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Economics Of Small Groundfish Trawlers In Iceland, Norway, And Southern New England

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**Resource Economics
NOAA/Sea Grant**

**University of Rhode Island
Marine Technical Report No. 53**

**Contribution Number 1734 of the Rhode Island Agricultural
Experiment Station**

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The publication is a result of research sponsored by NOAA Office of Sea Grant, Department of Commerce, under Grant #04-6-158-44002. The U.S. Government is authorized to produce and distribute reprints for governmental purposes notwithstanding any copyright notation that may appear hereon.

National jurisdiction over coastal fishery resources is increasing rapidly. In October 1975, Iceland extended its fishery limit to 200 miles, and in June 1976, Mexico took the same step. Canada, Norway and the common market countries will extend their fishery limits to 200 miles on January 1, 1977; and the U. S. will do the same on March 1, 1977. Many other countries, such as the Soviet are expected to follow. These changes in jurisdiction will affect not only the management of the fishery resources and the harvesting by the fishing industry, but also international trade patterns in fish and fishery commodities.

For New England fishermen, the largest competitors have been the Soviet Union, Poland and East Germany. The harvest by these countries has been consumed primarily in eastern Europe and only modest quantities have been shipped to the United States.

The major competitors in the marketplace for the kind of groundfish the New England fishermen supply have come from entirely different countries, the most important being Canada, Japan, Norway and Iceland. One might expect that Japan will be adversely affected by the new 200 mile limits and that in Canada, Iceland and Norway the landings of groundfish might increase significantly, with one major market for this increased supply being the United States.

The immediate effect of extended jurisdiction on the New England fishing industry will be a halt to further deterioration of the fish stocks, rather than a significant increase in the catch. Of the traditional foodfish stocks off New England, such as yellowtail and other flounders, cod, haddock, pollock and ocean perch, domestic fishermen already have 85 percent of the total quota under the International Commission for the Northwest Atlantic Fisheries (ICNAF). Some of these stocks are seriously depleted and it will take time for the stocks to recover from the disastrous effect of foreign fishing over the last 15 years. In short, the potential for recovery is there, but we will see a gradual improvement in landings over time, rather than an immediate one.¹

The bulk of the U. S. groundfish catch is marketed fresh, while the frozen market has been covered by imports. United States has had difficulties competing in the frozen market. Increased domestic catches might eventually exceed what can be marketed fresh and with no possibility for discrimination between buyers, the price will reflect the lowest price use. The price of imported frozen groundfish might determine the ex-vessel price for domestic landings, even if the major share of the catch is sold on the fresh market.

Is the New England fishing industry able to compete with Canada, Iceland and Norway at prices determined by the U. S. frozen market? Will it be able to in the future? Obviously, we have one competitive advantage, and that is the location. Other factors involved are the relative cost of harvesting, relative cost of processing, tariffs and subsidies.

This paper takes a brief look at one of these factors, namely the economics of similar size groundfish trawlers in three areas; Norway, Iceland and New England. Since it is based on only six weeks of field work and includes three countries, the observations are based on a small sample fleet from each country. This paper can only be considered a first step to determine the ease or difficulty in such a comparison.

If we were to study the costs and returns in the groundfisheries, in general, in those three countries, based on their most important producing units, we would have to study small U. S. trawlers, large Icelandic trawlers, Norwegian gillnetters and long liners. It might have been difficult to compare the results. However, we might presume that if 80 foot groundfish trawlers exist in all four countries, they have to be reasonably competitive with other methods of fishing and other sizes of trawlers, otherwise they would not have been used. Comparing catches, intensity of use, investments, prices, costs and returns for these similar sized vessels might shed some light on the reasons for the different costs of raw materials.

The United States has never conducted cost and earnings studies for its major fisheries on a continuing basis as have most of the other major fishing countries. Actually, most of the ad hoc studies published on the economic performance of U. S. fisheries have been carried out by universities. For some major fisheries, "the most recent data available" might be close to ten years old. In Norway and Iceland, comprehensive annual cost and earning studies for vessels in the major fisheries have been carried out for a long time. Canada started to collect data and publish annual reports on the economics of selected fishing enterprises in the Maritime Provinces in the middle 1960's. Unfortunately, it discontinues these studies in 1971 for all provinces except Nova Scotia.² The groundfish trawlers included in the Nova Scotia sample were either much smaller or considerably larger than representative New England trawlers and Canada was therefore not included in this study. Thus, this is a description and an attempt to compare the cost and returns for similar size groundfish trawlers in Norway, Iceland and Southern New England, including vessel characteristics, lay methods and some of the unit costs and prices, subsidies and transfer payments.

While groundfish caught in New England are almost exclusively harvested by trawl, this is not the case in Iceland and particularly not in Norway. Gillnets, long lines and other gear account for a significant percentage of the catch in those countries. Trawling is actually prohibited in large areas.

The trawler size, 60 to 90 feet, is typical of the Rhode Island trawler fleet and a large number of vessels in other New England states also fall within this size category. Most of the trawl fish landed in Iceland and Norway come from vessels much larger than any vessels we have in New England. Choosing similar sized vessels in the three countries helps in conducting certain comparisons. Using a representative vessel size or a stratified sample according to size for each country would be necessary for other comparisons. However, that would call for a considerably larger study than this one.

The data used are for 1974-one year only-and one might question whether 1974 was a representative year. The first six months were pretty good, but during the last six months there was almost a depression in the world fish market. The U. S. vessels fishing for the fresh market were to some extent isolated from part of the world market effect, though high inventories of frozen fish surely affected fresh market prices. As a whole, 1974 was not an unrepresentative year for the New England sample fleet. In Iceland, 1974 was considered a very poor year, while in Norway it was considered a good year for the sample fleet, which primarily fished for the salted fish market and had guaranteed prices.

In this report, each country's sample fleet, including some of the factors affecting its cost and economy, will first be discussed separately. Then an attempt will be made at comparing the cost structures.

This paper is primarily written for the southern New England fishing industry. People in that industry are generally familiar with the underlying causes for the various cost components of trawlers in their region. Therefore, these are not discussed in this paper. However, various underlying reasons or institutional programs affecting the costs and returns for small trawlers in Norway and Iceland, such as lay systems, vessel finance, insurance, transfer payments or subsidies, will be mentioned.

The setup of the accounts is quite different in the three countries, largely due to the fact that studies are carried out for different purposes. How to handle depreciation is generally the most difficult decision to

make when studying economics of fishing vessels. First one has to determine the value to use as a basis for depreciation and then the rate of depreciation. This can be illustrated by the average values for the Norwegian trawlers in our sample:

Book value	\$ 74,219
Market value	\$112,725
Replacement value	\$400,816

It is obvious that the returns to capital will be enormously affected by the choice of value used. In this study, market values have been used both as a basis for depreciation and for interest calculations. Rate of depreciation used is ten percent.

ICELAND

Introduction

No country is as dependent on its fisheries as Iceland. It is the country's most important industry and accounts for about 75 percent of the country's foreign earnings. The value of landings in Iceland in 1974 amounted to \$112.5 million; in addition, Icelandic vessels also unloaded in other countries, such as Britain and Denmark.

Most of the fishing is conducted off the Icelandic coast and the most important species caught are groundfish. Many different kinds of gear are used, such as trawl, gillnet and long line. Many vessels, particularly the smaller ones, use different gear in different seasons. Vessels of less than 100 gross tons can often use gillnets in wintertime fishing for migrating cod, while trawling the rest of the year, particularly for haddock and saith. Only the large stern trawlers go for ocean perch. Trawling is largely prohibited inside the 12 mile limit.

The vessels in the fleet are of a wide range of sizes. Medium-sized trawlers--300 to 500 gross tons--(with a crew of 15) do much better than the larger trawlers of more than 500 gross tons (with a crew of 24), and this is reflected in the crew's share.³ Therefore, many fishermen prefer to be a deckhand on a medium-sized trawler, rather than an officer on a large trawler. A medium-sized trawler catches almost as much fish as a larger one, but the costs are much lower. Over the last three years, 1972-75, Iceland bought about 55 trawlers in the 250-to-1,000 gross ton category and about tripled her fleet of large trawlers.

Vessels of 500 gross ton or more seem to be in serious economic trouble. One of the reasons for this is the heavy pressure on the resources, resulting in declining catch rates. While this affects all vessel classes, figures are only available for the large trawlers. Statistics for 1971-1973 can be seen in the following table:

TABLE 1. Average Catch and Daily Effort of Large Trawlers - Iceland

Year	Catch per hour trawling (tons)	Catch per day at sea (tons)	Hours trawling per day at sea
1971	1.04	10.88	10.41
1972	.91	9.23	10.09
1973	.83	9.17	11.03

While medium and large trawlers are city-based, the smaller trawlers which this paper deals with are more suited for the many smaller ports in Iceland.

The small trawlers are owned either by the men on board, such as the captain or the engineer, or by a processing plant. Other forms of absentee ownership are rare. The processing plants are generally owned by private interests, although some are operated by the community, i.e., the local government. None are operated by the state and only one plant is operated by a cooperative.

Contrary to what was the case in most countries in 1974, Iceland has a very tight labor market. Some economists in Iceland claimed that if a 40-hour work week were considered normal, than 25 percent of Iceland's output of goods and services were produced on overtime. However, the country had a serious rate of inflation, which in 1974 amounted to 53 percent and the country's currency has frequently been devalued. The average exchange rate of the Icelandic Krone versus the U. S. dollar was \$89.67 in 1973, \$99.84 in 1974 and \$142.99 during the first six months of 1975.

It is difficult to understand the cost and earnings figures for Icelandic fishing vessels without understanding the system of transfer payments within the industry and possibly also the financing of vessels and the lay method used. These will be covered first and then the cost and return data and finally some of the accounts will be explained.

Transfer Payments

Transfer payments make it rather difficult to determine the real price structure and also the real costs and returns for Icelandic fishing vessels. Due to inflation-rising prices, costs and expenses--and a reluctance to make drastic changes in the lay, transfer payments are

not subsidies, but are internal to the fishing industry. Without them, both the returns and the costs for the vessels would be higher. The following outlines the transfer funds from fish exporters in 1974:

1. Export tax based on a given amount of Icelandic Kroner per ton (may not exceed $4\frac{1}{2}$ percent of value) plus a percentage of F.O.B. value, Iceland. This fund and percentage breakdown of its use is as follows:

		<u>Million U. S. \$</u>
Insurance Fund	87.8%	
Fisheries Investment Fund	7.5%	
Other funds	2.0%	
Research	1.7%	8.5
Crew Union	0.5%	
Vessel Owners Association	0.5%	

100.0 percent

2. Export Tax Investment Fund (1% of F.O.B. value)	2.1
3. Catch Security Fund (1.25% of F.O.B. value)	2.8
4. Food for crew (1.5% of F.O.B. value)	3.3
5. Quality Control (0.15% of F.O.B. value)	.3
6. Oil Fund ⁴	3.0
7. Canning Development Fund	.2
TOTAL	<u>\$ 20.2</u>

The transfer funds outlined either increase the revenue or reduce the cost of fishing, depending on whether the individual items are added to the returns or deducted from the costs. The insurance fund pays most of the hull insurance of the vessel, up to 88.36 percent of the cost of insurance, but not more than 15 percent of its annual catch value. The Fisheries Investment Fund will be described later under vessel finance. Under the Catch Security Fund the country is divided into different regions and within each region, into vessel and gear classes and seasonal classes (Jan. 1 - May 15; May 16 - Sept. 15; Sept. 16 - Dec. 31). The five-year average catch of each vessel size category using a given gear in a given region during a given season is computed. If the group's catch in a season is less than 75 percent of this computed catch, then the group is entitled to support. This is calculated for each vessel to cover part of the difference between its catch and 75 percent of "normal".

Transfer payments also cover food for the crew based on man days "ready to fish", but if the crew spends more, the rest is deducted from the crew share. The rate of pay for trawlers of the size described in this paper was \$2.40 per man day from January 1 to May 15 and \$2.69 during the rest of the year.

The Oil Fund pays most of the cost of fuel for the fishing vessels and is based on consumption. The price of fuel for vessel owners in late 1974 was 17 cents per gallon, while the market price was about 3.8 times that amount.

These transfer payments will reduce the economic risk for an individual vessel or for a vessel in a specific fishery. It will have the effect of evening out income distribution. A successful vessel catching four times as much fish as another vessel actually may put four times as much into the fund, but they might get the same back.

In addition to transfer payments from exporters, transfer payments from processors also have to be paid to the vessel's owners, amounting to about 12.5 percent of the ex-vessel (landings) value. This money is deposited with the Fisheries Investment Fund into the vessel's account. It is used first to pay principal and interest on loans from the fund, thereafter principal and interest owed on other public funds. If no loans exist on the vessel, then the money goes back to the vessel's owner.

Vessel Finance

Most of the funds for vessel construction comes from the Fisheries Investment Fund, which again receives its funds from transfer payments or taxes on fish processors and exporters. Additional financing can be obtained from the Regional Development Fund. The interest rates are significantly lower than the going market rate. Financing terms for vessels in 1974 were as follows:

Fisheries Investment Fund	75% of value	- interest rate	9%
Regional Development Fund	10% of value	- interest rate	8%
Community			5%
State			5%

State and community funds were used only for financing large trawlers and therefore, a 15 percent down-payment was required for small trawlers, but only a 5 percent down-payment on large trawlers. By comparison, it can be mentioned that the bank interest rates were 12 percent on long term (10 year) loans and 16 percent on short term loans. A vessel owner can end up owing more money than he borrowed, however, because the principal outstanding

is regulated according to the foreign exchange rate and the degree of inflation. More specifically, a 54 percent of a devaluation loss and 10 percent of inflation (as measured by the cost of house construction) have to be carried by the owner.

Lay

Crews on Icelandic fishing vessels have a minimum wage per trip and a minimum wage per month. They are paid these guaranteed wages on a weekly basis. At the end of the fishing season (May 15, Sept. 15 and Dec. 31), the lot is calculated and the amount over and above the guaranteed wage (if any) is paid out. The guaranteed minimum wage is index-regulated by being tied to the shore labor rates.

By law, the captain of a vessel has to see that members of the crew are registered. That is usually done at the beginning of a fishing season. All changes in crew have to be reported.

All vessels are unionized. There is a union in each port or district, but the contract is almost similar for all ports. Vessel owners have one contract with captains and mates, one with the engineers and one with the rest of the crew. These three groups belong to different unions.

The following excerpts are from the contract between vessel owners, captains and mates:

1. Payment of the skipper shall never be less than two crew shares, first mate $1\frac{1}{2}$ and second mate $1\frac{1}{4}$ of the crew share. These shares shall be computed according to the size of crew, percentage to the crew and size of ship.
2. On vessels fishing with trawl, the crew shall have for their share the following percentage of gross receipts.
 - a. Vessels under 50 gross tons, 33.5 percent with six men or less.
 - b. Vessels between 51 and 90 gross tons, 32.5 percent with eight men or less.
 - c. Vessels between 91 and 130 gross tons, 32.5 percent with ten men or less.

If the fish is salted, the vessel is permitted to sail with two additional men without change in lay.

The percentage going to the crew is not reduced even if the crew is smaller, but if it is larger, it shall be increased by $1\frac{1}{2}$ percent for each additional man.

3. If officers are taken on board for one particular trip, the payment by the owner of the ship should be \$79 to the captain, \$57 to a first mate and \$50 to a second mate, as a guaranteed minimum. If the trip takes longer than 36 hours, the minimum pay is double. If the vessel returns from a trip on which it did not set out or taken in gear, the pay shall be half of that indicated above.

4. The owner of the vessel shall guarantee the captains and mates the following monthly minimum wages:

- | | |
|----------------|--------|
| a. Captain | \$766. |
| b. First Mate | \$766. |
| c. Second Mate | \$639. |

Captain and mates shall pay for their own food, that is, they shall be allowed to negotiate with the owner the amount of deduction for food. Captain and mates have the right to be paid once a week (pro-rated guaranteed pay, minus food costs). For a vessel fishing with trawl, the guarantee period shall be the following:

January 1 - May 15
 May 16 - September 15
 September 16 - December 31

5. If during the agreement period wages in the fishing industry ashore increase, then a similar percentage increase shall apply in this contract from the same day.

6. Crew shall be guaranteed at least four days off each month. Time off shall never be less than 24 hours. The time off which is more than 24 hours shall be counted in half or whole 24 hour periods.

7. The captain shall be paid \$3.15 per day (maximum 8 hours) to look after the vessel between fishing seasons.

8. a) Life insurance and permanent disability insurance is covered by maritime law.

b) Vessel owners have to buy liability insurance to cover a minimum of \$40,000 per accident with a maximum payment to each individual of \$15,000.

9. Settlements have to be made and paid within 14 days of the end of the fishing season. About 75 percent of settlement should be paid out each month.

10. $8 \frac{1}{3}$ percent of payroll shall be paid by vessel owner in vacation pay.

Characteristics of Icelandic Sample Fleet

The Fisheries Association of Iceland submits an annual questionnaire to owners of vessels of over ten gross tons. By law, the owners have to fill in the questionnaire. The vessels are grouped as follows:

Group 1 -	10 -	20 gross tons
Group 2 -	21 -	50 gross tons
Group 3 -	51 -	110 gross tons
Group 4 -	111 -	200 gross tons
Group 5 -	over	200 gross tons

Each group is broken down into sub-groups according to the gear used by fishing season--the Winter season, January 1 to May 15 and the rest of the year. As an example: Vessels in group 2, long lining in the Winter season and trawling in the Summer and Fall season. The category relevant to this study is group 3--vessels 51 to 110 gross tons - which were trawling the whole year. For this sub-group there were 21 usable records. For the 21-vessel sample fleet, the following average characteristics were derived:

Size (gross tons)	74
Age (years)	21
Horsepower	374
Age of engine (years)	9
Days ready to fish	208
Crew size	6

In most studies of trawler fleets, fishing effort is measured by "days at sea" or "days fishing". In the vessel account studies for Iceland, this information was not obtained, except in special studies of the large trawlers. The concept "days ready to fish" includes days at sea (fishing, steaming or riding the weather), time used for loading and unloading, days in port due to inclement weather or minor maintenance. In short, the concept is 365 days minus holidays, days spent on major repair or maintenance work and days in port between fishing seasons. The reason for this co-efficient is that the crew is paid both food and minimum wage based on days "ready to fish".

Landings and Prices

About half of the groundfish landed was cod and the average annual catch for these vessels in 1974 was as follows:

Groundfish	-	763	thousand pounds
Lobsters	-	12	thousand pounds
		<hr/>	
TOTAL		775	thousand pounds

The price obtained per pound for trawl-caught groundfish is below the price obtained from other gear - first, because the trawls catch more small fish (other gear is more selective) and secondly because the trips are longer, which reduces fish quality. As an example, it can be mentioned that in the Winter season of 1975, there were 27 minimum prices set for cod ranging from 4.5 cents to 19 cents per pound. First, there were three size categories, within each of which were three quality categories and for each of these nine categories there were three sub-categories referring to whether the fish was gutted and when during the season it was caught. These are minimum prices, but in reality they become the landing price. Competition among processors is generally not in the form of competition.

Dealers generally give ice free to the smaller trawlers and generally do not charge for lumping. The prevailing market price for these services would have been \$11 per ton of ice and \$15 per ton for lumping. Some fish processors might at times also offer credit or loans to vessel owners or even, on occasion, give nets free, rather than start price competition.

Costs and Returns

Average costs and returns for the vessels in U. S. dollars (using the average exchange rate for 1974) were as follows:

Returns

Catch landed in Iceland	\$ 84,991
Catch landed abroad	1,801
Payment from Catch Security Fund	3,037
Transfer Payment for Insurance	12,528
Other Income	1,975
	<hr/>
Total Income	\$104,334

Costs

Wages and Related Costs:

Total wages including 8 1/3% for vacation	\$ 49,611
Administration	1,341
Fees to Union Pension Fund	1,294
Employer contribution-Social Security	1,024
Crew insurance	1,499

Operation Costs and Services:

Fuel, oil, grease	8,241
Gear and supplies	9,952
Vessel insurance	15,291
Maintenance and repairs	19,810
Transportation	847
Travel expenses	214
Expenses on sheds and storage of gear	189
Wharfage, including fresh water	973
Office expenses	720
Miscellaneous (including professional & legal)	1,995
Taxes and fees	620

Total Expenses	\$113,842
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Left for Interest and Depreciation	- 9,508
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Depreciation	27,740
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Loss	31,248
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Percentage return to total assets - 14.4%

The return to labor was a much higher percentage of gross stock in 1974, than one normally would expect according to the lay used. The reason was, as the figure on return to capital indicates, that 1974 was a very bad year for the fishing industry on Iceland and the guaranteed minimum wages for fishermen therefore became effective.

Insurance

Insurance costs vary considerably for different vessel categories, but are generally six to nine percent of total annual costs when insurance paid from transfer funds are deducted. In 1974, insurance rates for wooden vessels up to 100 gross tons were 7.9 percent and for steel, they were 7.1 percent. Vessels are re-appraised each year for insurance purposes and inspected by surveyors every second year. The formula for determining insurance value is the initial construction cost multiplied by an index of vessel construction cost minus 5

percent a year for depreciation. Vessel values for insurance purposes (and also for depreciation) are affected both by inflation and currency re-evaluation. As an example, a 53 gross ton vessel built in 1941 had the following values for insurance purposes:

Year (January 1)	Insurance value (million Icelandic Kroner)
1968	3.2
1969	3.5
1970	3.5
1971	4.6
1972	6.1
1973	6.5
1974	7.7

Taxes

Payroll taxes for vacation are 8.33 percent. Taxes to the pension fund amount to 10 percent of payroll, 6 percent from the employer and 4 percent from the employee.

Local business tax is based on a percentage of expenditures. The rate differs from community to community but falls between 0.2 and 0.5 percent. However, if the vessel "runs in the red", then it is a percentage of income.

There is no capital gains tax on the sale of a vessel after four years of ownership. If the vessel was owned between two to four years, then there is tax on 50 percent of the capital gains. However, no tax is levied if the funds are used to buy or construct another vessel.

A 10 percent dividend on shares (face value) can be issued by incorporated vessels before taxes. Dividends above that figure are double taxed. However, 25 percent of profits can be set aside before taxes into a reserve fund for use against further losses. A corporation can request a re-evaluation of the face value of the shares.

Depreciation and Interest

The depreciation used on the accounts of the sample fleet in this paper is the one used by the Fisheries Association in their accounts, amounting to 10 percent of insured value. For tax purposes, several methods can be used. The fastest tax write-off is 21 percent a year for the first four years and 6 percent in the fifth year, leaving a 10 percent scrap value. However, not more than 15 percent can be used if the vessel thereby would go "in the red".

NORWAY

Introduction

Norway is one of the five fishing nations in the world in terms of volume landed. The country is about the size of Arizona and lands about the same amount of fish as the entire United States. In 1974, it landed about 5.8 billion pounds of fish and shellfish.

The Norwegian fishing fleet in 1974 consisted of about 3500 vessels of over 40 feet in length and an undetermined number of smaller boats. The number of vessels of over 40 feet has decreased by about 100 per year since 1968.

In 1974, Norway had a 3-mile territorial and a 12-mile fishery limit. Due to the broken coastline, the large number of islands and use of headland-to-headland baselines, however, a considerable amount of fishing ground existed inside the baselines from which the fishery limits were measured. These baselines were challenged by the United Kingdom, but they were upheld by the International Court in the Haag.

Social factors often play a role equally important as economic factors in Norwegian fisheries policy. As an example, purse seiners were tested in the in-shore groundfish fishery some years ago and were found so effective that they were prohibited there. Further, absentee ownership is frowned upon and only for large vessels which require a heavy investment capital is absentee ownership permitted. Trawlers of the size covered in this paper--60 to 90 feet--have to be owner-operated.⁵ Other reasons for restrictions on trawlers are to reduce gear conflicts and to some extent, to prevent disturbance of the sea bottom in the spawning areas by the heavy otterboards. In general, trawlers are prohibited from fishing within four miles of the baselines (except in the shrimp fishery), and trawlers over 300 gross tons have to fish outside the six-mile limit. This has resulted in most trawlers being in the 290-299 gross ton category.

In 1974, some seasonal trawl-free zones up to 50 miles from the Norwegian coast were established in cooperation with other countries, such as the Soviet Union, United Kingdom and West Germany; no violation occurred during the first six months of the agreement. The reason for these zones were to protect the coastal fishermen during

the Winter season. This is the season when there are the fewest fish to catch close to shore.

Unlike Icelandic currency, Norwegian currency has increased in value with respect to the U. S. dollar over the last years. The exchange rate in 1974, used in this paper, was 5.54 Norwegian Kroner per U. S. dollar (in 1972 the exchange rate was 7.15). This increasing value of the Norwegian Krone is causing problems for export industries like the fishing industry. The rate of unemployment in 1974 was insignificant, 0.4 percent of the labor force.

Characteristics of Norwegian Sample Fleet

While most of the coastal groundfish landings are harvested by gear other than trawl, groundfish trawlers of the size being discussed in this paper are found scattered along the coast.⁶ Most of them are found on the northern part of the West coast in the province of Møre and Romsdal.

The Norwegian Fisheries Directorate in Bergen has, for a long time, conducted annual cost and earnings studies for vessels of over 40 feet for the major fisheries. These studies serve as the basis for determining the amount of government support to the fishing industry and for other fishery policies. The surveys are conducted by mail questionnaire and the Directorate pays the vessel owners about \$60 (300 Norwegian Kroner) for a satisfactory return. The response rate is between 35 and 40 percent for all vessels in Norway exceeding 40 feet in length and engaged in fishing at least 30 weeks during the year.

With the help of the Fisheries Directorate, a sample of seven vessels from Møre and Romsdal was selected. The officials in the Directorate claimed that 1974 was a good year for this kind of vessel and that the performance of the sample fleet was representative of that type of vessel for that year.

Mean characteristics of the sample fleet were as follows:

Overall length (feet) ⁷	-	76.2 (63.3 to 83.0)
Gross tonnage	-	85.6 (39.0 to 99.0)
Horsepower	-	306 (225 to 400)

The average age of the vessels was hard to determine. Old vessels, if re-constructed, might contain little of the original. One vessel was built in 1883, another in 1908. Four of the seven vessels had been rebuild or re-

constructed. The average ages of the vessels were 35 years since construction (range 6-91) and 16 years since reconstruction (range 6-27). Three of the vessels were built of wood and four of steel.

As indicated earlier, it was difficult to determine the number of days the Icelandic vessels spent at sea fishing, because there they recorded "days ready to fish" rather than days at sea. In Norway, both concepts are used. The number of "days ready to fish" were 275, but the number of days at sea for the sample fleet were 127. Average crew size was 4.3 men and average number of hours worked per day were reported as 16 (most likely inflated).

Landings and Prices

The average total landings in 1974 by the vessels in the sample were as follows:

Cod	74,991 pounds
Saith	703,678 "
Haddock	21,716 "
Other food fish	12,379 "
	<hr/>
TOTAL food fish	812,764 pounds
Industrial fish	550,469 pounds
	<hr/>
TOTAL Landings	1,363,233 pounds

The average price received, by species was:

Cod	28.4 cents per pound
Saith	12.1 " " "
Haddock	19.3 " " "
Other food fish	19.9 cents per pound
Industrial fish	\$78.48 per short ton ⁸

For these vessels, saith accounted for about 75 percent of the value of food fish landed, cod for about 19 percent and haddock for about 3.5 percent. As indicated earlier, most of the food fish landed by the sample fleet was salted. During the three months, January through March, the fish was delivered in the round, only bled. The rest of the year it was gutted.

Fishermen's Sales Organizations have by law the right to set the ex-vessel prices of fish. This means the fishermen set the price of fish in negotiations with the processors. If they cannot reach agreement on a minimum price, then the Fishermen's Sales Organization sets the price. During the season, the buyers can offer more than the minimum price. In the province (where the sample fleet is located), the Sales Organization has worked

actively in negotiations to increase the landing price above the the minimum price. In northern Norway, the individual fishermen have to negotiate with the buyer for a higher price and there the minimum price often becomes the market price. The price in Møre and Romsdal is set only once a year, while in other areas it might be set three or four times a year. If the minimum price is set too high, then it will either result in production stop or the fish being handled through the Sales Organization's own plants. Fishermen pay 3 percent of landed value as a fee to the Sales Organization, which spends it for administration and to even-out the market by processing through its own facilities. Some sales organizations are even involved in exports. In 1974, there was no price subsidy on cod and saith for the sample fleet.⁹ Actually, prices received by fishermen were too high that year. The high price of fish combined with reduced prices in the world market made it difficult for processors or exporters to sell at a profit. Therefore, a large share of the output ended up in inventory.

Lay

The lay used differs from one fishery to another, depending upon the gear used, vessel size, fishery, etc.. The crew's share on purse seiners is a small percentage of gross stock, due to the capital intensity in this industry, while on small inshore boats, the crew's share of the gross stock is high. In some fisheries, the gear might have its own share. For small trawlers, the agreement for 1974, between the crew section and the vessel owner section of the Norwegian Fishermen's Association states:

1. Trip expenses shall be deducted from the gross stock.
2. These costs are considered trip expenses: fuel, oil, grease, sales expenses, telephone, telegrams, eccopaper, ice, food, cook's salary, rental of boxes, cost of gutting fish ashore, lumping and rental of Decca.
3. Net stock (gross stock minus trip expenses) shall be divided between vessel and crew as follows:

	<u>Boat</u>	<u>Crew</u>
Vessels up to 69' and up to six men	50%	50%
Vessels from 70' to 89' and up to ten men	52%	48%
Vessels from 90' to 120' and up to ten men	54%	46%

4. If the crew is larger than indicated above, the crew's share shall be increased by 2 percent for each additional man.

It would seem that this agreement might be interpreted more as a guideline than as a union agreement, because several vessels in our sample sailed under lays which were slightly different. As examples, it can be mentioned that the rent for Decca (navigational aid) on some vessels was "taken off the top", but on some it was deducted from the boat share. Further, that the cost of grub (food) on some vessels was considered a trip expense, while on others, it was deducted from the crew share. Hired captains get one crew share plus one share from the vessel.

Costs and Returns

The average gross income from fishing for these vessels was \$135,292, after the 3 percent fee to the Sales Organization had been deducted. In addition, an average of \$1,597 was declared as income for the vessel (such items as interest income, gear supplement, freight, etc.) but this was income for the vessel owner and did not affect the earnings of the crew. Therefore, the \$135,291 would be what we in New England call the gross stock.

Gross Stock:		\$135,291
Trip Expenses:	Fuel, Oil, Grease	\$15,173
	Ice	483
	Food	1,189
	Rent: Decca	433
	Telephone, postage, harbor fee, etc.	788
	Miscellaneous	174
	TOTAL TRIP EXPENSES	\$ 18,240
Net Stock:		\$117,051
Gross Crew Share	\$57,751	
Food	566	
Net Crew Share	\$57,185	
New Crew Share per man (4.3)	\$13,299	
Boat Share		\$ 59,300
Other Income		1,598
Boat Return		\$ 60,898
Boat Expenses:	Gear and Supplies	\$ 4,413
	Rent: Decca	650
	Lumping	392
	Repair and Maintenance	14,975
	Product Fee	2,185
	Insurance, vessel	3,828
	Insurance, gear	72
	Other Insurance	208
	Payroll tax	297
	Miscellaneous	828
	TOTAL EXPENSES	\$ 27,848
Left for interest and depreciation		\$ 33,050

As indicated in the beginning of the report, the average values of vessels and gear were as follows:

Book value	\$ 74,219
Market value	112,725
Replacement value	400,816

Book values have primary importance for tax purposes and then a 10 percent straight line depreciation is generally used. In the Norwegian studies, however, replacement value is used as the basis for depreciation and market value as the basis for computing interest on net worth. In this study, market values are used both as a basis for depreciation and for computing return on capital.

Earnings left for interest and depreciation	\$33,050
Depreciation - 10 percent of market value	11,273
Return on capital	<u>\$21,777</u>

Based on a market value of \$112,725, this would be an average return on total assets of 19.3 percent.

In 1974, the Norwegian Fisheries Directorate used 7.1 percent as the opportunity cost on net worth. Since the average interest charge on owner's equity was \$3,551, the average net worth would be \$50,014. Interest payments on debts averaged \$3,149. Therefore, the percentage return on net worth was:

\$21,777 (return to capital) - \$3,149 (interest payments)
 ÷ \$50,014 (net worth) or 37.2 percent.

There is a minimum wage guarantee in the Norwegian fisheries. If that wage is not reached, the difference is paid by the government. However, the crew share per man on these vessels was well above the minimum wage, so that no supplemental payment was made to these fishermen. The net crew share per man was \$13,299 and the total gross crew share amounted to 49.4 percent of the net stock.

Just as in Iceland, many dealers in Norway give free ice to the vessels and this is the reason for the low figure for this cost item. The market price of ice was \$8.10 per short ton, while the average fuel price was 43.3 cents per gallon. In 1974, Decca rental cost \$1,516 (one vessel did not have Decca). Generally, while industry in Norway pays a value added tax, fishermen are exempt from this tax and there is no unemployment tax on vessels of less than 100 gross tons.

Insurance

The base price for hull insurance was \$30.69 per gross ton, adjusted for the vessel's age in the following way:

New vessels	- base rate + 10%	or \$187 per gross ton
Vessels 11-25 years old	- base rate + 20%	or \$204 per gross ton
Vessels 26 years old or more	- base rate + 30%	or \$221 per gross ton

This insurance covers the value of the vessel in case of damage or sinking. However, liability for collision between vessels on the banks or while steaming is covered by P & I and not by hull insurance. On the other hand, P & I does not cover injuries to the crew (Norway has a national health scheme), but the owner has to cover each member of the crew to \$1,800. This is paid to the widow in case of death and a percentage of \$3,600 is paid to a crewman if disabled. "Product fee" in the Norwegian accounts is a cost item which would be included partly under P & I insurance, partly under welfare and partly under payroll taxes in the United States.

Several vessel owners also carry miscellaneous insurance, which is bought at the following rates:

Crew's belongings	- 2%
Crew's & Officer's pay, if vessel sinks	- 2%
Fuel and Food	- 2%
Catch	- 2%
Gear on board (sinking or fire)	- 2½%

Vessel Finance

The National Fishermen's Bank (state operated) gives long-term loans at low interest rates.

First priority:

50-60% of assessed value, 5% interest, 10-15 years

Second priority:

10-20% of assessed value, 2% interest, 10-15 years

In addition, the bank gives support loans to young fishermen without assets (third priority) up to 20 percent of assessed value. This is for young fishermen who cannot get a loan through a private bank due to lack of net worth. This loan is free of interest and principal payments for ten years, after which time it is determined whether the individual should start paying off the loan. As a comparison, it can be mentioned that the loan rate of a commercial bank would have been 8 to 8½ percent. It is prohibited in Norway to import fishing vessels more than ten years old.

Subsidies

Besides the subsidized interest rates on loans, several other subsidies are received by the industry that of course affect the cost and/or the price structure. Some of these subsidies, such as the subsidy on bait, do not affect trawlers. However, there is a subsidy on trawl gear, such as the trawl net, the trawl doors and the bobbins, amounting to 25 percent of cost. More important, each year an agreement is worked out between the government and the industry concerning transfer of funds from the national budget to the industry. These funds are paid to processors to offset the high minimum prices and to the fishermen's sales organizations. Thus, the ex-vessel price is higher than it would have been without the transfer. While much of the welfare cost is not paid through payroll taxes, but comes from the national budget (primarily derived from income taxes and value added taxes), this is not unique to the fishing industry and is not a subsidy. However, the fact that the fishermen are exempt from the value added tax is a special treatment.

NEW ENGLANDSample Vessels

In the summer of 1975, the University of Rhode Island gathered a large number of vessel records (for the year 1974) in New England. Of the vessels in the sample in southern New England, seven groundfish trawlers fell within the size range used in this study. Three of the vessels fished out of New Bedford, Massachusetts and four out of Point Judith, Rhode Island. Characteristics of the sample fleet were as follows:

	<u>Average</u>	<u>Range</u>
Length (overall)	75	65-85
Length (registered)	67	61-79
Gross tonnage	74	43-94
Hold capacity (thousand lb. of iced fish)	69	60-85
Age	12	4-28
Engine horsepower	400	330-480

Four of the vessels were built of wood and three of steel, and four were stern trawlers, while three were eastern rig side trawlers.

The five species contributing the most to the value of landings from these seven vessels were winter flounder, fluke, cod, butterfish and yellowtail, though not necessarily in that order. Average landings in 1974 for these vessels were 695 thousand pounds of foodfish and 488 thousand pounds of herring and industrial fish. About 15 percent of the catch was discarded at sea. The average head line length of the trawl used was 78 feet, average door weight 1010 pounds and average fuel consumption 15 gallons per hour.

Fishing Effort

In New England, the concept "ready to fish" is not used. However, the number of days at sea can be obtained from settlement sheets, landings-slips, etc. and this is, of course, a much better measure of fishing effort.

The various vessels had different fishing patterns. One vessel made almost exclusively day trips, while at the other extreme, one vessel made trips up to nine days in length. The average number of trips made was 50, the average length of trip 2.9 days and "days at sea" averaged 145 days (range 100-195). Average steaming time to the fishing grounds and back for the seven vessels was nine hours.

Investment

Book values on investments are necessary for income tax purposes, but they are useless for an economic analysis. The vessel owner's or corporation's real net worth is reflected by the market values and a return on capital should be based on those values. Vessel owners normally have a fairly good idea what their vessels are worth. They derive these values from various sources, such as surveys for insurance or finance purposes, offers received by individuals interested in buying the vessel and what similar vessels in the port have been sold for lately. A vessel owner might exaggerate when asked what he expects his vessels might sell for in today's market, but then the insurance value could normally be used as a check. However, over the last years, cost of vessel construction of used vessels has increased so rapidly, therefore many vessels now seem underinsured; some owners do not have full insurance coverage even in more "normal" times.

The average market value for the sample vessels was \$156,000 (hull \$124,000, engine \$18,000, electronics \$14,000) compared to an average insured value of \$121,000. In addition, the vessel owners had an average investment of \$9,000 in gear and \$5,000 in trucks, sheds, etc. used for business purposes. Thus, the total average investment amounted to \$170,000.

Lay

All vessels sailed on a broken lay, ranging from a broken 40 to a broken 45. A broken lay means that the expenses associated with a given trip are deducted from the gross stock (sales value of the catch) for that trip and the remainder (net stock) is divided between the crew and the vessel owner. A broken 40 means that the vessel owner gets 40 percent of the net stock, while 60 percent goes to the crew. What is considered trip expenses might be different for different vessels. Two of the vessel owners in this sample treated food as a trip expense, while on most vessels it was taken off the crew share. Similarly, two vessels deducted "welfare" from the crew share, while generally it is considered a trip expense. A hired captain would receive 10 percent of the boat share for management, in addition to his average share. Normally, one would consider the 10 percent of the boat share return to labor or management. In this sample, all vessels were owner operated and for ease of comparison, the captain's/owner's 10 percent is not deducted as a cost, therefore is included in the return to captial.

Costs and Returns

The average annual gross stock, costs and expenses were as follows:

Gross Stock			\$171,834
Trip Expenses:	Fuel, Oil, Grease	\$15,135	
	Ice	4,611	
	Lumping	2,696	
	Officer's bonus	575	
	Welfare & Pension	2,179	
	Food	766	
	Other	64	
	TOTAL TRIP EXPENSES		\$ 26,024
Net Stock:			\$145,810
Gross Crew Share		\$86,400	
Crew Expenses:	Food	\$3,582	
	Other	247	
	TOTAL	3,829	
Net Crew Share		\$82,571	
Net Crew Share per man		\$19,286	
Gross Boat Share			\$ 61,010
Repairs and Maintenance		\$ 7,185	
Gear and Supplies		7,717	
Wharfage		893	
Insurance		7,409	
Payroll Taxes		5,657	
Licenses and Fees		84	
Business Taxes		454	
Officers Compensation		825	
Clerical and Legal		544	
Office Expenses		218	
Transport and Travel		1,153	
Hired Labor		156	
Other Expenses		1,494	
Total Boat Expenses			\$ 33,790
Left for Interest and Depreciation			\$ 27,220
Depreciation (10% of market value)			17,000
	RETURN TO CAPITAL		\$ 10,220
Return on Total Assets:	$\$10,220 \div \$170,000 = \underline{6.0\%}$		

Conclusions

Comparison of the cost structure for two vessels even in the same country might at times be difficult when different accountants are used. The grouping of expense items might not be similar. When comparing the cost structure for vessels from different countries, the difficulty is compounded by different industry structure, tax policies, transfer payments, subsidies, fluctuating exchange rates and so on. In some countries, trawler accounts do not include expenses for ice, lumping or wharfage, because they are supplied free by fish dealers (though it might affect the fish price). What is covered by a payroll tax in one country, which is a cost item for a vessel owner, is covered through income taxes in another and therefore is not a vessel expense. Transfer payments, which are widely used, have an "artificial" downward effect on both fish prices and the cost of operation and subsidies, will hide the "true" costs or returns depending on what kind of subsidies are given.

International comparisons have to be based on a given currency. The relative cost or returns for fishing vessels from different countries will therefore change with currency re-evaluations. In international comparisons, one country's fishing vessels will show higher earnings if that country's currency is increasing in value even if, in reality, the vessels are earning the same as before. The difficulties outlined above have to be kept in mind when looking at the various cost and return data in the comparison that follows.

The year 1974 was such an abnormally poor year for the Icelandic fishing industry that the vessels went "in the red" and the fishermen were paid the guaranteed minimum wage. The comparison is therefore between the Norwegian and the New England trawlers.

<u>Sample Characteristics</u>	<u>Norway</u>	<u>New England</u>
Overall length of vessel, feet	76	75
Gross tonnage	86	74
Horsepower	306	400
Age of vessel in years, (since reconstruction)	16	12
Crew size	4.3	4.3
Days at sea	127	145
Market value of vessel, \$ thousands	113	156
Gross Stock	\$135,291	\$171,834
Fuel	15,173	15,135
Other Trip Expenses	3,067	10,889
Net Stock	117,051	145,810
Gross Crew Share	57,751	86,400
Net Crew Share per man	13,299	19,286
Boat Share	59,300	61,010
Repair and Maintenance	14,975	7,185
Gear and Supplies	4,413	7,717
Insurance	4,108	7,409
Payroll Taxes	297	5,657
Other Vessel Expenses	4,055	5,821
Left for Interest & Depreciation	\$ 33,050	\$ 27,220
Depreciation (10% of owners investment)	11,273	17,000
RETURN ON CAPITAL	\$ 21,777	\$ 10,220
Percent return on Total Assets	19.3	6.0

While the vessel characteristics are fairly similar in these two samples, there are considerable differences in the economics of the vessels. The New England vessel had a higher market value, put in more days at sea and had a higher gross stock. However, the average lay on the Norwegian trawlers was a broken 51, while the average lay on the New England trawlers was a broken 42. Despite the same crew size, the difference in gross stock and lay on board resulted in a 45 percent higher net crew share per man on the New England vessels than on the Norwegian vessels.

On the New England trawlers, a much larger share of the value of the catch goes to labor and less to capital than is the case in the Norwegian fleet. Thus, despite a much higher gross stock on the New England vessels, the boat share was about the same as for the Norwegian vessels. Since both the vessel expenses and market values were higher on the New England vessels, the percentage return on capital for New England vessel owners was only a third of what it was for Norwegian vessel owners, 6.0 percent versus 19.3 percent. One might expect that both figures have a downward bias, due to the cost of

depreciation used, but the true difference would be about the same. One should also realize that this is based only on data from 1974, a year which was very good for the Norwegian trawlers while only a mediocre one for the New England trawlers.

FOOTNOTES

¹Extended jurisdiction will reduce the uncertainty concerning quotas and thereby improve the investment climate. This might stimulate utilization of the five large stocks of fish off New England, now being primarily harvested by foreign fleets. These fish are squid, mackerel, whiting, red hake (ling) and the Georges Bank herring stock, "p. 1."

²Quebec was added again in 1975 and the other Provinces in 1976, "p. 2."

³The crew share on large trawlers was similar to that on small trawlers, "p. 5."

⁴From September 1, 1974, "p. 7."

⁵This does not mean that the owner has to be captain on board, "p. 15."

⁶Most trawlers of less than 200 tons fish for industrial fish or shrimp, "p. 16."

⁷This is English feet. A Norwegian foot is $2\frac{1}{2}$ percent longer than an English foot, "p. 16."

⁸This price includes some minor amounts of transfer funds from processors and from the price control fund, "p. 17."

⁹During the first six months of 1975, price subsidies amounted to about 10 percent of the landing price, "p. 18."

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