initial purchase price includes the value of a licence in which case a downward adjustment is made to reflect this.

In our view the above broadly confirms that as we had assumed there is normally a reasonably close relation between insured and capital values although this is never likely to be exact owing to lags in the adjustment process.

Our discussions confirmed that there is generally a close and often personal relation between the fishermen and their Bankers, especially in places such as the Scottish Islands where the fisheries are a major source of economic activity.

When reviewing applications for borrowings to support new investment in fishing vessels, the banks' main consideration generally seems to be the relations between expected operating margins and the monies required to service such borrowings and if this is regarded as acceptable no assessment is made of the expected ROC in relation to the overall investment. In this connection the banks do not expect a conventional DCF analysis, but are content with simplified cash-flow projections which may relate to no more than the first two years of the vessel's operations. It was emphasized that the track records of potential borrowers are of prime importance to the banks, who would be reluctant to lend in the absence of evidence of good previous performance over many years.

One company told us that their bankers were now asking for details of the relevant quotas before approving loans for additional investment but this seems to have been an isolated case, the general position being that the banks do not wish to know about this aspect of their clients' projections.

7. DEVELOPMENTS OF THE RETURN ON CAPITAL PER VESSEL IN DENMARK, FRANCE, THE NETHERLANDS AND THE UNITED KINGDOM IN THE PERIOD 1991-1996

7.1 Denmark

In general the period 1991 to 1995 shows that the gill netters and the Danish seiners are the most successful vessels operating given the fact that these vessels had an average ROC of 7-8% during this the period. When turning to the reduction fleet the categories of trawlers larger than 50 GRT shows an average ROC of 2-3% in the period of investigation. In this sense the consumption fleet in general has performed better in the period of investigation. However, we have to be aware that the reported ROCs are based on the assumptions underlying the common method of calculating depreciation costs. The magnitude of the depreciation costs in general is higher for the reduction vessels than for the consumption vessels, this complicates a comparison of the economic performance in consumption and the reduction fleet.

Table 7.1 Average ROC per vessel in Denmark in the period 1991 to 1995 (percentages)

Vessel group	1991	1992	1993	1994	1995
Thyborøn					
Trawler 0-50 GRT	6.9	0.5	6.0	11.4	6.7
Trawler 50-120 GRT	-0.6	1.7	2.6	4.2	2.4
Trawler 120-200 GRT	3.5	1.8	-0.3	4.4	6.0
Trawler > 200 GRT	4.3	4.2	0.0	2.4	4.3
Danish seine 0-30 GRT	11.0	11.1	5.6	10.7	4.2
Danish seine > 30 GRT	7.0	6.8	3.8	7.7	3.2
Gill netters	8.9	8.6	10.6	8.0	4.9
Hirthals					
Gill net and Danish seine	12.8	12.3	na.	na.	na.
Trawler 0-50 GRT	6.9	9.3	na.	na.	na.
Trawler 50-120 GRT	1.6	2.2	na.	na.	na.
Trawler > 120 GRT	-0.6	1.8	na.	na.	na.
Skagen					
Trawler 15-19.9 GRT	9.2	6.5	na.	na.	na.
Trawler 20-49.9 GRT	4.5	7.9	na.	na.	na.
Trawler 50-99.9 GRT	3.0	4.0	na.	na.	na.
Trawler > 100 GRT	-1.4	2.1	na.	na.	na.

Note: ROC defined as: (net profit plus (imputed) interest) as a percentage of the invested capital, represented by insured value.

The prices of landed fish have an important impact on the total earnings generated in the single vessels categories. In the port of Thyborøn the price development of cod, plaice of reduction landings are seen to be particular importance for the operating fleet. The price development of cod has had a decreasing trend between 1991 and 1995. If this development continues it will probably have a major impact of the economic performance for the gill netters and Danish seiners. The development of the prices of plaice and reduction landings have been stable in the period of investigation. However, when considering the price of the reduction landings, it has to be noted that the reduction processing is owned by the owners of the operating reduction vessels. This vertical integration in the reduction industry is probably the main cause for the stable price development of reduction landings.

Table 7.2 Danish (average) prices per kilo for some species (ecu)

Species	1991	1992	1993	1994	1995
Cod	1.675	1.643	1.410	1.363	1.178
Plaice	1.800	1.296	1.391	1.449	1.416
Sole	5.864	6.659	6.110	6.144	5.924
Herring	0.226	0.236	0.214	0.208	0.174
Shrimps	2.453	2.683	1.803	2.046	1.951
Reduction	0.071	0.075	0.068	0.068	0.069

Note: Exchange rate ecu = 8 DKK.
Source: Fiskeriets bruttoindtjening (Danish Ministry of Fisheries).

7.2 France

Negative ROC during many years is somewhat surprising in any economic sector. Firstly, our calculations of depreciation and interest costs influence the level of the ROC as the estimation of the insurance value which the limits has been already shown.

However, the negative gross cash flows give evidence of the lack of profitability of some fleet segments in the industrial fishing sector and the relative fixity of the capital in terms of barriers to leave the sector. This assertion may be investigated more deeply while we are confronted with big companies, generally assumed to be more flexible, comparatively to individual owners. But the recent investment (takes over or 'take shares') in the fishing industrial sector from groups comes specialized initially in the fish processing or distribution at the European level (or worldwide) seems to be no consistent with our estimation of the profitability of the sector, in terms of opportunity to invest in it (the main limit of the ROC as an indicator of the past results and not of future results is shown there).

Table 7.3 Average ROC per vessel in France in 1990-1995 (percentages)

	1990	1991	1992	1993	1994	1995
Trawler (24 m., 442 kW, 100 GRT, port of Guilvinec)	21	10	5	-1	6	7
Trawler (34 m., 619 kW, 233 GRT, port of Concarneau)	-9	-10	-12	-17	-11	
Trawler (33 m., 610 kW, 234 GRT, port of Etel-Lorient)	-22	-25	-27	-49		
Trawler (55 m., 2139 kW, 645 GRT, port of Lorient)	-20	-16	-17	-16		

An inversion of the decreasing trend is observed in 1993 for the categories from which economic data are available and companies have confirmed this fact in the questionnaires. The evaluation of the impact of innovations and public policies are then useful to understand this recovery.

7.3 The Dutch cutter fleet

Table 7.4 contains the ROC per size group during the period 1991-1995, e.g. the years that are covered by this study.

Table 7.4 Average ROC per vessel in the Netherlands (percentages)

Vessel group (kW)	1991	1992	1993	1994	1995
Region North					
110 - 150	4.3	1.8	-2.1	3.1	11.9
151 - 190	1.7	1.6	-1.3	0.8	0.1
191 - 220	12.2	7.3	3.6	0.9	3.4
295 - 440	8.8	2.4	0.7	1.1	3.3
810 - 1,100	15.3	9.0	2.5	1.9	1.0
1,101 - 1,470	17.3	11.5	5.9	6.4	5.6
>1,470	9.7	7.2	5.6	3.4	2.5
Region South					
191 - 220	3.8	3.0	3.9	2.9	5.7
810 - 1,100	11.2	9.6	2.9	.	.
1,101 - 1,470	.	.	.	9.2	8.3
>1,470	11.4	5.0	6.3	6.4	6.3

Source: Fishery accountancy data network of LEI-DLO.

The development of the ROC shows a declining tendency in most cases in these five years. The year 1995 indicates a stabilization or improvement for some vessel groups. It has to be kept in mind that 1991 was a very favourable year mainly as a result of the high flatfish prices. Only in this year the level of ROC allowed a 'normal' reward for the total capital invested in the vessel 1) in most cases. This reward can be assumed to be some 8%. The ROC remained below 4% in most cases in the years after 1991.

In spite of this rather low level of the ROC, the vessel owners characterized the years 1993-1995 as 'moderate' or 'good' (chapter 6, results of the interviews). This indicates that the vessel owners do not have a 'sufficient' reward for their own capital in mind, as is mostly the case in family enterprises.

The level of the ROC is in fact overestimated since the value of the fishing rights (ITQs) has not been included. These rights may represent a very high value on the basis of current market prices. For the larger beamers this value may even equal the value of the vessel. However, the market value of ITQs does not apply to full ITQs, but only to marginal quantities that are traded.

7.4 The United Kingdom

In the case of the 1993 samples estimated ROC were negative in all sectors/sub-sectors with the exception of the Scottish nephrop trawlers. These figures do, however, represent marginal improvements relative to out-turns in the case of the previous year's samples with the notable exceptions of the Scottish demersal trawlers and the smaller (25-50 GRT) demersal seiners (also the smaller (9.5-25 GRT) nephrop trawlers).

This general if marginal improvement is consistent with overall indicators relating to the fishery as a whole, which have already been discussed and include increases in overall industry landings and earnings associated with higher TACs 2).

Whilst (as has been emphasized in the earlier discussions) any strict comparisons as between sample out-turns from one year to the next are ruled out because of sample fluctuations, it is interesting to note the overall 'improved'

---

1) Represented by the insured value.

2) The contrastive out-turn in the case of the Scottish demersal trawlers is probably due to a mix of factors including the change in the scale and composition of the sample itself. For example, the larger, (81-130 GRT) vessels in the 1993 sample achieved significantly lower average gross earnings than the corresponding vessels in the 1992 sample, while average effort and operating costs were broadly identical in both cases. Given the overall indicators for this sector as a whole, including the improvements in average catch rates, this then may suggest the possibility of relative inefficiencies in the case of the 1993 sample although of course this cannot be confirmed on the basis of these statistics alone. Similarly, the out-lying results in case of the smaller demersal seiners appear to be largely attributable to randomly higher than average year-on-year vessel costs in the case of the 1993 sample.

performance of the 1993 Scottish demersal seiners relative to the 1992 sample. This may partly reflect technical innovations (e.g. the introduction of 'pair-seining').

In summary, it may be noted that on our estimates ROC in the UK demersal fishery have generally been negative throughout the survey period. As between 1991 and 1993, however, the total numbers of vessels (under 10 m excluded) in the Scottish demersal fleet barely changed (564-1991: 557, 1993). This suggests that the industry may be able to cope with negative ROC for considerable periods no doubt in this case partly due to optimistic expectations including the future benefits of conservation the prospect of a decommissioning scheme; and speculations 1) that fishing licences/entitlements might increase in value as the fisheries improved.

Table 7.5 Average ROC per vessel in the United Kingdom (percentages)

	1990	1991	1992	1993
ENGLAND				
Beam Trawlers				
100-430 GRT	0.4	-2.7	-7.1	-6.2
100-225 GRT	-1.2	-6.9	-7.1	-6.1
225-430 GRT	1.3	-1.5	-7.3	-6.2
SCOTLAND				
Demersal Trawlers				
20-174 GRT	1.1	-1.0	-0.8	-4.3
20- 45 GRT	2.1	-1.3	-2.0	-6.9
45- 59 GRT	2.6	-4.9	-1.2	-3.0
61-174 GRT	-0.1	0.2	-0.1	-4.8
Demersal Seiners				
25-125 GRT	1.2	0.0	-6.4	-0.7
25- 50 GRT	3.8	-2.0	-7.9	-20.7
50-75.5 GRT	1.2	3.3	-2.5	-0.5
76-125 GRT	0.5	-0.5	-7.3	-1.1
Nephrop Trawlers				
9.5- 50 GRT		-5.6	0.6	1.3
9.5- 25 GRT	N/A	0.9	0.0	-1.5
29- 50 GRT		-11.0	0.8	2.9

1) Which have since turned out to be well justified.

8. IMPACT OF PUBLIC POLICIES AND OTHER MAJOR FACTORS ON THE RETURN ON CAPITAL IN THE PERIOD 1991-1996

8.1 Denmark

There are two main components of the public policy that have affected the economic performance of the operating vessels. First of all the restrictions of the available quantity of consumption quotas is seen to have impact on the economic performance of the Danish seiners, gill netters and the small and medium-size trawlers. Second, the implemented decommissioning scheme has had considerable impact on the structure of the Danish fishing fleet, and in this sense has indirectly altered the average economic performance for the operating vessels.

In addition to the public policies the abundance of fish for reduction is seen to have importance for the economic performance of the operating reduction fleet. Finally it is noted that common methods of calculating depreciation and interest expense are based on assumptions that have consequences for the estimated ROC. However, when calculating depreciation and interest costs, it has to be recognized that the Danish fishing fleet in general is among the oldest operating fleets within EU. Therefore, in addition to the common calculation of depreciation and interest costs, a Danish calculation method has been used. It is seen that the depreciation costs significantly affect the estimated ROC of the vessels.

The impact of the quotas

In the period between 1990 and 1996 the development in the cod quota had a major impact on the economic performance of the vessels. First of all, there is large difference between ability the single vessels categories to adjust their fishing pattern to changes in the cod quota. In general the gill netters but also Danish seiners have a large share of their earnings in the cod fisheries. In this sense the gill netters have been affected strongly by the relatively low quota of cod in the early nineties. However, as seen in table 8.1, there is a growing tendency in the cod quotas in 1995 and 1996, which will presumably affect the economic performance of the gill netters and seiners.

The plaice quota is of particular importance for the seiners, where it contributes 40-50% of their earnings (appendix 5). The plaice quota has been rather stable between 1990 and 1994. However, there is a remarkable decrease in the quotas in 1995 and 1996, which would presumably affect the economic performance of the seiners.

Table 8.1 Danish fishing quotas on selected species in EC fishing zone and third country fishing Zone 1990-1996 (tonnes)

	Cod (1)	Plaice (2)	Sole (3)	Haddock (4)	Hake (5)	Lobster (6)
1990	103,125	43,566	1,845	9,925	2,595	
1991	87,862	42,680	2,195	5,240	3,430	
1992	64,752	44,220	2,570	5,425	3,490	
1993	46,854	43,513	3,645	11,015	3,580	
1994	52,865	44,608	3,040	13,890	2,900	4,275
1995	76,765	31,836	3,770	11,910	2,630	4,275
1996	92,960	29,580	2,765	12,740	2,460	4,345

(1) ICES 3A+B+C+D,4,2A + Swedish fishing zone 3D
(2) ICES 3A+B+C+D,4,2A
(3) ICES 3A+B+C+D,4,2A
(4) ICES 3A+B+C+D,4,2A
(5) 3A+B+C+D,4,2A
(6) ICES in 1994 3A+B+C+D,4,2A

In the following the impact of the 1996 quotas on the economic performance of the distinguished vessel categories is estimated. The implemented quota policy in 1996 gives a good estimate of the anticipated catches of consumption species in 1996. The revenue shares distributed on species for the vessel categories in Thyborøn is outlined in appendix 5. When assuming that the average revenue shares calculated in the period 1988 to 1994 are also valid for 1996, we are able to predict the effect of the quota policy in 1996. Finally it has to be noted that the operating costs and prices of the species' are assumed to be constant, when estimating the impact of the 1996 quotas.

The most important change in the quota between 1995 and 1996 is that the cod quota increased with 21%, whereas the plaice quota has been reduced with 7%. The impact of the 1996 quota is predicted to double the ROC for the gill netters. This estimated is based on the fact that the netters generate more than 50% of their earnings in the cod fisheries. The economic performance of the Danish seiners will be affected positively by the development in the cod fisheries, whereas the decrease in the plaice fisheries will tend to reduce earnings. However, in general an increase in the ROC of 2.5-3.3% points is predicted for the seiners. The trawlers in the range between 50 to 120 GRT are also predicted to have an increase of the ROC in 1996, this is explained by the fact that 25% of their earnings are generated in cod fisheries. The increase in 1996 consumption quotas will only have a minor effect on the other trawler categories, because they are targeting species for reduction.

The fishing quotas give a misleading picture of the restrictions that the reduction fishers are facing. However, in order to give an indication of how the abundance of reduction fish will affect the different vessel categories, we have assumed that abundance of reduction fish is increased by 5% in 1996 compared

to 1995. When taking account of the revenue shares, seen in appendix 5, this change in the abundance of reduction species will affect the vessels categories differently. First of all it is noted that the Danish seiners, gill netters and trawlers smaller than 50 GRT will be unaffected by a change in the abundance of reduction fish. On the other hand the trawlers larger than 120 GRT having a revenue in the reduction fisheries of nearly 70% will be highly affected by changes in the abundance of reduction fish. Based on the present calculation it is seen that a 5% increase in abundance of reduction will increase the ROC for the large trawlers with 30-40%, assuming that operating cost are expected to be constant.

The impact of decommissioning scheme

In the period 1990-1996 the decommissioning scheme has been a widely used tool in the restructuring of the Danish fishing fleet. By studying the development of the fishing capacity in the single vessel categories as shown in the table, we get an impression of the large impact of the decommissioning scheme on the structure of the fleet. Between 1990 and 1995 there has been a decrease in the GRT capacity of 50% for the Danish seiners and the trawlers smaller than 120 GRT. On the other hand the GRT capacity of the trawlers larger 200 GRT has been doubled in Thyborøn between 1990 and 1995. However, it should be emphasized that there has been a general re-classification of the vessels from GRT to GT, which means that there is some uncertainty in the development in the GRT/GT over the period. The conclusion is that the decommissioning scheme was of major importance in decreasing the fishing capacity of the small and medium-size vessels. However, the decommissioning scheme

Table 8.2 The development in GRT/GT fishing capacity distributed on vessels categories in the port of Thyborøn 1990-1995

	Trawler 0-50*)	Trawler 50-120	Trawler 120-200	Trawler >200	D.Seine <30	D.Seine >30	Gill net a)
1990	806	1,796	3,484	4,263	335	3,885	1,892
1991	972	1,903	3,780	5,102	316	3,880	1,915
1992	515	1,179	3,773	5,384	259	3,748	1,959
1993	395	976	3,993	5,896	173	2,856	1,912
1994	831	1,028	3,366	8,101	173	2,550	2,045
1995	821	916	2,877	9,077	145	2,417	2,002
Change 1990/1995 b)	-51%	-49%	-17%	113%	-57%	-38%	1%
Change per year b)	-17%	-10%	-3%	23%	-11%	-8%	0%

a) In the period 1990-1993 the trawlers 0-50 GRT and gill netters is defined as vessels more than 5 GRT. In 1995 and 1996 the trawlers 0-50 GRT and gill netters are defined as vessels more 6 metres; b) The change in GRT capacity between 1990 and 1995 only cover the period 1990 to 1993 for the gill netters and the trawlers smaller than 50 GRT.

had no impact on the growth of the fishing capacity of the large trawlers in Thyborøn, which presumably is caused by the fact that these vessels have been re-classified from GRT to GT.

In general it is difficult to see any immediate relationship between the decommissioning scheme and the economic performance of the operating vessels in the sense that the decommissioning scheme is advantageous for the vessel owners who are leaving the fisheries. Moreover, it is noted, that the decommissioning scheme should imply that the vessels with the poorest economic performance get an incentive to leave the fishery, as they are compensated economically by quitting the fishery. In the long run the reduction in the capacity of the fleet is of benefit for the remaining vessels as the pressure on the stocks is reduced. In the short run the decommissioning scheme results in an increased performance of the average vessel in a statistical sense, because the average economic result is increased, while enterprises with the poorest performance are excluded from the sample. In the following the focus is on the short-run effect of the decommissioning scheme. In the Danish case this is approximated by use of the available information of the vessels in Hirthals in 1991, where the vessels are grouped according to their performance in three groups: good results, medium results, and bad results (appendix 5).

It is assumed that when the decommissioning scheme is implemented, the vessels with the poorest economic performance will quit the fishery. In the Danish case it is assumed that a 5% reduction in the number of vessels in each category means that the vessels with the lowest gross cash flow are quitting the fisheries. Based on calculations in appendix 5 an exclusion of 5% of the worst performing vessels, in e.g. the category of Danish seiners and gill netters, gives an increase of the average gross cash flow of 3.6%. By using the average increase in gross cash flow in Hirthals for the comparable vessel categories in Thyborøn, the full effect of the decommissioning scheme is outlined (table 8.3). In general terms the effect of a 5% decrease in the number of operating vessels is a 0.3% increase in average ROC, which covers an increase in the ROC of 0.4% for the Danish seiners and gill netters and an increase of about 0.2% for the trawlers smaller than 50 GRT in the Thyborøn.

The impact of the 'calculation of depreciation costs' on the ROC

The ROC calculated for 1995 is based on the assumption that the depreciation costs follow the common method of calculating depreciation costs. However, the Danish fishing fleet is old in European terms and this calls for a method that takes more explicitly into account the Danish fishing fleet. The Danish method of estimating depreciation is based on the information of booked insurance value and the age of the vessel. The average rate of depreciation of each vessel category is calculated by using the booked insurance value and the replacement value of the vessel relative to the age of the vessel. In general the average depreciation in Denmark is calculated from the following equation:

$$\text{Average depreciation rate} = \frac{(\text{- insurance value / replacement value})}{\text{vessel age}}$$

The average rate of depreciation for the Danish vessels is outlined in appendix 5. By separating the vessels in groups of vessels with age ≤ 25 years and the vessels older than 25 years it appears that there is an average depreciation rate of 1.9% for vessels younger than 25 years and 1.4% for vessels older than 25 years. These estimated average depreciation rates form the basis for the calculation of the depreciation costs, which is outlined in appendix 5.

In general the result of using the age of the vessel when estimating the depreciation costs is that the ROC is improved. Moreover, it has to be recognized that the Danish method of calculating depreciation costs gives an ROC that is more in line with the economic performance as seen by the representatives from the fisheries.

Table 8.3 Sensitivity analysis of the ROC in Denmark

Vessel category	Sensitivity analysis of ROC (percentages)				
	1995 Common method	1996 consumption on quotas	5% increase abundance of reduction fish	5% decommissioning schemed	Danish method
Trawler 0-50 GRT	6.7	8.6	6.8	6.9	8.5
Trawler 50-120 GRT	2.4	5.5	3.5	2.7	4.3
Trawler 120-200 GRT	6.0	7.4	8.0	6.3	10.0
Trawler > 200 GRT	4.3	4.1	6.1	4.6	8.3
Danish seiners < 30 GRT	4.2	6.6	4.2	4.5	8.0
Danish seiners > 30 GRT	3.2	6.5	3.2	3.5	5.3
Gill netters	4.9	10.4	4.9	5.1	6.1

(1) Calculated based on revenue shares for the particular vessel categories (outlined in appendix 5) and the quota policy in 1996 (outlined in table 8.1). The calculation base on the species: Cod, plaice, sole, haddock, hake and lobster.

Looking at table 8.4, it has to be concluded that the increase in the consumption quotas between 1995 and 1996 are seen to have a positive implication for especially the gill netters. Moreover, also the vessels categories of Danish seiners and medium size trawlers (50-120 GRT) are predicted to have better performance in 1996 compared to 1995. The increase in abundance of reduction species will increase the economic performance for the trawlers larger than 120 GRT. It is estimated that a 5% increase in abundance of reduction species will increase the ROC by 30-40%. In general the decommissioning scheme has only a small impact on the economic performance of the operating vessels in the short run. The largest economic effect of the decommissioning scheme is presumably for the vessel owners who have decided to leave the fisheries and for the commercial banks that lend money to the fishermen. Finally, the analysis shows that the estimation of depreciation costs has an important impact on the estimated ROC. In general the Danish method is designed

to take account of the vessel structure in Denmark, and in this sense the Danish ROC, as outlined in table 8.3, will give a better impression of the economic performance of the operating Danish vessels. This means the Danish fishermen in Thyborøn 1995 had a return of 4-10% of their invested capital, which gives an indication of an effective fishing fleet.

8.2 France

The decrease of the fish prices was the major determinant of the evolution of the profitability of the vessels between 1991 and 1993. However, it is not the only factor. The profitability, and so far the viability of the fishing sector, depends also on the availability of the marine resource.

In France, all the vessels in activity can compete for the national quotas and the fishery is stopped when the quota is totally caught. The TAC is based on estimation of biologists about the abundance of the specie so that a decreasing quota may be correlated with a less availability of the specie. The evolution of the French quotas/species in the EU waters shows globally a decreasing trend between 1991 and 1993 and an increasing one between 1993 and 1996. So that in the period 1991-1993, apart from the lower prices, the vessels were confronted with a relative scarcity of the marine resource.

Table 8.4 Quotas of french fishing fleet (tonnes)

	1991	1992	1993	1994	1995	1996	1991-1993 (%)	1993-1996 (%)
Cod	26,830	24,885	23,870	23,450	24,120	26,780	-11	12
Haddock	7,225	7,310	14,030	15,290	13,370	14,250	94	2
Saithe	58,660	49,385	41,515	42,035	44,795	43,325	-29	4
Whiting	31,798	28,980	30,180	30,325	30,030	32,870	-5	9
Hake	35,850	36,780	37,880	31,870	29,200	27,040	6	-29
Anglerfish	31,830	31,830	20,090	19,270	18,850	23,480	-37	17

Source: 'TAC et quotas de pêche' ed. by Direction générale de la pêche (Commission des Communautés Européennes).

It must be underlined that the inverse effect caused by the decommissioning of vessels during the same period must be examined. For some species and particularly for hake, whiting and anglerfish, some big artisanal vessels compete with industrial vessels on the same stocks and the decommissioning in the artisanal sector may have positive effects on the industrial sector and vice versa. Taking all the determining factors into account will be too complex to investigate here.

A decommissioning plan has been implemented in the French fishing sector in 1991 and this involved the complete fleet. The decrease of the total capacity of the industrial fleet (in terms of number of vessels) is shown. The decrease is more pronounced between 1993 and 1995.

Table 8.5 Capacity (1990-1995) number of vessels over 24 m. (Industrial fresh stern trawler)

	1991	1992	1993	1994	1995	1991-95
Total	114	110	97	82	76	-33%

Source: Données UAPF (1991-1996), Données CRTS.

Impact of quotas and decommissioning policy on the ROC

Assuming that everything is constant and that the average vessel is representative for the behaviour of all the vessels in its category, it may be interesting to estimate the effect of changes quota on the ROC for each category. Next, the effect of decommissioning a part of the worst performers in the fleet will be evaluated. The comparison is based on the ROC of 1993.

If we expect that the effect of an increase in quota and of the exit of vessels will be positive on the ROC, according to the assumptions we made (the constancy of the economic environment), it will be also interesting to underline the differences in the sensitivity of the ROC to public policies.

Effects on quota changes on ROCs

The quotas are supposed to increase 5% for all vessel categories. An important species is one which contributes to the total earnings more than 10%. The 5% increase in quota is assumed to be a direct reaction to earnings (so that prices and cost structure are assumed to be constant). There is no need for additional costs to capture the supplementary quota.

Table 8.6 Effects of quota changes on the ROC (percentages)

Port	GRT	Common method (ROC 93)	5% increase quotas
Guilvinec	100	-1,25	0,92
Concarneau	233	-16,87	-16,00
Lorient	234	-48,70	-44,92
Lorient	645	-15,72	-13,33

The sensitivity of each fleet to this policy quota varies from 0.87% to 3.78%. In fact, it depends on the specialized/diversified behaviour of each ves-

sel category. The results show how this behaviour may differ from one category to another. The 33 metres of Concarneau for example are less sensitive to quota changes because of the strategy of catch diversification they adopt. On the other hand , the 33 metres of Lorient which concentrate their catches on two species are more sensitive to quota changes.

It must be underlined that the fishing gear used by the vessels of our sample is the same and corresponds to the stern trawl so that this behavioural difference (specialization/diversification of catch) may correspond to a strategic choice made by the companies in the sample. This should lead to further investigation.

Table 8.7 Contribution to total earnings of different species in France

	Guilvinec 100 GRT	Concarneau 233 GRT	Lorient 234 GRT	Lorient 645 GRT
> 40%		Whiting		
30 - 40%	Anglerfish		Cod	
20 - 30%		Anglerfish		Saithe
10 - 20%	Megrim			
Ray	Cod		Ling	
			Rat-tail	
			Cod	
			Anglerfish	

Effects of decommissioning policy on the ROC

The rate of exit in the industrial sector in the beginning of the 1990s is consistent with the economic results of the activity. A decommissioning policy will be assumed to be efficient if there is an amount of overcapacity. This assumption is reasonable in the case of the French industrial sector.

In order to correspond to reality, a rate of exit of 30% in each category is used. Table 8.5 shows that the total capacity of the industrial fleet was reduced nearly 30% between 1991 and 1995. Even if this trend is different among categories of fleet, we assume that the same rate of decommissioning applies to each category of the fleet.

This decommissioning only affects the vessels with the worst performance so that they leave the fleet firstly. The direct (or short term) effect is an increase of the average results of the fleet. In reality, if we suppose that nothing else changes, the decommissioning reduces the competition for the quotas and increases, with the same effort, the quantity landed by each vessel.

Globally, the sensitivity of the ROC to this rate of decommissioning is less than an increase of 5% quota for the big vessels of Lorient and the Guilvinec fleet. If the dispersions of the gross cash flows inside a category are weak, the effect of a decommissioning policy will also be weak in the short term. This is a statistic evidence.

Table 8.8 Effects of decommissioning 30% of the vessels (percentages)

Port	GRT	Common method ROC 1993	30% Decommissioning
Guilvinec	100	-1.25	0.45
Lorient	234	-48.70	-44.75
Lorient	645	-15.72	-14.12

Note that this estimation can not be made for the 33 metres of Concarneau for which we just have average data.

The Lorient 33 metres ROC appears to be more sensitive to a decommissioning policy. It seems that the bad results of this category are largely caused by very bad performances of some vessels.

8.3 The Netherlands

The main impacts of public policies in the period 1991-1996 on the returns of the cutter fleet regard 1) quota decreases 2) decommissioning of vessels and 3) limitations of the engine power in the form of horsepower licences.

Quota decreases

The major lowering of the Dutch plaice quota has lead to the most important impact of public policies on the returns of the cutters. The 1996 quota was at a 60% lower level compared with 1991. The main decrease (-32%) was imposed for 1996. Moreover, the sole quota was lowered by 21.5% for this year. Section 5.3 already indicates the negative effects for the larger beam trawlers. Table 8.9 explores these effects by indicating the separate quantity- and price effects for larger beam trawlers. Vessels of this size group (1,101-1,470 kW) account for some 50% of the total fishing effort of the beamers.

Table 8.9 shows to which extent the price increases for sole (19%) and plaice (12%) have compensated the quota lowerings. Despite these compensations, a substantial number of firms will run into liquidity problems, as has been stated in section 5.3.

The expectation is that the price increases, especially for plaice, will not hold since some important processors had to stop their activities in 1996. The raw material plaice price became too high to make a profit with processing into frozen plaice fillets.

Table 8.9 Effects of flatfish quota changes on the return on capital of larger beam trawlers (ecu)

	1995 quotas a)	1996 quotas, prices 1995	1996 quotas, prices 1996 b)
1101-1470 kW, Northern ports			
Total earnings	1,211,900	932,500	1,048,200
Gross cash flow	326,800	199,400	270,000
Net profit	85,200	- 42,200	28,400
Return on capital (%)	5.6	0.8	3.6

a) Average returns as in section 5.3; b) Average prices in the period January-August 1996.

Decommissioning

Several decommissioning schemes have been in operation for the Dutch cutter fleet. The last one started in 1992 and ended in 1996. A new budget has been reserved in the latter year for another decommissioning scheme.

In the period 1991-1994 87 vessels accounting for 77,000 horsepower (57,000 kW) have been commissioned (Hans Frost et al., 1995).

This has contributed to the decline of the total engine power of the fleet from 400,100 kW to 360,200 kW by the end of 1995 (-10%, mentioned in section 5.3.3). The decrease has been less than the decommissioning because of new investments. 'Floating' horsepower licences, arisen after the implementation of the horsepower stop in 1984, have generated these new investments.

The fleet contraction has favoured the profitability of the remaining vessels since less cutters target for the same quotas. However, in the Dutch situation the quota rights of the decommissioned vessels do not accrue for free to the remaining vessels. The owners of them have to acquire the ITQs of those owners who leave the fishery or shift to a non-quota species like shrimps 1). Leasing of these ITQs that become available is also possible, but there is only a limited period for holding an ITQ without exploiting a vessel.

The impact of decommissioning on the return on capital is clear in case of leasing an extra quantity of flatfish quota. The gross earnings amount increases and on the other side extra costs of leasing an ITQ influences the return on capital negatively. A posittive balance for the return on capital will remain since the auction price of sole and plaice exceeds the costs of leasing. The following example makes this clear.

The assumption is that the 10% decrease in fleet capacity (mentioned above) has result in 6% extra flatfish quoas for the remaining vessels (those

1) The horsepower licence has to be submitted to the ministry to obtain a decommissioning grant. The individual sole/plaice quota may be kept and can be sold to another vessel owner.

vessel owners who have left the fishery owned lower quota quantities). The example shows the consequences for the return on capital of leasing such an extra quantity.

Table 8.10 Estimated increase of the Return on Capital in case of leasing an extra flatfish ITQ. Example of a beamer in the size class 1101-1470 (ecu)

Additional earnings:		
Sole 6,000 kg, auction price 6.54	=	39,200
Plaice 13,380 kg, auction price 1.56	=	20,900
Bycatch (mainly turbot), 20% of value	=	12,000
Total extra earnings		72,100
Costs of leasing the extra ITQ		22,300
Balance		**49,800**

The extra cash-flow of ecu in the example of table 8.10 leads to an increase of the return on capital from the average 5.6% of these beamers in 1995 to 7.1%, after deduction of 6% extra costs of fuel.

The profitability will also increase in case of buying the extra flatfish quantities that become available from the decommissioned vessels. The return on capital increases even more than in table 8.10 since the applied methodology means no (depreciation and interest) costs for ITQs 1). In practice, buyers of ITQs may have higher costs of interest when a loan has been attracted for the extra ITQ. Moreover, tax payments may be reduced since an eight years fiscal depreciation is allowed on purchased ITQs.

Horsepower ceiling

Licences, specifying the number of horsepower of the vessel, were introduced by the end of 1984. Since then, vessel owners who want to invest in a larger vessel have to purchase additional horsepower rights. This means a ceiling for the total horsepower of the fleet that target on quota species. It took some five years before the total engine power of the operative fleet became stabilized, since there were a substantial number of 'floating' licences. This has been the result of orderings for newbuildings, just before the horsepower stop was implemented.

The increase in horsepower was effectively halted in 1989 and since then this capacity declined continuously in subsequent years.

---

1) The question 'how to deal with fishing rights with respect to profit calculations?' will be considered in the EU FAIR study 'Property Rights in the Fishing Industry', to be published in 1997.

A very important effect of the horsepower ceiling has been the removal of the investment mechanism in the cutter fishery. This contained a sharp increase of newbuildings after profitable years. Typical investment 'waves' can be distingished in the sector in the seventies and eighties. However, after 1989 profitable years did not generate a high investment activity because of the horsepower stop.

Figure 8.1 shows something of this change in investment pattern. This graph indicates the relationship between the return on capital (for the fishery as a whole) and the investents in newbuildings and new engines one year later (the years in the graph are the ones of investment one year after the measured return on capital).

Two periods can be distinguished in this graph: 1984-1989, when a higher return on capital led to an increase in investments and the years 1990-1994, showing a low investment level, rather independent from the relatively high level of return on capital. Especially the relationship between the very high return on capital in 1991 (9.7%, one of the highest of the fishery in the past two decades) and the low investments in 1992 is very particular. The two types of relationships in figure 8.1 demonstrate the break in the investment patttern that the Dutch capacity policy has established.

The high profitability in 1991 has resulted in another type of investments: those in fishing rights, i.e. flatfish ITQs. These investments were indeed higher in 1990 and 1991 than those in vessels and amounted to some hundred million NLG.

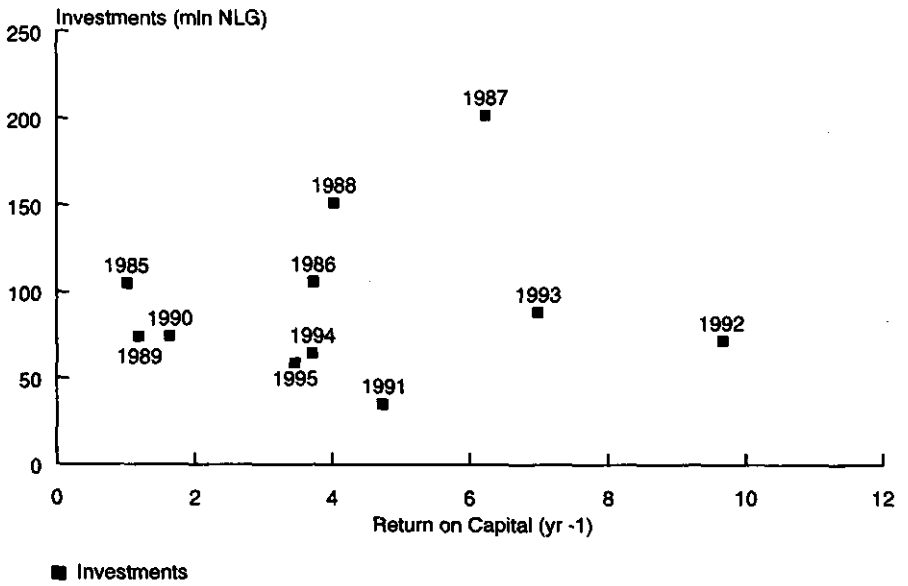


Figure 8.1 Dutch cutter fishery, ROC and investments

The effective horsepower ceiling has favoured the level of return on capital in 1991 and subsequent years. The extension of capacity did no longer absorb a satisfactory level of profitability, since that year.

Higher fuel price

The increase of the fuel price in the second half of 1996 is a major threat for the profitability of the Dutch beamers. This price went up from NLG 0.25 on average in 1995 to 0.35-0.38 in November 1996. This means a cost increase of NLG 140,000 (ecu 66,500) for a larger beamer on an annual basis. The effect on the return on capital is a decrease from a prognosed level of 3.6% (1996) to 1.9%, all else equal (table 8.11). A substantial number of beam trawlers can not remain in operation when these constraints of lower quotas and a higher fuel price will last.

Table 8.11 Effects of a fuel price increase on the return on capital of larger beam trawlers (ecu)

	1996 prognosis	1996 fuel price level Nov. '96
1,101-1,470 kW, Northern ports		
Total earnings	1,048,200	1,048,200
Gross cash flow	270,000	226,100
Net profit	28,400	-15,500
Return on capital (%)	3.6	1.9

8.4 The United Kingdom

The main influences on economic out-turns over this period which have arisen as a result of public policy initiatives relate to conservation and structural measures adopted in furtherance of the aims and objectives of the CFP.

Conservation measures may generally be expected to have a balance of positive and negative impacts. In the short-run for example both additional gear restrictions (such as increases in minimum mesh sizes) and reductions in overall catching possibilities (lower TACs) may have certain negative effects associated with higher costs/lower earnings, the scale of which will depend in principle on the relevant price (and other) elasticities. Even in the short-run, however, there may well be positive influences (e.g. larger mesh sizes may reduce unproductive discarding of small fish).

If such measures have the desired effect on the biology of the fishery, then in the longer term TACs can be enhanced and this can obviously be expected to have positive effects on the industry's economics, although in this case also much will depend on elasticities.

For example, in the case of the Scottish haddock fishery, recorded landings were virtually halved between 1988 and 1990 (down from a total of 91,000 tonnes to 46,000 tonnes) as a result of sharply reduced TACs. But over this period quayside prices, driven by the scarcities of fish, increased by over 70%, so that in the event gross earnings from the fishery fell by less than 10% 1).

Conversely, recorded landings of haddock in Scotland increased from a total of some 43,000 tonnes in 1991 to over 69,000 tonnes in 1993 (i.e. plus 60%) but quayside prices fell by almost 40% over the period reflecting these increases in supply, so that gross earnings from the fishery were in the event virtually unchanged (£ Stg 50.0m in both years).

The impact of *structural measures* is more difficult to assess although it is of course clear that in the absence of a restrictive licensing regime the most likely scenario is a virtual collapse of the industry.

In the case of individual measures, however, some indications are now available e.g. on the likely impacts of the UKs decommissioning scheme over the period 1993/94-1995/96 on the economics of the residual fleet.

For example, over this period a total of 122 vessels are recorded as having been withdrawn from the Scottish fleet under the scheme. In the event, however, the majority of these (more than 60%) were nephrops trawlers and other shellfish vessels, so that the direct impacts on the residual demersal fleet (only reduced by some 40-50 vessels) has really been too small to measure.

It is, however, possible to estimate the effects in the case of the residual Scottish fleet of nephrops trawlers. At its simplest for example, this fleet has been reduced by over 20% in terms of vessel numbers as a consequence of exits under the scheme, so that in principle and on very simplifying assumptions the potential earnings of the residual fleet will have increased by 25% (relative to a scenario in which vessel numbers are assumed to have remained unchanged).

---

1) From £ Stgm 63.5 in 1988 to 56.0 in 1990 (Source: Scottish Sea Fisheries Statistical Tables: 1994)

In the country report 1992 (UK, page 22-25) the results are presented of an analysis of the likely impacts of changes in productivity prices and fishing opportunities on estimated ROC. This is not repeated here, but may be generally regarded as providing a soundly based indication of the relevant realities in the case of *marginal* changes in the selected variables. In the case of non-marginal changes, however, (and as illustrated in 7.4/7.5 above) the out-turn has to reflect the relevant elasticities; so that any models based on marginal changes are likely to be misleading.

9. IMPACT OF INNOVATIVE TECHNIQUES

9.1 Denmark

In general terms there has only been minor innovation in the Danish fishing fleet in the 1990s. The major technical developments and investments have been undertaken by the owners of the large trawlers targeting species for reduction. The owners have improved the loading and facilities including cooling and draining facilities of the vessels. The consequences of the storage investments were a reduction of the quantity of ice used and moreover an increase of the general quality of the fish landed. Moreover, the owners of the large trawlers have been investing in increasing the engine power of the vessels. However, investments in new engines are more regarded as maintenance of the vessels rather than a technical innovation.

Investments in the consumption vessels is motivated by maintenance rather than a technically improvement of the vessels. However, it is noted that the landings of herring in Skagen have changed from landing by fish boxes to automatic landing facilities. Moreover there has been a tendency toward more careful handling of the catch by the Danish seiners and gill netters. Finally it has been noted that many of the Danish seiners have quitted the fishery, which in fact indicate the lack of incentives to undertake technical innovation in consumption fleet.

The general conclusion is that innovations are regarded to be of only minor importance for the economic performance of the Danish fishing vessels. On contrary the development in the Danish fisheries has been characterised by a general reduction of the fishing capacity. This development will increase the average productivity of the operating vessels, because the vessels with the lo-

Table 9.1 Calculation of effect on increased productivity (percentages)

Vessel category	Common method	2% increased productivity	12,5% increased productivity
Trawler 0-50 GRT	6.7	7.8	13.4
Trawler 50-120 GRT	2.4	3.7	10.3
Trawler 120-200 GRT	6.0	6.9	11.9
Trawler > 200 GRT	4.3	5.1	9.5
Danish seiners < 30 GRT	4.2	5.6	12.8
Danish seiners > 30 GRT	3.2	4.4	10.4
Gill netters	4.9	6.3	13.6

west productivity are leaving the fleet. In this sense an increase in productivity is seen as a consequence of the implemented decommissioning scheme rather than an increase in investments in new technology.

The consequence of increased productivity on the economic performance of the operating vessels is estimated in table 9.1. It is assumed that increased productivity would lead to reduced operating costs, while keeping earnings and depreciation costs constant. The effect of a 2% increase in the productivity is a estimated to give a 1.1% increase in the average ROC of the vessel. On the other hand if the productivity in the period 1990 to 1996 have increased by 12.5% the ROC would have been nearly doubled in the period. In this sense a rather moderate increase in productivity is able to give a large effect on the economic performance over the long run. However, in the Danish case there is not seen any tendency towards large increases in the productivity of the vessels in the nineties. Moreover, it has to be recognised that large increase in the productivity of the vessels would demand a increased pressure for the restructuring the fleet to prevent an increased pressure on the fish stock.

9.2 France

The beginning of the 1990s is characterized by a lack of public grants for new vessels. Anyway, instead of being replaced by new ones, most of the vessels of the sample have been modernized during the period. Those modernization were accompanied by the introduction of new techniques on board which could be sometimes considered as innovations.

A taxonomy of innovations implemented by the fishing vessels has been proposed in the first interim report and included either technical innovations or organizational ones.

A) Technical innovations

Those innovations refer to the material investment implemented on board by companies and concern the direct or indirect means to catch the fish, the electronic equipment and the means for the handling and conditioning on board of the catch.

1. The direct or indirect means to catch the fish:
   in this category, innovations may concern the shipbuilding, the propelling system and the fishing gears. For the industrial fleet, fishing gears include trawl, trawl doors, warps, trawl drums and trawl winch. Because of the lack of new built vessels, the innovations have mainly concerned the fishing gears. The discovery of new species and particularly new bottom species (rat-tail, rough fish) has changed the target species of some vessels, especially the biggest vessels. Those new fishing strategies have forced companies to adapt their fishing gears.
2. The electronic equipment:
   main innovations appear in the fields of acoustic detection of fish and the transmission of the information (between the fishing vessel at sea

and its company particularly). The satellite systems (standard C or standard M) are now replacing the traditional methods of communication VHF or UHF. Those new systems allow to communicate instantaneously and confidentially by phone, telex or telecopy.
The GPS (Global Positioning System) is now largely diffused in the fishing industrial sector just like the computers on board which give the network management of all the information and which are mainly used for the management of the fishing plans.

3. The means of handling and conditioning the fish on board:
the objective of the companies is to improve the quality of the fish. The main innovations concerns the conditioning of the fish on board. The containerization of the fish is now current in all industrial vessels (and sometimes it is coupled with sea boxes for high quality fish) and is consistent with the organizational innovations implemented during those last years.

B) Organizational innovations

Strategy of sea products valorization becomes a necessary objective for fishing companies now, faced to the relative scarcity of the marine resource. However, the large duration of the fishing trips endangered this objective (by reducing the freshness of the fish) so that companies decided to investigate new landing sites near the fishing areas. At the same time, new methods of handling and conditioning on board (ice machine, sea box, container) to improve freshness state of products have been implemented. The fish is then landed after 5 or 6 days fishing (while the duration of the trip and then the duration of the storage of the fish on board was approximately 15 days before) and is almost entirely hand-picked on board.
Those new fishing strategies have completely changed the working method of the crew which have now to integrate the quality aspect of the fish as a important objective of the company. The evolution of the fishing market becomes a determining factor of fishing strategies (the choice of the best moment and sites to land the fish for example) and computer meanings allow those continuous data exchange between the company and its vessels.

9.3 The Netherlands

In the period 1991-1996 there has been no major innovations in the fleet. Just minor innovations have been taken place and these are each year so small that the ongoing progression per year is not exactly measurable. These improvements might result in a gradual increase of productivity of 1-2% per year.

9.3.1 Process innovations

Ship and engine

Just for cutters of 0-300 HP and between 1801-2000 HP:

- some new buildings nearly all just 300 HP and 2000 HP;
- small alterations concerning sea behaviour;
- optimalization productivity, mainly for the 2000 HP beamers e.g. by fitting of a larger propeller;
- better manoeuvring possibilities (extra propeller in front).

Electric equipment

All cutters from 300 HP and bigger:

- navigation, communication and fish-searching equipment become more modern every year with slight innovations in relation to the year before.

Fishing methods

All cutters:

- there have no new methods been introduced. Just some perfectioning of the traditional methods with slight alterations. The most spectacular one now is pair trawling on round-fish with three boats instead of two, called triple trawling.

Fishing gear

All cutters:

- just some alterations on gear like beam trawls and pair trawls.

9.3.2 Organizational innovations

Fishing policy and organization by the ship owner

All cutters:

- nearly every owner is member of a management 'group' now since 1993. That makes the total and individual quotas better manageable and gives the owner some more rights compared with non-members of such a 'group'.

Fishing grounds

Cutters 1501 HP and bigger:

- a small part of the fleet above 1500 HP has been searching for new fishing grounds in the north of the North Sea trying to catch plaice.

9.3.3 Product innovations

Catch treatment

Cutters 1501 HP and bigger:

- some cutters, which have the opportunity to trawl on herring, installed new fish stores aboard and land now in so called 'tubs' for a better quality;

- there is a tendency (in a trial phase yet) to improve the catch treatment by weighting and sorting of the fish on board.

9.3.4 A case study for 1470 HP beam trawlers

Since 1987 the maximum engine capacity of new build vessels in the Netherlands is set at 1,470 kW. Before that year vessels were built with engine capacity up to 3,000 kW. Nowadays vessels in the HP-group 1,101-1,470 kW (all beam trawlers) have become the most important vessel category in the Netherlands. In terms of value of landings they account for almost 40% of the total Dutch landings value of the cutter sector.

Productivity of the fleet is assumed to increase about 1-2% per year in the context of this ROC-project. This means that productivity of the relatively new 1470 kW beam trawlers should be significantly higher than productivity of the older beam trawlers with comparable engine capacity. To test this hypothesis a sample of the LEI-DLO cost and earnings-panel has been analysed. The results are shown in the table below.

Table 9.2 Average results of large beam trawlers in 1994, selection by age of the vessel (ecu)

Group	Hull, age ≥ 9 years	Hull, age < 9 years
Average engine power (kW)	1435	1480
Average age (years)	13	3
Average number of days-at-sea	201	201
Number of vessels	13	10
Total earnings	1,190,031	1,384,956
Total costs/expenses	898,934	966,659
Gross cash flow	291,096	418,297
Depreciation	196,312	309,486
Interest	76,395	161,481
Net result	18,389	-52,670
Insurance value	2,486,495	2,352,364
Return on capital	3,8%	4,6%

Source: Costs and earnings panel of the Dutch Fishery Accounting Data Network.

The gross cash flow of the new vessels is significantly higher compared with the older vessels. New vessels perform better, especially with respect to earnings. The average earnings per day-at-sea are 16% higher in 1994.

Total costs are also somewhat higher for the new vessels. This is mainly due to labour costs which are directly related to earnings on board of the Dutch cutters. Higher earnings lead to higher wages for the crew. In terms of gross added value (gross cash flow plus wages) the relative performance of new vessels is therefore even better.

As could be expected depreciation and interest costs are much lower for the older vessels resulting in a positive net results. The average net result for the new vessels is negative. Part of this can be explained by the fact that in the above table depreciation costs are calculated using a degressive depreciation method.

Average ROC in 1994 for the new vessels is 4,6% which is considerably higher than ROC of the older vessels (3,8%) 1) . Lower net results are more than compensated by higher imputed interest income. The insurance value of the vessels is estimated on the basis of reported insurance costs. Whether this approach leads to representative estimates in the Dutch case remains a question which should be studied more thoroughly in the future.

Further analysis shows that old vessels with relatively new engines perform slightly better than the average old vessel. It seems that the age of the casco is a by far a more influencing factor than age of the engine.

Conclusions

Newer 1,470 kW-vessels seem to be significantly more productive than the older vessels in this category. Reasons for this are mostly related to ship and engine:

- small alterations which improve sea behaviour of the vessel;
- optimalization of engine productivity, e.g. resulting from a larger propeller;
- improvements of manoeuvring possibilities (extra propeller in front).

All this factors result in a more efficient use of the days at sea. Higher earnings per day-at-sea are therefore possible of course within the quota limitation. Until 1996 this was the way in which productivity increases were exploited in the Dutch cutter sector. In 1996 TACs for plaice and sole were substantially decreased and became therefore a more limiting factor for the vessels. Dutch cutter owners reacted by lowering effort considerably. A strategy of catching the same amount of fish in less days-at-sea is therefore feasible in the future. This strategy results, however, in a relatively less increase of ROC than the old strategy, as is shown in the sensitivity analysis in section 9.3.5. However, the old strategy required additional investment in fishing rights (buy or lease) which are very expensive in the Netherlands.

9.3.5 Two strategies of utilizing a higher productivity

Productivity increases will arise mostly in the size class 1,101-1,470 kW, as the previous section indicates. The 2,000 maximum for the horsepower of the beamers will lead to an optimalization of technical parameters that are not limited. However, in a situation of individual quotas, as is the case for the

---

1) Somewhat lower than in section 7.3. Since the LEI-DLO depreciation has been applied here, in stead of the common method in the uniform totals of chapters 5 and 7.

Dutch beamers, higher catches need the acquisition of extra ITQs. The alternative is to utilize the same flatfish quotas in less fishing days. Table 9.3 indicates which strategy is most profitable, under the assumption that extra quotas will be leased.

The example simulates the productivity increase during a six year's period (assumed to be 12.5%), to get substantial differences between both strategies.

Table 9.3 Two strategies of realizing a higher productivity under a quota situation. Case of 1,470 kW beam trawlers (ecu)

	Average returns in 1995 effort	12.5% higher productivity	
		less more quotas	leasing
Total earnings	1,211,900	1,211,900	1,363,400
Gross cash flow	326,800	354,100	372,800
Net profit	85,200	112,500	131,200
Return on capital	5.6%	6.7%	7.4%

Less effort means 12.5% less fishing days to land the same quota, which result in substantial savings of fuel costs. However, leasing 12.5% extra flatfish ITQs causes a higher return on capital than this effort reduction.

These return on capital figures will be somewhat overestimated since no investment costs, to get a higher productivity, have been included.

The example in table 9.3 makes clear that productivity improvements may be slowed down in a situation of ITQs because of costs of extra fishing rights, to be leased or purchased. Another conclusion is that an ongoing increase of productivity will contribute to high prices of fishing rights (ITQs).

9.4 The United Kingdom

Technical and other innovations in the fishery are mainly driven by the aspirations of the industry and its suppliers to increase earnings and profits. In addition, a separate dynamic is provided by the work of the Sea Fish Industry Authority and the Marine Laboratories of the Fisheries Divisions which undertake independent research into e.g. gear technologies and fish handling.

Earlier statistical analysis in the context of the measurement of relative catching capacities (1980s) has suggested that on average technical and other innovations have tended to improve the efficiency of a unit of fishing capacity by some 2% per year.

Since then the industry's awareness of the need to reduce catching and handling costs and improve product quality (and hence product prices) has been sharpened by a phase of intense competitive pressures associated e.g.

with increased availabilities of imports. If anything therefore the rate of 'technical creep' has probably been increasing since this research was completed.

Shipbuilding

In the areas of marine architecture, new, deep-draughted vessels have been designed and have entered the fleet/are under construction. These are aimed in part at the unregulated fisheries for deep water species on the edge of the Continental Shelf, for which most existing vessels were unsuitable.

In some cases redundant vessels (e.g. former purse seiners) have been adapted to transport live fish/shellfish to export markets offering higher prices than can be obtained in the UK for this type of product.

'Pocket' (under 10m.) beam trawlers, designed to fish close inshore have began to enter the fleet and are reported to be highly competitive.

Small (under 10m.) vessels designed on the 'catamaran' principle (and with two engines) have entered the fleet and are reported to be highly efficient and are equipped to trawl for demersal species/nephrops etcetera.

Fishing Gear

There has been more widespread use of multiple rigs. And an important tranche of the former seine net fleet has begun to practice 'pair seining'. This is reported to have significant competitive advantages including economies in fuel consumption.

'Rock hopping' gear has been designed for use e.g. in the vicinity of marine pipelines where fish are known to congregate but for which conventional trawls are unsuitable. There has also been a progressive increase in the use of static gear notably in the case of gill nets.

Organization Innovations

These include technical improvements to onboard equipment such as more sophisticated radar plotting of vessels and gear, better fish finding equipment and computerised trawl winches.

Other developments include reductions to crew sizes, through mechanization of fish handling (use of onboard sorting systems, conveyor lines etcetera) made feasible by the more widespread introduction of shelter decks.

In the areas of fish quality and marketing, plastic fish boxes have now completely replaced wooden ones and the need to stack boxes in fish auction halls has been reduced by the construction of a number of new markets e.g. at Grimsby and North Shields in England and Lochinver and Scrabster in Scotland. There has also been a trend towards improvements in onboard market information systems. This enables vessels to adjust landing locations in response to market signals.

Finally, although not strictly 'innovations' as such, it is important to note that there have been significant improvements in fisheries infrastructure over the survey period. For example, in the case of Scotland fishing harbours/quayage have been expanded at e.g. Lochinver and Scrabster. This has enabled additional vessels to relocate closer to the relevant fisheries and so reduce unproductive steaming operations. It has also reduced congestion at the harbours

and so idle time spent queueing to land fish/exit from the harbour. The practice of landing and marketing 'black fish' although not a legitimate innovation should perhaps be mentioned for completeness as this is believed to be having a significant impact on financial out-turns in the case of some vessels, although the scale of this activity has been difficult to establish.

10. DISCUSSION OF RESULTS

The special significance of this study is that the return on capital (ROC) and costs and earnings of fishing vessels in four EU countries have been calculated on a uniform basis and are expressed in ecu. This allows a good comparison of the profitability of vessels in Denmark, France, the Netherlands and the United Kingdom.

The ROC is a measure that gives information which is especially useful for the owner of an enterprise since it shows the amount available for the invested capital, after deduction of the costs of labour and of all other costs. This economic indicator seems to be informative for the fishery sector because of the capital intensity of the means of production, the fishing vessels.

However, the interviews which have been held for this project have made clear that the ROC is hardly used by vessel owners, accountants and bankers in the fishery sector. Only bigger companies in France and the United Kingdom, which own or co-own fishing vessels, use this financial indicator regularly. Nevertheless, the ROC provided in this report is useful to:

- identify briefly trends in the economic performance of fishing vessels. In this respect, the ROC is more informative than the pure profit amount since it is related to the invested capital;
- compare the profitability in the fishery sector with profitability levels in other industries;
- get more insight in the behaviour of fishermen.

The latter aspect leads to two conclusion:

1. Fishermen do not require an 'adequate' reward for their labour since the ROC of the vessel groups in the four countries is mostly (far) below the actual costs of capital.
2. A very low or even negative ROC does not suggest that the enterprise has to be stopped within a short time. Owners of family enterprises, like most fishery firms are, can continue their activities for a rather long time, consuming their depreciations and accepting a low reward for their labour. Many farm holdings and fishery enterprises are an example of such a development. The consequence of this is that it may be very difficult to reduce the fleets by imposing limiting measures.

The mix of capital, provided by the owners and labour of the crew members, depending more or less on the proceeds, needs an additional measure like the Net Value Added (NVA). This NVA shows the total income generated both by capital and labour.

Vessels may have a very low return on capital but a NVA that is on the level of rather profitable vessels, as has been shown in the second interim re-

port of this study. This indicates a different relationship between capital- and labour intensity.

The indicator 'gross cash flow' in this report serves special attention since it gives more information about possibilities to survive in the short run. When this indicator is negative, as is the case for the French vessels from Concarneau and Lorient, the situation is alarming. This indicates an immediate shortage to pay the bills of the suppliers and to pay off the loans.

11. FUTURE WORK

Several studies on the economic performances of fleet segments have been carried out on a European scale since 1993:

- the harmonisation exercise in the project 'Costs and earnings of fishing fleets in four EC countries', 1993;
- the 'Analyse de la rentabilité des flottiles de pêche de la Communauté', 1996;
- the economic reports of the FAIR Concerted Action 'Coordination of research in fishery economics', 1996 and 1997;
- the economic reports on six selected fisheries of the STECF sub-group, 1996.

This report provides detailed costs and earnings of fleet segments of four countries, based on sample vessels. Some of the results have been used for one of the reports (on the flatfish fishery) of the STECF sub-group.

Continuation of studies on the economic performance of fleet segments is recommendable and even necessary in view of the basic Regulation for fisheries management (R(EEC) nr.3760/92). The STECF in its meeting of 17.09.93 suggested that an Annual Economic Report (AER) was required in order to comply fully with this Regulation.

This Return on Capital study has established a useful network for data collecting and processing. Continuation of this project could result in building-stones for future issues of the AER.

The establishment of an AER requires a well developed data network in the EU fisheries countries. In this respect, the EU Farm Accountancy Data Network (FADN), in operation in the agricultural sector already for a long time, may serve as an example for future AERs.

APPENDICES

Appendix 1 Danish depreciation and interest calculation

Table A1.1 Imputation of depreciation 1993 (ecu) (Common method)

			Replacement value				Depreciation		
	GRT	kW	age Hull	engine 1)	vessel 2)	total 3)	engine 4)	vessel 5)	total 6)
Thyborøn									
Trawler 0-50	20,8	175,1	25,2	59525	260000	319525	5953	5200	11153
Trawler 50-120	75,1	305,6	26,8	103900	779163	883063	10390	15583	25973
Trawler 120-200	159,7	544,9	21,0	185250	1656888	1842138	18525	66276	84801
Trawler >200	310,3	829,2	21,7	281925	3219363	3501288	28193	128775	156967
Danish seine <30	24,7	100,2	45,0	34075	308750	342825	2283	6175	8458
Danish seine >30	42,0	161,5	34,4	54900	525000	579900	3678	10500	14178
Gill net	16,2	99,6	30,1	33850	202500	236350	2268	4050	6318

1) Replacement value engine = 340 * KW
2) Replacement value vessel = (12500 * GRT; if $0 < GRT \leq 50$)
   = (10375 * GRT; if $GRT > 50$)
3) Replacement value total = replacement value engine + replacement value vessel
4) It is assumed that heavy and light used engines are replaced after respectively 10 and 15 years. The yearly depreciation is:
   - Heavy used engine = 10% of replacement value engine
   - Light used engine = 6.7% of replacement value engine
5) Depreciation vessel = (4% of replacement value vessel; if $0 <$ hull age ≤ 25)
   Depreciation vessel = (2% of replacement value vessel; if hull age > 25)
6) Depreciation total = depreciation engine + depreciation vessel

Table A1.2 Imputation of interest 1993 (ecu) (Common method)

	Age engine	Booked value			Imputed interest 4)
		engine 1)	vessel 2)	total 3)	
Thyborøn					
Trawler 0-50	5	29763	12948	1354	42711
Trawler 50-120	7	31170	37556	68726	2176
Trawler 120-200	1	166725	265102	431827	13689
Trawler > 200	2	225540	424956	650496	20621
Danish seine < 30	0	34075	9263	43338	1374
Danish seine > 30	4	40187	21315	61502	1950
Gill net	0	33850	9092	42042	1361

1) Light and heavy used engines are assumed to be replaced respectively every 15th and 10th year.
2) Booked value engine = ((1-engine age * 10%) * replacement value engine; if engine heavy used). Booked value engine = ((1-engine age * 6.7%) * replacement value engine; if engine light used).
3) Booked value vessel =((1-4% * hull age) * replacement value; if hull age ≤ 25). If the vessel is more than 25 years the booked value after 25 years is 5% of the replacement value. Booked value vessel = (1-2%(vessel - 25) * 5% of vessel replacement value; if hull age > 25).
4) Booked value total = booked value engine + booked value vessel.
5) The interest basis for imputation is the nom. Interest on Government Bonds 8.54 (1992) reduced with inflation 1.92 (1992). Imputed interest expenses = 6.62 of the total booked value.

Appendix 2 The fishing remuneration system in France

Table A2.1 The fishing remuneration system in France

	GROSS EARNINGS (Total earnings) - Costs of selling fish (*Landing costs*) + Auction taxes) =	
	NET EARNINGS	
Remuneration called 'a part' (share system a)		Remuneration called 'minimum wage a system b)
NET EARNINGS - All other running costs (Fuel, Ice, Food...) =		NET EARNINGS =
EARNINGS FOR SHARE		EARNINGS FOR SHARE
% of sharing out Vessel Owner/crew (from 65%-35% to 50%-50%)		
CREW SHARE		INDIVIDUAL SHARE per mille based on the EARNINGS FOR SHARE
INDIVIDUAL SHARE (*Crew member Share*/ total number of shares)		Ex: Seaman share equals 11% skipper share varies from 45 to 60%
Ex: 2 shares for the skipper 1 share for the seaman....		If the individual share <. minimum wage, the crew member receives a compen- sation equal to the difference

a) Used by Lorient 33 metres, Concarneau and Guilvinec vessels as soon as all vessels less than 24 metres in France; b) Generally used by the biggest vessels (here, the Lorient 55 m. vessels). Notes: 'Commitments conventions' may exist and sometimes define a minimum wage. Collective bargainings (bigger vessels) exist and fix especially: the minimum wage per day-at-sea according to the office of the crew member on board; the individual share per mille according to the office of the crew member on board.

Table A2.2 The costs structure of the french industrial vessels

Cost structure		Depending on
Running Costs	Fuel and lube oil - Gasoil - Lube Oil Costs of selling fish - Landings costs - Auctions taxes	Activity of the vessel Quantity landed Earnings
Labour, Social insurance	Labour Social Insurance	Earnings fors shares a) Fixed wage b)
Vessel costs	Repairs, Hire, Maintenance Vessel Insurance Other	Generally assumed as invariable costs a)

a) See appendix 2: The 'minimum wage system' is closely linked with the size of the vessels. All the vessel of our sample do not applied the 'minimum wage system'. In fact, the so called 'semi-industrial' vessels (Lorient -248 GRT-, Concarneau, Guilvinec) use the 'share system', even if 'commitment conventions' exist and define a minimum wage; b) The calculation of 'Social Insurance' is based on a fixed wage defined by interministerial decree and periodically reevaluated. Every member of the crew belongs to a category according to his diploma, his office on the vessel, the type of vessel etc... A fixed wage exists for each category.
Sometimes, the 'Social insurance charges' are deduced from the Net Earnings (in addition to the running costs) to calculate the earnings for shares in the 'share system'.

Table A2.3 Depreciation and interest calculations for french sample vessels (common method) 1993 (ecu)

	m.	kW	GRT	Age hull	Age hull	Replacement value			Depreciation		Total vessel
						engine 1)	engine 2)	vessel	total 3)	engine	
Le Guilvinec	24	442	100	9	6	76782	1213638	1290421	7678	48546	56224
Concarneau	34	619	233	10	5	107530	2815710	2923240	10753	112628	123381
Lorient	33	610	234	22	5	105967	2821752	2927719	10597	98369	108965
Lorient	55	2139	645	19	8	371579	7791541	8163119	37158	311662	348819

	m.	kW	GRT	Age hull	Age engine	Booked value			Real interest rate 4)	Imputed interest
						engine	vessel	total		
Le Guilvinec	24	442	100	9	6	32907	796962	829868	5.06%	41991
Concarneau	34	619	233	10	5	53765	1689426	1743191	5.06%	88205
Lorient	33	610	234	22	5	54866	453595	508461	5.06%	25728
Lorient	55	2139	645	19	8	94093	1930332	2024426	5.06%	102436

1) Replacement value engine = 174 * kW; 2) Replacement value vessel = 12085 * GRT; 3) It is assumed that engines are heavy used and replaced after 10 years. Depreciation is then = 10% * replacement value engine; 4) real interest rate is the rate of bonds 7,16% (1993) reduced with inflation 2.1% (1993).

Table A2.4 Economic indices

	1991	1992	1993	1994	1995
Inflation rate	3.2	2.4	2.1	1.6	2.1
Exchange rate ecu/FF	6.99	6.84	6.62	6.57	6.45
Rate of government bonds	9.43	8.87	7.16	7.33	7.75

Table A2.5 Imputed amounts per vessel group in 1991, 1992 and 1993 (ecu)

	1991	1992	1993
Trawler (24 m., 442 kW, 100 GRT, port of Guilvinec)			
Gross cash flow	86411	73093	51535
Imputed depreciation and interest	108381	109917	98231
Net profit (or loss)	-21970	-36824	-46696
Trawler (34 m., 630 kW, 229 GRT, port of Concarneau)			
Gross cash flow	14903	-6578	-46677
Imputed depreciation and interest	209100	217462	211587
Net profit (or loss)	-194197	-224040	-258264
Trawler (33 m., 631 kW, 248 GRT, port of Lorient)			
Gross cash flow	-73266	-125650	-133270
Imputed depreciation and interest	139600	155619	134706
Net profit (or loss)	-212866	-281269	-267976
Trawler (55 m., 2165 kW, 649 GRT, port of lorient)			
Gross cash flow	-64785	-153491	-14671
Imputed depreciation and interest	481082	480564	448641
Net profit (or loss)	-545867	-634055	-463312

Appendix 3 Dutch enquiry 'perceptions in the industry'

Table A3.1 Main characteristics of vessels involved in the survey of perceptions on profitability amongst vessel owners

Horsepower group	Nr. of vessels a)	Main fishery	Target species
Up to 260	3	Shrimp trawling	Shrimp
261 - 300	4	Shrimp-/ beam trawling	Shrimp/sole/plaice
301 - 1,100	2	Pair trawling	Cod-whiting
1,101 - 2,000	6	Beam trawling	Sole-plaice
> 2,000	2	Beam trawling	Sole-plaice

a) Two vessel owners operate more than one vessel, so that the number of vessels exceeds the number of interviewed owners.

Questionnaire, the Netherlands

For the Dutch situation it is not sensible to send out questionnaires for this project. Answers have to be collected by visiting the fishermen, preferably by the employees of LEI-DLO who already use to visit fishermen more or less regularly.

The workprogram refers to two groups: representatives from banks and from the industry, i.e. fishermen.

Banks, financing fishing vessels

1. Which are the main financial indicators for the bank for information about the financial position of a fishing enterprise? (to be mentioned spontaneously firstly). Then the following indicators could be ranked:
   - fiscal profit- commercial net profit- cash flow- total earnings- return on capital- equity/debt ratio.
2. What is your impression about the returns of fishing vessels in:
   <u>1992</u> <u>1993</u> <u>1994</u>
   good moderate bad
   which were in your opinion the underlying factors for these levels of returns?
3. Were there special fleet segments showing another level of returns?
4. Do you have an idea about the development of the level of debts of fishing enterprises in these past three years? Did it: -increase- remain stable- decrease? which were the main influencing factors?
5. Which are your observations with respect to the level of the return on capital of fishing enterprises in the past three years? Is this indicator for fishing enterprises, compared with other industries, - low- at the same level- high? Do you consider a kind of minimum level for the return on capital?
6. Regarding the European Common Fisheries Policy, which (national) measures do have most impact upon the returns of fishing enterprises? (in the past three years)
7. Do you observe a process of innovation in the fishery sector? which type of investments do show that? are the financial means sufficient to maintain a certain level of innovation?
8. Regarding the value of fishing rights, would you consider this item as an asset and would you prefer to depreciate on it?

In the Netherlands a very limited number of people (no more than ten) are involved in the financing of fishing vessels. Only a small number of persons can be interviewed and therefore the character of the interviews is more an in-depth interview than answering a lot of questions by the multiple choice method.

Questionnaire, the Netherlands

Skipper-owners
Characteristics of enterprise to be collected:
- vessel, identification letter/number;
- length, horsepower, GRT;
- fishery involved.

1. Which are the main financial indicators you use, to be informed about the returns of the vessel? (Ranked as to importance.)
2. Do you usually consult the annual financial report/ balance sheet of the enterprise?
3. What is your impression about the level of returns of your enterprise in the past three years? Which factors are the main cause of this development of returns?
4. What is in general your impression about the returns in the fishery you are involved in, in this year and in the past year?
5. Which national measures have mainly affected the returns of your enterprise?
6. Did you implement innovations in the past three years? Do you have plans for such an implementation? Are there innovations necessary but not possible due to lack of financial means?

There is no time available in this project for extended interviews with a big number of skipper-owners. It can only be a brief survey amongst some 15-20 skipper-owners.

Appendix 4 British enquiry 'perceptions in the industry'

District	Institution
Shetland Islands	Shetland Fish Producers' Organization (SPFO)
	LHD Ltd. (Fish Selling Company and Fishermen's Agents)
	Mr. Hutchison (F.V. 'Charisma'; a new pelagic trawler)
	Clydesdale Bank (main source of commercial lending to the industry in the Shetland Islands)
Peterhead	Peterhead Harbour Trust Ltd
	Peterhead Fisheries Ltd. (Fish Selling Company and Fishermen's Agents: a co-operative organization)
Fraserburgh	Bank of Scotland (main source of commercial lending to industry in Fraserburgh)
	Fraserburgh Inshore Fisheries Ltd. (Fish Selling Company and Fishermen's Agents; a co-operative organization)
	Denholm's Ltd. (Fish Selling Company and investor (minority shares in) inshore fishing vessels)
North East England	Sunderland Marine. Insure fishing vessels
	Alliance Fish, Whitby. Own 5 medium-sized (16m) trawlers fishing mid-North Sea and Yorkshire coast. Manage a few other vessels based in Whitby. Fish processing
	Bridlington Trawlers, Bridlington. Own some 5/6 vessels and processing facilities
Humberside	J. Marr and Sons, Hull. Own a fleet (about 8 vessels) of distant water white fish freezer-trawlers and 1 pelagic freezer. Manage a large number of inshore vessels in England and Scotland via P. and J. Johnstone. Processing and other facilities
	Jubilee Fishing Co., Grimsby. Own/part-own some 15 vessels of various types; trawlers, gill netters and anchor seiners fishing North Sea and Channel. Also manage about 50 other vessels based in Grimsby
Central East England	Colne Fishing Co., Lowestoft. Currently own a fleet of some 10/11 beam trawlers

SCHEDULE

1. How does the Industry assess the on-going profitability of its existing investments in fishing vessels?

2. Is the concept of 'return on capital' normally used as an indicator of financial performance in such assessments; and if so how important is it relative to other financial indicators e.g. cash flows?

3. Aside from financial profitability as conventionally measured, what are the other main factors influencing decisions to retain existing investments? For example, what weight is assigned to the employment aspect of such decisions?

4. When assessing the case for investment/disinvestment in catching capacity, what account is taken of possible alternative opportunities in fisheries related activity e.g. on-shore fish processing?

5. What is the role of the banks/other sources of commercial finance in the context of the Industry's investment/disinvestment decisions? Do they appear to assign much weight to the concept of return on capital?

6. When measuring the current value of the capital invested in fishing vessels, is it normal to assign a value to the associated fishing licences and if so is this acceptable to the banks as additional collateral?

7. What has been the impact on the Industry's financial out-turns of the various additional restrictive management measures introduced in recent years e.g. effort controls (92 day limit; 8 day tie-ups; mesh size regulations)?

8. To what extent has it been feasible to offset the effects of such restrictions by operational adjustments e.g. changes in landing patterns, etc.?

9. Statistical analysis undertaken by Seafish seems to suggest that the Industry's productivities tend to increase at an annual average rate of around 2%. Is this consistent with the Industry's perceptions?

10. What have been the main operational and technical innovations since 1990/91?

11. Our estimates relating to 1990 suggest that in that year the Industry's financial out-turns were broadly consistent with long-run financial viabilities e.g. cash flows were generally on a scale to cover all costs including interest and depreciation. Is this consistent with the Industry's experience?

12. Estimates for 1991 and 1992 suggest a downward trend to levels which if maintained might seem inconsistent with long-run viabilities. Is this consistent with the Industry's perceptions?

Appendix 5 Influences on the Return on Capital (DK)

Table A5.1 Imputation of economic depreciation in Denmark 1995 (ecu)

	Age hull	Calculated value	Actual insured value	Average depreciation per year
Thyborøn				
Trawler 0-50	34	206038	154088	0,0074
Trawler 50-120	26	891896	465388	0,0184
Trawler 120-200	23	1838669	1120775	0,0170
Trawler >200	22	3631121	1911000	0,0215
Danish Seine < 30	47	339458	161463	0,0112
Danish Seine > 30	35	597290	304800	0,0140
Gill net	30	180406	118275	0,0115

1) Replacement value is imputed like:
(<= 50 GRT) 340 ecu * kW + 12500 ecu * GRT
(> 50 GRT) 340 ecu * kW + 10375 ecu * GRT.
2) The actual insurance value of the vessel categories is based on figures from the Ministry of Fisheries.
3) The average depreciation rate is calculated like (1-(insurance value/replacement value))/vessels age.

Table A5.2 Imputation of depreciation, interest and booked value of vessel, 1995 (amounts in ecu, Danish method)

	Age hull	Deprecia 1)	Booked value 2)	Interest 3)
Thyborøn				
Trawler 0-50	34	2885	82209	2877
Trawler 50-120	26	12487	455759	15952
Trawler 120-200	23	34935	1035171	36231
Trawler >200	22	68991	2113312	73966
Danish Seine < 30	47	4752	73662	2578
Danish Seine > 30	35	8362	229957	8048
Gill net	30	2526	82085	2873
Skagen				
Trawler 15-19.9		0	0	0
Trawler 20-49.9		0	0	0
Trawler 50-99.9		0	0	0
Trawler > 100		0	0	0
Hirthals				
Gill net and seiners		0	0	0
Trawler < 50		0	0	0
Trawler 50-120		0	0	0
Trawler > 120		0	0	0

1) Depreciation = 1.9% of replacement value (if age <= 25 years) 1.4% of replacement value (if age > 25 years)/
2) Booked value is imputed like:
(if age <= 25 years) replacement value * (1-1.9% * age).
3) Interest = 3.50% of booked value.

Table A5.3 Average revenue shares (percentages) distributed on species, the port of Thyborøn1988 - 1994

	Trawlers 0-50 GRT	Trawlers 0-120 GRT	Trawlers 120-200 GRT	Trawlers > 200 GRT	Danish seiners <30 GRT	Danish seiners >30 GRT	Gill netters
Cod	18.4	25.5	13.2	2.4	31.2	36.4	51.9
Saithe	-	-	1.3	2.5	-	-	-
Plaice	9.4	15.9	6.3	11.9	48.2	38.3	15.2
Hake	1.6	3.2	-	0.7	4.8	3.9	3.2
Haddock	2.1	4.3	-	-	3.1	5.7	0.4
Sole	1.2	-	-	-	-	-	9.6
Herring	-	-	-	3.0	-	-	-
Mackerel	-	-	-	0.6	-	-	-
Lobster	2.6	-	2.2	-	-	-	-
Shrimp	-	1.8	0.8	-	-	-	-
Norway pout	-	-	7.9	19.6	-	-	-
Sandeel	3.8	29.4	57.0	44.5	-	-	-
Sprat	4.2	0.6	3.3	0.9	-	-	-
Horse mackerel	-	-	-	1.2	-	-	-

Note: Danish Ministry of Fisheries.

Table A5.4 Calculation of effect on average gross flow of decommissioning the vessels with 5% worst performance (ecu)

	Danish seiner/ gill netters	Trawlers < 50 GRT	Trawler 50-120 GRT	Trawler > 120 GRT
Gross cash flow, best part	50265	36083	77370	157926
Gross cash flow, medium part	33973	30288	53790	101103
Gross cash flow, bad part	8736	14166	7264	55731
Average gross cash flow 1)	28518	26178	46142	108233
New average gross cash flow 2)	29560	26811	48188	110996
Percentage increase in gross cash flow, percentage 3)	3.65	2.42	4.43	2.55

Source: Cost and earnings studies, Hirthals, 1991.
Note: Exchange rate DKK/ecu is 8 DKK per ecu.

1) Average gross cash flow = ((number best vessel * gross cash, best) + (number medium vessel * gross cash, medium) + (number bad vessels * gross cash, bad)) divided by total vessel number.
2) New average gross cash flow = [(number best vessel * gross cash, best) + (number medium vessel * gross cash, medium) + (number bad vessels - 5% of total vessels) * gross cash, bad] divided by 95% of total vessel number.
3) Percentage increase in gross cash flow = [New average cash flow - average cash flow] divided by average cash flow.

Appendix 6 Influences on the Return on Capital (UK)

This appendix briefly reviews the role of depreciation in the estimates of ROC, and the impact on the figures of possible adjustments/alternative methods of calculation.

Aside from artisanal sectors the UK fishery is relatively capital-intensive and 'capital consumption' (i.e. depreciation) is hence normally an important component of total production costs. For example, in the case of the English beam trawlers and based on the 'common method' of calculation the 1993 estimates of average depreciation correspond to almost 20% of total gross earnings (table 5.16).

Common Method

This was developed for a former EU study 1) and is based on the replacement values of vessels as measured by the 'current' (i.e. survey year) building costs of a similar new vessel. Based on this cost, hulls are depreciated over 25 years, and engines over a lesser period (10-15 years depending on intensity of usage).

In the case of the UK, where building costs appear to have been much higher than elsewhere in EU 2) and where fishing vessels often remain operational for upwards of 30-35 years, this approach results in relatively high estimates of depreciation and so also low estimates of the corresponding book values, which are inconsistent with actual insured values (see tables 5.16, 5.18 and 5.22).

This is entirely realistic in the context of financial accounting models, since many enterprises are known to adopt a 'high depreciation' policy for e.g. fiscal reasons. It is ,however, less appropriate in the case of economic models, where ideally and in theory book values and the corresponding insured values should be virtually identical.

One possible adjustment to reflect these realities could be to extend the depreciation term and possibly also to make a deduction from 'new build' costs to reflect real capital additions to vessel design over time such as improved accommodation, more powerful equipment etc. both of which would reduce the estimates of depreciation, and hence result in book values in closer alignment with the corresponding insured values. This is illustrated in the table ('Adjusted Common Method') for the case where the depreciation term is extended to 35 years, and new build costs have been abated by 25%.

Danish Method

This approach is similar to the common method insofar as it is based on the same concept of replacement costs. In this case, however, average depreciation *rates* are calculated on the basis of apparent out-turn capital consumption as indicated by the difference between the replacement value of a vessel and its 'current' insured value.

This has the advantage of ensuring that 'book' and insured values are in alignment (by definition). It also generally results in significantly lower estimates of depreciation than the (unadjusted) common method. This is also illustrated in the table ('Danish method').

---

1) 'Costs and earnings of fishning fleets in four EC countries', LEI-DLO (1993).
2) See examples in the LEI-DLO Study (page 99) already referred to.

Other options

An alternative and simpler approach which seems intuitively attractive is to dispense with replacement costs and base the estimates of depreciation squarely on insured values. All that is then needed is an assumption on the remaining operational term of the relevant vessel. This again has the attraction of aligning insured and book values by definition and is also consistent with this study's assumption to the effect that insured values are generally a valid measure of the value of the corresponding capital. This may also, but not necessarily, generate lower estimates than the common method as is illustrated in the table ('Other Option') for the case where the residual operational term of each vessel is estimated by (35 years less vessel age in years).

In line with all the above the table below sets out estimates of annual depreciation book value and ROC on a sample average basis in relation to the English beam trawler and Scottish demersal seiner sectors for the purposes of illustration and in relation to the following scenarios vis-à-vis depreciation.

1. Common method
2. Adjusted common method
3. Danish method
4. Other option.

Table A6.1 Imputed economic depreciation relating to english beam trawlers and scottish demersal seiners based on alternative methods of estimation sample averages 1994/95 (x 1,000 ecu)

Sector	Estimated depreciation	Insured value	Imputed book value	ROC (%)
English beam trawlers				
1. Common method	115	1,426	758	(4.3)
2. Adjusted common method	91	1,426	953	(3.2)
3. Danish method	59	1,426	927	(0.4)
4. Other option	63	1,426	1,426	(0.7)
Scottish demersal seiners				
1. Common method	50	532	250	1.9
2. Adjusted common method	31	532	406	3.6
3. Danish method	36	532	536	4.6
4. Other option	30	532	532	5.7

These figures indicate that the estimates of ROC can be rather sensitive to the method of calculation/underlying assumptions in relation to the estimates of depreciation and this should be borne in mind when considering the figures in the main text.