NOAA Technical Memorandum NMFS-NE-112

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Data Description and Statistical Summary of the 1983-92 Cost-Earnings Data Base for Northeast U.S. Commercial Fishing Vessels

A Guide to Understanding and Use of the Data Base

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December 1996

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Contents

Tables

Figures

Acronyms

CCF	=	[NMFS] Capital Construction Fund
DAB	=	days absent [from port]
GRT	=	gross registered tonnage
IRA	=	individual retirement account
IRS	=	[U.S. Department of the Treasury] Internal Revenue Service
NEFSC	=	[NMFS] Northeast Fisheries Science Center
NMFS	=	[NOAA] National Marine Fisheries Service
TSD	=	two-standard-deviation [test for outlying data]
USCG	=	U.S. [Department of Transportation] Coast Guard

ABSTRACT

Data from the National Marine Fisheries Service's Capital Construction Fund are summarized to provide a financial profile of Northeast U.S. commercial fishing vessels. Averages for various cost categories are presented by tonnage class, fishery, and effort level. Costs are also presented as percentages of total revenue. Data are then evaluated for how well they represent the Northeast fishing fleet. Potential uses and pitfalls of using these data for economic analyses are also discussed.

INTRODUCTION

While vessel-level landings data are available in most Northeast U.S. commercial fisheries, data on operating costs of fishing vessels typically are not. The main goal of this project was to compile (from existing sources), organize, and summarize a data base which contained vessel-level information on revenues, landings, and expenditures for vessels operating in Northeast U.S. fisheries during 1983-92, and which could be used for subsequent economic analyses. This report describes the contents and potential uses of this data base. (Note that while the data base covers 1983-92, some of the figures in this report cover 1984-92 due to the low number of observations in 1983.)

Financial data on the revenue and expenses of owners (sole or corporate) of individual Northeast U.S. vessels were obtained from the National Marine Fisheries Service's (NMFS) Capital Construction Fund (CCF) data base (described later). Individual vessel landings data were obtained from the NMFS Northeast Fisheries Science Center's (NEFSC) weighout files. Data on individual vessel characteristics were obtained from the NEFSC master vessel file (also described later).

The cost-earnings data base should be useful for determining economic performance measures of various fisheries. These measures can help to identify sources of inefficiencies in fisheries, changes in performance, and impacts of fishery regulations. Such information will enhance fisheries management by providing policymakers with additional knowledge upon which to base decisions.

The specific objectives of this project were to: 1) create a panel data set which incorporates cost, landings, and vessel characteristics data in one file; 2) aggregate these data in various ways, and calculate statistics which describe or identify relevant trends; 3) determine the within-sample reliability of the data; 4) ascertain the degree to which the group described by the data collected are representative of the Northeast U.S. fleet; 5) summarize and make available the data in spreadsheet and ASCII form for NMFS staff who want a general idea of cost-earnings of Northeast U.S. vessels; 6) document the data collection and synthesis process to provide future researchers with guidelines regarding the quantity and quality of information which can be collected using these data sources; 7) illustrate the limitations of these data; and 8) prepare this report as the "reference manual" for understanding and using the data.

This report has four subsequent sections. The next, or second, section ("Data Sources and Descriptions") describes the three data sources and their limitations. The third section ("Data Organization, Categorization, and Descriptive Statistics") generally describes the data base and provides summary statistics in order to illustrate the quantity and quality of data collected, and some trends in Northeast U.S. fisheries. Included in this latter section are analyses of costs as a percent of total revenues for various levels of disaggregation, tests for outliers in the cost data, and correlations between reported value of landings (from weighout data) and reported gross revenues (from tax returns) in order to evaluate the reliability of using tax records.

The representativeness of these data is an important issue. To address this issue, weighout data on all reporting Northeast U.S. vessels were obtained, and the average values of several variables were compared with the average sample values from this data base. Results of this comparison are shown in the fourth section ("Comparison of Sample and Population Statistics"). Finally, an assessment of the data base is offered in the fifth section ("Discussion"). The overall reliability of the data is discussed, and potential uses as well as inherent pitfalls in these data are identified.

DATA SOURCES AND DESCRIPTIONS

Three data sources are employed in the cost-earnings data base: CCF files, NEFSC weighout files, and NEFSC master vessel file. A common element linking all three sources is the U.S. Coast Guard (USCG) registration number. The variables collected from each file are defined in Tables 1 and 2. Descriptions of each file, including its potential limitations, are discussed separately below.

Capital Construction Fund Files

The CCF program, operated by NMFS's Financial Services Division, was designed to allow commercial fishing vessel owners to save pre-tax earnings to purchase, construct, or reconstruct fishing vessels. Under this program, the tax on fishing vessel income is deferred, and untaxed earnings are put into an account, much like an IRA (Individual Retirement Account), which is later used for vessel projects. A requirement of the program is that participants submit their annual federal income tax returns to the CCF program. Tax returns are kept for every year the vessel is active in the program.

The annual tax returns provided by CCF participants yield a potentially rich source of data on vessel-specific revenues and expenditures. Depending on the additional financial schedules that owners submit with their basic tax form, data elements available for collection may include some or all of the following: 1) gross returns; 2) itemized expenditures on fishing-related costs such as bait, docking fees, groceries, fuel & oil, gear & supplies, ice, insurance, lumping fees, packing fees, licenses, repairs, storage costs, water, crew shares or wages, and auction fees; and 3) other itemized expenses such as rent, vessel depreciation, employee benefits & pension payments, automobile expenses, bank charges, dues & membership fees, office expenses, professional salaries, utilities, and travel & entertainment expenses.

Several caveats should be noted with respect to these data, and any researcher planning on using the data should be aware of them:

1. The costs itemized may be based on an accountant's classification scheme rather than an actual breakdown of costs.

2. Costs are often aggregated over vessels when more than one vessel is owned by an individual or corporation; it is usually not possible to allocate costs among vessels in a corporate fleet.

3. Many vessels are active in more than one fishery throughout the year, hence some costs cannot be allocated or divided among fisheries.

4. The "sensitive" nature of these data limits their usefulness. Because records are obtained from Internal Revenue Service (IRS) tax forms, the identity of the individuals participating must be protected. While NMFS employees have access to these files, and can match them appropriately with other data sets, researchers outside the agency would not have unlimited access.

5. The data are not available in electronic form.

6. These costs may need to be augmented for economic studies. For example, opportunity cost may be the most relevant cost to the fishermen or vessel owner, but this is not an accounting cost that can be itemized on a tax return.

7. As will be discussed later, most vessels that participate in the CCF program are considered "highliners" in the fleet, i.e., vessels that, on average, earn the highest profits.

NEFSC Weighout Files

The NEFSC weighout files consist of voluntary, trip-level data recorded by port agents at the end of a vessel's fishing trip. The data elements collected include: days absent from port, days spent fishing, pounds of fish or invertebrates landed, value of landings, and port where the fish or invertebrates were landed. The files are maintained electronically and are readily accessible.

One potentially serious problem is that the data do not capture every trip a vessel takes, so that recorded annual levels (of effort, landings, etc.) reflect only reported levels, not necessarily actual levels.

NEFSC Master Vessel File

The master vessel file maintained by the NEFSC contains detailed data on such features of individual vessels as: number of crew berths, types of gear used, construction type, gross tonnage, length, year built, and horsepower. The file is maintained electronically and is readily accessible.

Caveats to using these data include:

1. Some data in this file may not be current. That is, individual vessels may upgrade or add engines (increased horsepower) or may make other structural changes which are not reflected in the master vessel file.

2. The crew size variable is based on the number of berths on the vessel. Therefore, actual crew employed is not always known nor are seasonal variations in crew size always reflected.

DATA ORGANIZATION, CATEGORIZATION, AND SUMMARY STATISTICS

Data Organization

The data compiled for this study were derived from 130 individual vessels and for 375 vessel years; multiyear data exist for some vessels. Some CCF tax returns contained data on more than one vessel; in those cases, the costs and revenues could not be linked to a particular vessel. Although these data remain in the data base, the data presented here exclude the multivessel returns, leaving a total of 313 individual vessel-year records representing 90 unique vessels.

Due to varying tax reporting techniques, missing observations exist in many of the cost variables. In some instances, the cost was either not incurred or not reported. Often, a cost was added to another. For example, reported fuel expenses frequently included oil expenses and sometimes food and ice expenses. Gear expenses often subsumed supply expenses. The reason for such categorization of costs by accountants and fishermen is often for convenience in calculating crew share. In this report, fuel, oil, food, water, and ice are considered trip expenses. Insurance, interest, taxes, maintenance, etc., are considered fixed costs , or at least costs not assignable to a trip.

To address the missing data problem, some costs in this report have been summarized by group. All variables collected or created from the master vessel and weighout files are provided in Table 1. All variables collected or created from the CCF files are provided in Table 2.

Data Categorization

The data base reflects a fairly heterogenous fishing fleet. This heterogeneity of vessels is particularly noticeable in three categories: tonnage class, fishery or gear type, and effort level. Before descriptive statistics on cost and earnings variables are presented, summary vessel information in these three categories is described.

Tonnage Class

Three tonnage classes have been identified: class 2 refers to 5 to less than 50 gross registered tons (GRT), class 3 refers to 50 to less than 150 GRT, and class 4 refers to 150 and greater GRT. Of the 90 unique vessels in the data set, the majority are class 4, followed closely by class 3; fewer than 15% are in class 2.

Similarly, the majority of vessel years are in class 4, and the smallest number in class 2. Table 3 presents the number and percentages of unique vessels and vessel years by tonnage class.

Fishery or Gear Type

Ten fishery or gear types have been identified. Because vessels can and often do participate in more than one fishery during a year, each vessel's primary fishery was considered to be the fishery in which it earned the highest revenue during the year. Table 4 shows the numbers and percentages of unique vessels and vessel years by gear type.

The number of vessel years is higher than the number of unique vessels for nine of the 10 gear types because some vessels' principal fishery changed from one year to the next. Therefore, some double counting occurred.

Otter trawls and scallop dredges constitute the majority of observations. Together, these two gear types represent 70% of the unique single-vessel observations and 76% of the vessel-year observations. Longlines and surfclam/ocean quahog dredges are the next most frequent gear types, collectively contributing 14% of the vessel-year observations. The low number of observations in several other gear types suggests that data for these gear are probably not suitable for detailed analyses. Only otter trawls and scallop dredges provide enough information for fishery-level analysis.

Effort Level

Another way to categorize observations is by a measure of effort such as the number of days that a vessel spends at sea per year. Three classes were chosen to break up the range of days absent (DAB): DAB class 1 if a vessel spent fewer than 110 days at sea in a year, DAB class 2 if a vessel spent between 110 and 219 days; and DAB class 3 if a vessel spent 220 or more days. Table 5 shows the numbers and percentages of unique vessels and vessel years by effort level.

As Table 5 shows, the majority of observations consist of vessels which spent 110-219 days at sea, or roughly one- to two-thirds of the year. The division of observations in the other two effort levels is skewed towards DAB class 1. Since the number of days at sea is determined through the voluntary weighout collection system, there may be some vessels (or vessel years) categorized in DAB class 2 which were actually at sea more than 220 days, and some vessels in DAB class 1 which were absent more than 110 days.

Summary Statistics

Table 6 contains the mean, standard deviation, and minimum and maximum values of all variables in the data set. The means and standard deviations of several key variables are presented in Tables 7-9, distinguishing among fishery, effort level, and tonnage class, respectively. Those key variables are: 1) vessel characteristics (gross registered tons, length, horsepower, year the vessel was built, and number of crew members); 2) weighout data (annual quantity & value of harvest, number of crew members, annual days absent & days fished, and trips taken per year); and 3) CCF variables (trip costs, other variable operating expenses, indivisible operating expenses, gross revenue, insurance costs, crew shares, interest payments, salaries, and employee benefits).

Average deflated costs for all vessels are shown in Figure 1. Averages for trip costs, indivisible operating expenses, crew shares, salaries, and interest payments declined over the 1984-92 study period, while other variable operating expenses and employee benefits remained fairly constant. The average number of fishing trips taken and the average days fished during the period both increased as depicted in Figure 2. Average real total costs and gross revenues decreased as shown in Figure 3.

Reported costs are averages for those vessels that reported a particular cost. As can be seen from the number of observations in Table 6, most cost variables have missing values. In the case of fuel or crew share, it is expected that all vessels incur these costs, thus these averages can safely be applied to all vessels. However, certain costs such as employee benefits are not incurred by all vessels. In this case, missing values should be treated as zeros. So, for certain costs, it may not be accurate to apply the reported average to all vessels, but only to vessels that normally incur that cost.

Costs as a Percentage of Total Revenues

The ratio of costs to revenues can provide insight on the relative importance of particular categories of costs to fishing operations. The following section evaluates costs

as a percentage of revenue for various data categorizations. To more accurately describe the cost characteristics of groups of vessels, missing values in the data are treated as zero.

Figure 4 shows the trend in costs as a percentage of gross revenue for all vessels over the 1984-92 study period. Other variable operating expenses show a slightly upward trend, interest payments show a slightly downward trend, while trip costs, indivisible operating expenses, crew shares, and salaries do not exhibit clear trends.

Costs as a percentage of gross revenue, averaged over the 1984-92 study period, for the major gear types--scallop dredges and otter trawls--are shown in Figure 5. Trip costs for otter trawlers and scallop dredgers were 18% and 17% of gross revenue, respectively. Other variable operating expenses for otter trawlers and scallop dredgers were 8% and 7% of gross revenue, respectively, while indivisible operating expenses were 17% and 16%, respectively. Crew shares, salaries, and interest payments were calculated as a percentage of gross revenue also. For otter trawlers, crew shares were 37% of gross revenue, salaries were 3%, and interest payments were 6%. For scallop dredgers, crew shares were by far the largest expense at 40%, salaries were 2%, and interest payments were 4%.

Breakdown of costs as a percentage of gross revenue by tonnage class and effort level is shown in Figures 6 and 7, respectively. Trip costs, indivisible operating expenses, interest payments, crew shares, and salaries were greater for larger vessels, while other variable operating expenses decreased with vessel size. Crew shares increased with effort. Trip costs were greater for more active vessels. Other variable operating expenses decreased from DAB class 1 to 2, but increased slightly from class 2 to 3. Other costs remained rather constant relative to effort level.

Individual Cost Shares Relative to Average Cost Shares

To examine the data for outliers, the share of each individual cost item as a percentage of total cost was calculated for every observation. Actual shares were then compared with the average share of the same cost item over all observations. Following Herrick et al. (1992), a two-standard-deviation rule was used to evaluate each observation. The formula used was:

$$S_{ij} = \frac{C_{ij}}{TC_j} - \frac{\left\{ \sum_{j=1}^{n} \frac{C_{ij}}{TC_j} \right\}}{n}$$

where C_{ij} refers to cost item i of vessel j, and TC_j refers to the total costs of vessel j. If the absolute value of S_{ij} was greater than two standard deviations from the average share for that cost item, the expenditure on i for vessel j was considered an outlier.

The analysis was also performed for the aggregate variables of trip costs, other variable operating expenses, and indivisible operating expenses for each observation. All average shares were calculated by tonnage class, under the assumption that vessels in different tonnage classes have significantly different expenses (see Figure 6). Table 10 shows the results for the three aggregate cost categories. Some recorded expenditures were determined to be outlying values. Table 11 shows the results of the tests of individual cost items.

Gross Revenue Versus Landings Values

To evaluate the consistency of CCF data with weighout data, we compared gross revenue from the tax return files with the annual landings values from the weighout files. These were the only comparable variables in the two files. All values were deflated using the gross domestic product implicit price deflator. Figure 8 illustrates the pattern of gross revenue and landings values during 1984-92. A strong downward trend is evident in both variables over the period. Average reported gross revenue was higher than average landings values in all years. This is likely due in part to the voluntary reporting of landings data.

Figure 9 shows the trends in average gross revenue and landings values by tonnage-class-3 and -4 vessels. (There were not enough observations on tonnage-class-2 vessels to include this category.) Again, average gross revenue was greater than average landings values in all years, with the exception of 1992 for class-4 vessels. Revenue of class-4 vessels has been declining since 1987, while revenue of class-3 vessels has been rising since 1988. As expected, class-4 vessel revenue was higher than that of class-3 vessels. Paired comparison t-tests indicate that gross revenue for class-3 vessels was not significantly different from landings values ($P > 0.05$). For class-4 vessels, gross revenue did not significantly differ from landings values in 5 of the 9 yr.

Given that most observations were from otter trawlers and scallop dredgers, the landings values and gross revenue of these vessels over time were examined. Figure 10 shows the mean real landings values and gross revenue for these two gear types. Paired t-tests reveal that gross revenue and landings values differed significantly in only 2 of 8 yr (1990 and 1991) for trawlers, and in none of the 9 yr ($P > 0.05$) for dredgers.

Finally, the means of gross revenue and landings values were calculated by effort levels, as defined by days absent. For DAB-class-1 vessels, means could only be calculated for 1986-92; of these 7 yr, values were significantly different ($P < 0.05$) in 5 yr. For DAB-class-2 vessels, values were significantly different only in 1988. For DAB-class-3 vessels, values were different only in 1991. Trends in mean real landings values and gross revenue are shown in Figure 11 for DAB-class-2 vessels. (There are too few observations to present trends for DAB-class -1 and-3 vessels.)

Overall, gross revenue reported on annual tax returns reflects the same trends found in landings values obtained from the weighout data base. The two series are not signifi-

cantly different after controlling for variation due to fishery, vessel size, or effort level.

Although average gross revenue and average landings values were not significantly different, for some observations the values were quite different. Depending on the kind of analysis, these particular observations may need to be excluded.

COMPARISON OF SAMPLE AND POPULATION STATISTICS

Table 12 compares average revenues, landings, days absent, days fished, number of trips, and vessel characteristics of all Northeast vessels, as reported in the NEFSC weighout files, with those in the cost-earnings data base for 1983-92. The landings value variable is deflated to remove inflation distortions. A given vessel in a given year is treated as a unique observation regardless of whether it appears in other years. Tables 13 and 14 compare averages otter trawlers and scallop dredgers, respectively.

Tables 13 and 14 indicate that vessels sampled from the CCF program are, on average, newer, bigger, more powerful vessels which are at sea more days per year than the average vessel in the weighout data base. Therefore, one would expect the average CCF vessel to have higher landings and greater revenues. However, a comparison of profits cannot be made because cost data are not available for the weighout vessels. A reasonable assumption could be made that the average CCF vessel earns a higher profit than the average weighout vessel since the nature of the CCF program is to put aside earnings for new projects. Presumably, the vessels most likely to participate in the program are those consistently returning profits.

DISCUSSION

Potential Uses

Information on fishing vessel costs is normally difficult to obtain. Periodically, surveys are undertaken by a university or a consulting firm, but these usually provide only snapshots of the total financial situation. The NMFS Northeast Region does not routinely collect vessel financial information. While data on revenue or landings values are typically available, revenue data alone do not adequately capture the viability of fishing operations; that is, information on costs is necessary for evaluating the overall profitability of operations. One important feature of the CCF tax returns is that vessels can be tracked over several years. This is useful for assessing how certain costs, and hence profitability, change over time. These, in turn, could be used in part to assess the economic health of particular fisheries.

A significant use of this information has been and can be to evaluate the potential benefits and costs of various fishery management measures. For example, the analysis of Amendment #5 to the Northeast Multispecies Fishery Management Plan used CCF tax returns to calculate the impact of various regulatory schemes by evaluating expected changes in benefits and costs from each of the schemes. Determining expenditures and profits by tonnage class, gear type, and effort level (e.g., days absent) can help identify sources of inefficiency in a fishery, and may also be used to test for economies of scale. This information is useful to managers in making resource allocation decisions.

Finally, general relationships between vessel characteristics, effort levels, and expenditures on various cost items can be evaluated with these data. This information is often used in bioeconomic models.

Potential Pitfalls

Before drawing conclusions from these data, one must fully understand their limitations. Most caveats have been addressed in the course of the report, but it is worth reiterating that these data are based on tax returns. Costs are reported to the IRS in such a way as to minimize tax liability. For example, there are a host of techniques used to calculate depreciation expenses and these can vary significantly from one return to the next.

A significant shortcoming of the data set is that it does not fully represent the population of Northeast fishing vessels. Compared to all vessels in the NEFSC weighout system (which also does not represent the population, but is a closer approximation), the vessels participating in the CCF program can be considered the fleet "highliners." Hence, analyses based on these data may show that the average vessel is better able to withstand financial difficulties than may actually be the case.

Finally, the data base is of limited value for gear types other than scallop dredges and otter trawls. As long as one is interested in these fisheries, the data provide a reasonably good description of ongoing trends.

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Table 1. Definitions of NEFSC master vessel and weighout file variables

Variable Name	Definition
GRT	Gross registered tons
LEN	Length
HSPR	Horsepower
YRBLT	Year built
CONS	Vessel construction: 0 = unknown, 1 = wood, 2 = steel, 3 = composite, 4 = iron, 5 = alloy, 6 = concrete, 7 = aluminum, 8 = fiberglass, and 9 = plastic
CREW	Number of crew including captain as measured by number of berths
DABS	Total number of days absent from port
LNDLB	Landed pounds
LNDVAL	Value of landings as reported in the weighout files
NTRIPS	Number of trips
DF	Number of days gear is fished as measured by number of hours gear is fished divided by 24
GEARCD	Gear code as determined by gear that brought in most revenue for year: 1 = longline, 2 = otter trawl, 3 = bottom pair trawl, 5 = sink gillnet, 6 = drift gillnet, 7 = purse seine, 8 = scallop dredge, 9 = midwater pair trawl, 10 = fish pots, 11 = lobster pots, 14 = midwater trawl, 16 = surfclam and ocean quahog dredge, 17 = Other
PORTLND	Port code for port where majority of pounds were landed for the year: 220101 = Portland, ME; 220201 = Typographical error in weighout data base; 20207 = Rockland, ME; 220907 = Other Knox County, ME; 222307 = Vinalhaven, ME; 230131 = Ocean City, MD; 240115 = Boston, MA; 240207 = Gloucester, MA; 240301 = Chatham, MA; 240403 = New Bedford, MA; 240407 = Typographical error in weighout data base; 240901 = Hyannis, MA; 240903 = Fall River, MA; 241901 = Woods Hole, MA; 241903 = Westport, MA; 320101 = New Hampshire other than Portsmouth; 320201 = Portsmouth, NH; 330127 = Point Pleasant, NJ; 330201 = Atlantic City, NJ; 330309 = Cape May, NJ; 330409 = Wildwood, NJ; 331627 = Long Beach, NJ; 350635 = Montauk, NY; 420105 = Newport, RI; 420209 = Point Judith, RI; 420905 = Newport County other than (City of) Newport, RI; 420909 = Washington County other than Point Judith, RI; 420999 = Other Rhode Island; and 490345 = Cape Charles, VA
TONCLASS	Ton class: 2 if $5 \leq GRT < 50$, 3 if $50 \leq GRT < 150$, and 4 if $150 \leq GRT$
TRPCLASS	Trip class: 1 if $1 \leq NTRIPS < 80$, and 2 if $80 \leq NTRIPS$
DABCLAS	Days absent class: 1 if $1 \leq DABS < 110$, 2 if $110 \leq DABS < 220$, and 3 if $220 \leq DABS$

Table 2. Definitions of Capital Construction Fund variables

Variable Name	Definition
CORP	Corporation: 0 = not incorporated, and 1 = incorporated
FLEET	Whether vessel belongs to a fleet (doesn't necessarily mean vessel's tax information is reported with other vessels): 0 = no, and 1 = yes
GROSS	Gross stock as reported on tax return (theoretically same as LNDVAL)
BAIT	Bait cost
DOCK	Docking fee
FOOD	Food cost
FRT	Freight cost
FUEL	Fuel cost
GEAR	Gear purchase cost
ICE	Ice cost
INS	Insurance cost
LUMP	Payments to lumpers (those who unload fish)
MISCEXP	Miscellaneous vessel expenses
MISDOCK	Miscellaneous dock help
OIL	Oil and lubrication
PACK	Packaging fees
LIC	License and permits
RENT	Rent, lease, and moorage
REPAIR	Repair costs
STORE	Storage fees
VDEPR	Vessel depreciation
WATER	Water expense
AUTO	Auto expense
BANK	Bank charges
CCFDEPO	Deposit to CCF account
CCSHR	Crew share (payment to crew and captain)
DEPR	Total depreciation expense
DUES	Membership dues and subscriptions

Table 2. (Cont.)

Variable Name	Definition
INT	Interest expense
OFFICE	Office expenses
SALARY	Payments to officers
UTILS	Phone/utilities
PROFEES	Professional fees (legal and accounting)
SUPPLY	Supplies
TAX	Taxes (not income)
TRAVEL	Travel costs
AUCT	Auction fee
EMPBEN	Employee benefits
PENSION	Pension and welfare
PATREF	Patronage refund (a revenue)
BAGS	Scallop bags
SPOT	Fish spotting
ADVERT	Business promotion
ENT	Entertainment expense
BUSINC	Other business income
MEDREIM	Medical reimbursement
OTHDED	1120S other deductions
YEAR	Year in which fiscal year ends
FISC	Month, day, and year fiscal year ends
CTRIP	Trip costs = FUEL + OIL + ICE + WATER + FOOD + BAGS + BAIT
OVOE	Other variable operating expenses = GEAR + SUPPLY + FRT + LUMP + AUCT + PACK + ADVERT + SPOT
IOE	Indivisible operating expenses = INS + LIC + REPAIR + OFFICE + PROFEES + TRAVEL + DUES + TAX + UTILS

Table 3. Numbers (and percentages) of observations of unique vessels and vessel years by tonnage class

Tonnage Class	Unique Vessels	Vessel Years
2	12 (13.3%)	20 (6.4%)
3	37 (41.1%)	127 (40.6%)
4	41 (45.6%)	166 (53.0%)
Total observations	90	313
Missing observations	0	

Table 4. Numbers (and percentages) of observations of unique vessels and vessel years by gear type

Gear Type	Unique Vessels	Vessel Years
Otter trawl	41 (41.0%)	120 (39.1%)
Scallop dredge	29 (29.0%)	112 (36.5%)
Longline	8 (8.0%)	24 (7.8%)
Surfclam & ocean quahog dredge	8 (8.0%)	19 (6.2%)
Fish & lobster pots	4 (4.0%)	12 (3.9%)
Sink gill net	5 (5.0%)	9 (2.9%)
Drift gill net	1 (1.0%)	1 (0.3%)
Purse seine	3 (3.0%)	6 (2.0%)
Bottom pair trawl	1 (1.0%)	1 (0.3%)
Midwater pair trawl	1 (1.0%)	3 (1.0%)
Total observations	101	307
Missing observations	3	6

Table 5. Numbers (and percentages) of observations of unique vessels and vessel years by DAB class

DAB Class	Unique Vessels	Vessel Years
1	40 (30.5%)	74 (24.1%)
2	64 (48.9%)	185 (60.3%)
3	27 (20.6%)	48 (15.6%)
Total observations	131	307
Missing observations	3	6

Table 6. Means, standard deviations, and minimum and maximum values of all variables (1987 dollars)

Variable	No. of Observations	Mean	Standard Deviation	Minimum	Maximum
GRT	313	142.25	48.52	7	269
LEN	312	79.32	16.10	33	125
HSPR	295	654.55	252.72	100	1,500
YRBLT	305	1978.27	6.20	1943	1988
CREW	225	7.35	3.35	2	13
DABS	307	155.70	66.46	1	329
LNDLB	307	494,081.02	656,121.65	720	6,029,981
LNDVAL	307	522,199.19	320,792.18	361.23	2,144,239.63
CORP	313	0.83	0.37	0	1
GROSS	313	576,339.68	312,571.79	6,412.56	2,078,556.03
BAIT	37	34,773.30	30,777.32	74.70	84,237.69
DOCK	145	2,627.27	3,264.87	26.43	17,025.99
FOOD	216	19,728.74	16,080.02	226	138,823.96
FRT	48	6,672.80	12,008.49	75.82	68,689.30
FUEL	293	77,014.28	44,144.32	1,268	206,014
GEAR	217	40,115.38	30,837.11	449.92	211,939.62
ICE	201	10,777.02	6,355.53	43.31	42420
INS	305	39,764.87	21,552.65	21.22	116,803.92
LUMP	92	8,926.39	13,876.72	40.55	85,990.66
MISCEXP	96	4,313.22	11,929.81	8.66	110,167.40
MISDOCK	87	1,496.46	1,697.95	18.43	7,962.46
OIL	35	1,943.90	1,317.95	116.13	5,381
PACK	18	5,910.69	6,431.64	27.65	19,634.10
LIC	222	912.87	1,298.90	15.89	7,592.63
RENT	90	5,582.85	12,050.08	82.77	92,165.90
REPAIR	300	39,076.35	28,510.83	272.49	141,074.11
STORE	15	2,461.76	2,605.09	45	8,000.92
VDEPR	65	52,281.42	42,779.51	488.11	174,787.41
WATER	78	680.35	273.12	52.93	1,509.14
AUTO	205	2,926.01	3,089.53	26.48	24,033.02
BANK	110	310.28	823	1.03	6,521.16
CCFDEPO	113	42,645.24	49,493.15	0	369,432.94
CCSHR	303	229,080.06	163,687.79	736.28	1,233,529.95
DEPR	241	44,148.43	44,455.61	37.88	331,264.68
DUES	119	1,060.22	2,538.49	28.87	19,569.16
INT	272	29,820.88	24,963.87	146.85	184,764.98
OFFICE	223	1,313.96	1,850.32	11.98	11,717.05
SALARY	120	35,552.15	30,880.82	330.88	195,991
UTILS	229	2,104.23	2,076.56	6	12,785.23
PROFEES	300	4,186.04	4,223.98	107	43,322.58
SUPPLY	190	20,489.86	28,194.99	37	181,015.86
TAX	259	5,399.76	6,585.45	14.43	49,286.08
TRAVEL	106	2,100.25	2,749.32	11.98	17,035.61
AUCT	73	3,743.23	7,552.90	33.69	50,894.74
EMPBEN	61	603.31	5,942.57	55.82	22,329.52
PENSION	55	7,860.24	11,742.09	18.28	42,792
PATREF	27	4,395.41	1,871.66	17.83	6,993.55
BAGS	5	2,574.30	816.17	1,145.51	3,152.07
SPOT	8	22,717.45	18,978.84	9,327.19	61,095.15
ADVERT	8	917.29	971	211.45	3,179.12
ENT	2	915.96	334.95	679.12	1,152.80
BUSINC	275	9,653.17	43,100.66	0	166,325.31
MEDREIM	2	3,878.75	16.36	3,867.18	3,890.32
OTHDED	11	354,993.70	112,125.37	233,662	551,215.59
NTRIPS	307	31.99	25.16	1	156
DF	307	100.11	74.60	0	324

Table 6. (Cont.)

Variable	No. of Observations	Mean	Standard Deviation	Minimum	Maximum
YEAR	313	1988.68	1.94	1983	1992
FUEL	293	72,081.31	41,469.58	1,076.40	174,884.55
TONCLASS	313	3.47	0.61	2	4
TRPCLASS	307	1.06	0.23	1	2
DABCLASS	307	1.92	0.63	1	3
CTRIP	298	102,058.26	54,609.16	1,543.78	255,859.36
OVOE	300	47,694.53	40,749.66	449.92	354,589.13
IOE	313	88,919.72	47,575.62	263.16	227,202.04

Table 7. Means (and standard deviations) of key variables for otter trawlers and scallop dredgers (1987 dollars)

Variable	Otter Trawlers		Scallop Dredgers	
GRT	137.4	(40.8)	166.2	(30.1)
LEN	78.7	(16.0)	86.9	(9.3)
HSPR	627.1	(272.4)	756.0	(193.7)
YRBLT	1979	(5.0)	1979	(4.6)
CREW	6.3	(3.0)	10.1	(2.4)
DABS	157.8	(59.5)	191.1	(48.5)
DF	84.8	(49.9)	134.0	(65.6)
LNDLB	823050	(899356)	222293[a]	(90719)
LNDVAL	467379	(358610)	684111	(246593)
NTRIPS	39.9	(25.2)	19.5	(4.2)
CTRIP	92667	(43231)	128666	(44619)
OVOE	45759	(44962)	49980	(33544)
IOE	81932	(44347)	111792	(45904)
GROSS	537362	(310241)	718797	(276159)
INS	35626	(18380)	55047	(18840)
CCSHR	203332	(129140)	302624	(135699)
INT	29840	(27782)	32711	(23362)
SALARY	31271	(35548)	38522	(21819)
EMPBEN	2526	(1757)	11134	(7073)

[a]Meat weight.

Table 8. Means (and standard deviations) of key variables by DAB class (1987 dollars)

Variable	DAB Class 1		2		3	
GRT	128	(65.3)	146	(40.3)	162	(29.4)
LEN	72.2	(18.9)	80.7	(13.6)	88.2	(13.7)
HSPR	573	(253.9)	659	(239.8)	785	(244.0)
YRBLT	1977	(8.5)	1978	(5.3)	1980	(4.5)
CREW	5.3	(2.8)	7.9	(3.4)	8.5	(2.4)
DABS	61.7	(32.6)	170.7	(31.9)	242.8	(23.9)
DF	31.4	(47.5)	108.5	(66.0)	173.6	(49.5)
LNDLB	347329	(331376)	553390	(790750)	491736	(369542)
LNDVAL	227164	(171301)	568894	(297117)	797076	(236683)
NTRIPS	32.1	(28.8)	33.9	(26.4)	24.3	(5.6)
CTRIP	58703	(41656)	105310	(46742)	135631	(47577)
OVOE	42308	(42733)	47168	(42831)	59650	(26977)
IOE	66189	(40599)	92913	(46539)	115754	(43905)
GROSS	432216	(283071)	594005	(308216)	768440	(260075)
INS	27399	(16337)	42586	(20836)	51369	(20703)
CCSHR	178304	(217951)	233697	(140378)	307882	(120073)
INT	25626	(24234)	30972	(25047)	32453	(25722)
SALARY	36572	(29859)	33803	(30615)	36768	(33293)
EMPBEN	2637	(1246)	5570	(5570)	6683	(7606)

Table 9. Means (and standard deviations) of key variables by tonnage class (1987 dollars)

Variable	Tonnage Class 2		3		4	
GRT	28	(9.1)	111.7	(25.1)	179	(16.7)
LEN	51.6	(17.7)	69.8	(10.2)	90.0	(9.9)
HSPR	387	(219.0)	527	(216.3)	790	(199.0)
YRBLT	1978	(5.2)	1976	(5.9)	1980	(6.2)
CREW	4.6	(3.5)	6.0	(3.3)	8.4	(3.0)
DABS	75.1	(68.3)	151.6	(57.5)	167.5	(66.4)
DF	74.6	(105.4)	103.8	(77.1)	100.1	(68.6)
LNDLB	108008	(90421)	597909	(857857)	459012	(477350)
LNDVAL	143770	(161309)	447608	(317414)	618503	(290809)
NTRIPS	39.4	(36.6)	43.0	(29.5)	23.0	(14.7)
CTRIP	30782	(37154)	80484	(40458)	118485	(50757)
OVOE	22065	(20303)	44435	(41937)	53630	(40344)
IOE	22907	(20890)	76526	(38388)	106355	(46201)
GROSS	206142	(135160)	471878	(278107)	700861	(288041)
INS	12346	(19788)	32667	(18618)	48413	(19124)
CCSHR	66876	(61891)	174789	(121295)	288990	(172695)
INT	13733	(14742)	26982	(25915)	33680	(24096)
SALARY	12095	(9840)	29571	(32398)	41505	(29203)
EMPBEN	—		2734	(1918)	11068	(7138)

Table 10. Two-standard-deviation (TSD) test for number of outlying and nonoutlying observations of trip costs, other variable operating expenses, and indivisible operating expenses, by tonnage class

Variable	Tonnage Class 2		Tonnage Class 3		Tonnage Class 4	
	Within TSD	Not Within TSD	Within TSD	Not Within TSD	Within TSD	Not Within TSD
CTRIP	19	0	113	8	132	14
OVOE	19	0	118	3	142	4
IOE	19	0	117	4	138	8

Table 11. Two-standard-deviation test for percentages (and numbers) of nonoutlying (within TSD) observations of individual cost shares, by tonnage class

Variable	Tonnage Class					
	2		3		4	
FUEL	94%	(18)	94%	(121)	94%	(143)
OIL	–		100%	(24)	100%	(11)
ICE	100%	(7)	96%	(90)	97%	(99)
WATER	–		92%	(36)	98%	(42)
FOOD	100%	(5)	94%	(105)	97%	(100)
BAGS	–		–		–	
BAIT	100%	(5)	100%	(18)	100%	(14)
GEAR	100%	(12)	95%	(99)	98%	(100)
SUPPLIES	89%	(18)	99%	(87)	96%	(78)
FREIGHT	100%	(7)	100%	(11)	93%	(29)
LUMPERS	–		92%	(52)	95%	(37)
AUCTION	–		95%	(41)	97%	(30)
PACK	–		100%	(3)	100%	(14)
ADVERT	–		100%	(3)	100%	(3)
SPOT	–		–		100%	(6)
INS	100%	(18)	95%	(118)	95%	(146)
LIC	93%	(15)	94%	(88)	94%	(107)
REPAIRS	95%	(19)	97%	(117)	96%	(141)
OFFICE	92%	(13)	98%	(83)	94%	(108)
PROFESS	94%	(16)	97%	(117)	96%	(142)
TRAVEL	100%	(5)	95%	(44)	94%	(47)
DUES	100%	(7)	96%	(54)	96%	(53)
TAX	93%	(15)	96%	(97)	95%	(126)
UTILS	100%	(14)	94%	(93)	98%	(106)

Table 12. Means (and standard deviations) of cost-earnings data and weighout data for all Northeast U.S. vessels (1987 dollars)[a]

Variable	Cost-Earnings Data		Weighout Data	
LNDLB	494081	(656122)	312774	(799518)
LNDVAL	522199	(320792)	208223	(254570)
DABS	155.7	(66.5)	94.7	(76.1)
DF	100.1	(74.6)	62.2	(82.9)
NTRIPS	32	(25.2)	38.4	(40.6)
GRT	142.2	(48.5)	81.4	(64.5)
LEN	79.3	(16.1)	73.7	(89.6)
HSPR	654.6	(252.7)	430.1	(405.7)
YRBLT	1978	(6.2)	1970	(15.3)
CREW	7.3	(3.4)	4.7	(3.3)

[a]All means significantly different at the 1% level except for length (LEN).

Table 13. Means (and standard deviations) of cost-earnings data and weighout data for otter trawl vessels (1987 dollars)[a]

Variable	Cost-Earnings Data		Weighout Data	
LNDLB	823050	(899356)	307346	(528773)
LNDVAL	467379	(358610)	172544	(215856)
DABS	157.9	(59.5)	96	(71.3)
DF	84.8	(49.9)	47.9	(48.4)
NTRIPS	39.9	(25.2)	39.5	(39.6)
GRT	137.4	(40.8)	79.9	(59.8)
LEN	78.7	(16.0)	76.4	(102)
HSPR	627.1	(272.4)	409.7	(416.8)
YRBLT	1979	(5.0)	1969	(14.5)
CREW	6.3	(3.0)	4.4	(2.4)

[a]All means significantly different at the 1% level except for length (LEN) and number of trips (NTRIPS).

Table 14. Means (and standard deviations) of cost-earnings data and weighout data for scallop dredge vessels (1987 dollars)[a]

Variable	Cost-Earnings Data		Weighout Data	
LNDLB	222293	(90719)	158059	(203038)
LNDVAL	684111	(246593)	486983	(299678)
DABS	191.9	(48.5)	164.3	(79.1)
DF	134.0	(65.5)	120.2	(71.8)
NTRIPS	19.5	(4.2)	17.2	(10.8)
GRT	166.2	(30.1)	146.1	(48.8)
LEN	86.9	(9.3)	88.2	(73.7)
HSPR	756.0	(193.7)	680	(426.7)
YRBLT	1979	(4.6)	1974	(12.2)
CREW	10.1	(2.4)	8.6	(3.4)

[a]All means significantly different at the 1% level except for length (LEN), days fished (DF), and number of trips (NTRIPS). Latter two significantly different at the 5% level.

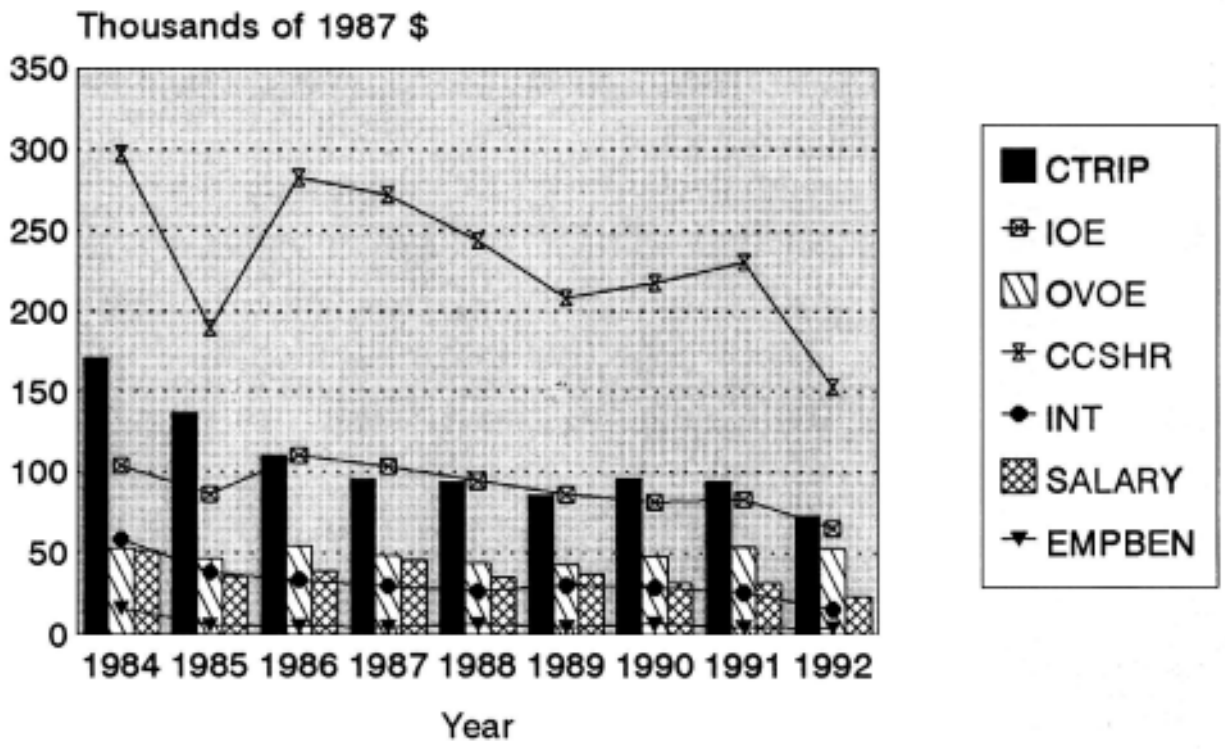

Figure 1. Changes in real costs of key variables during 1984-92

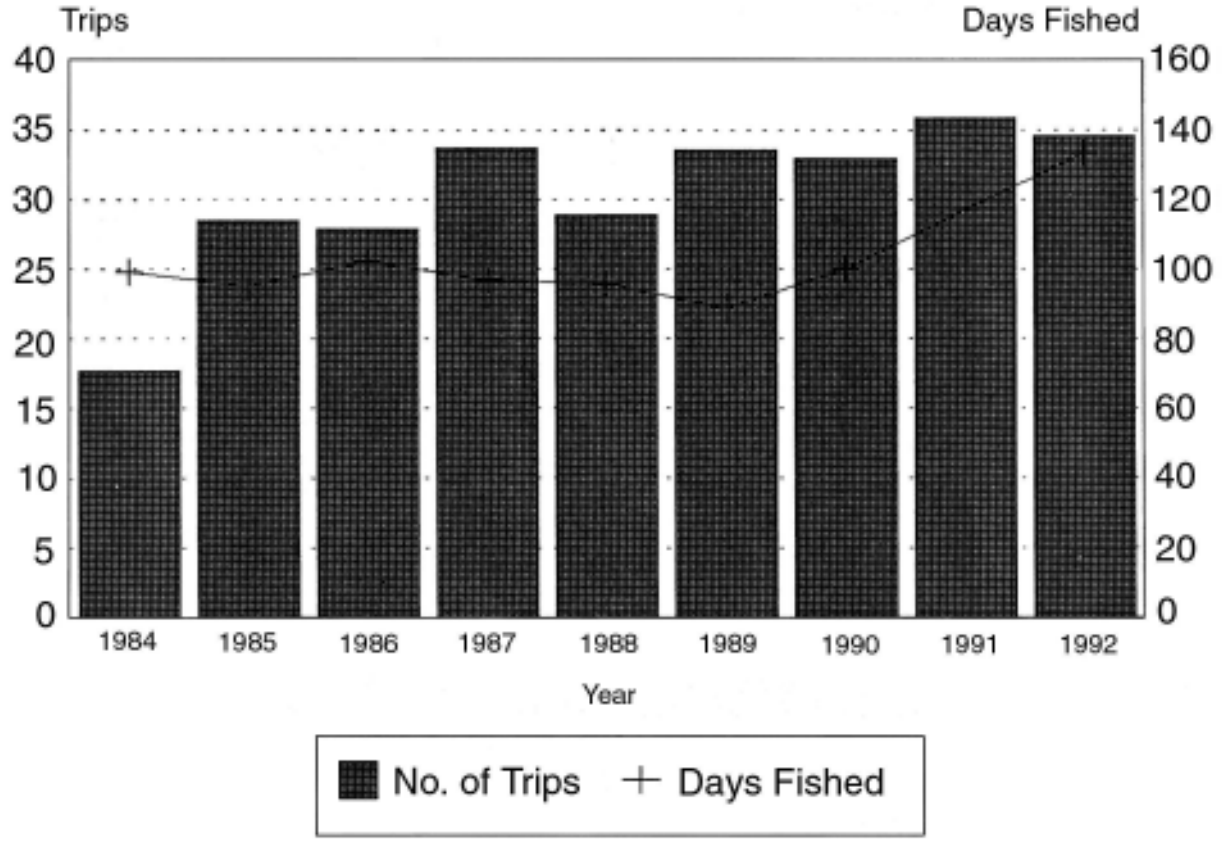

Figure 2. Number of fishing trips and days fished by all vessels during 1984-92

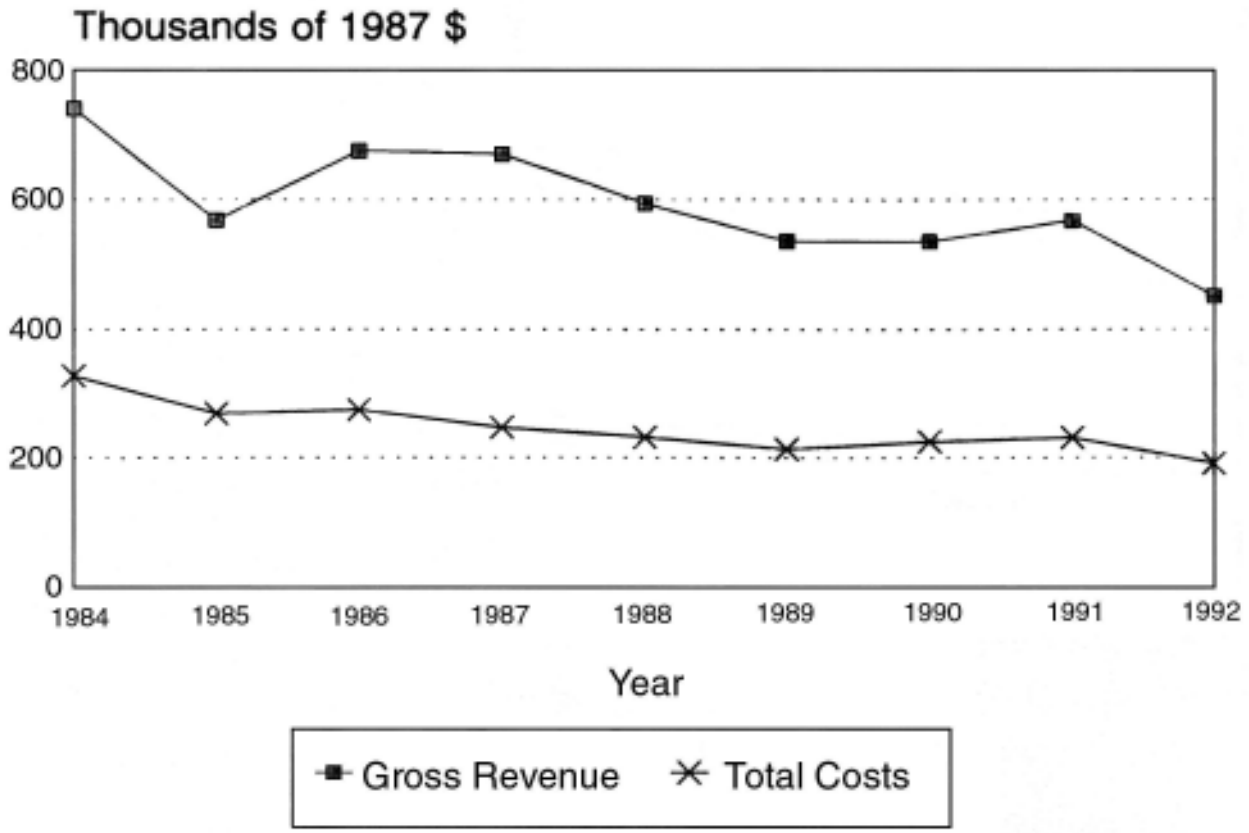

Figure 3. Average real total costs and gross revenue for all vessels during 1984-92

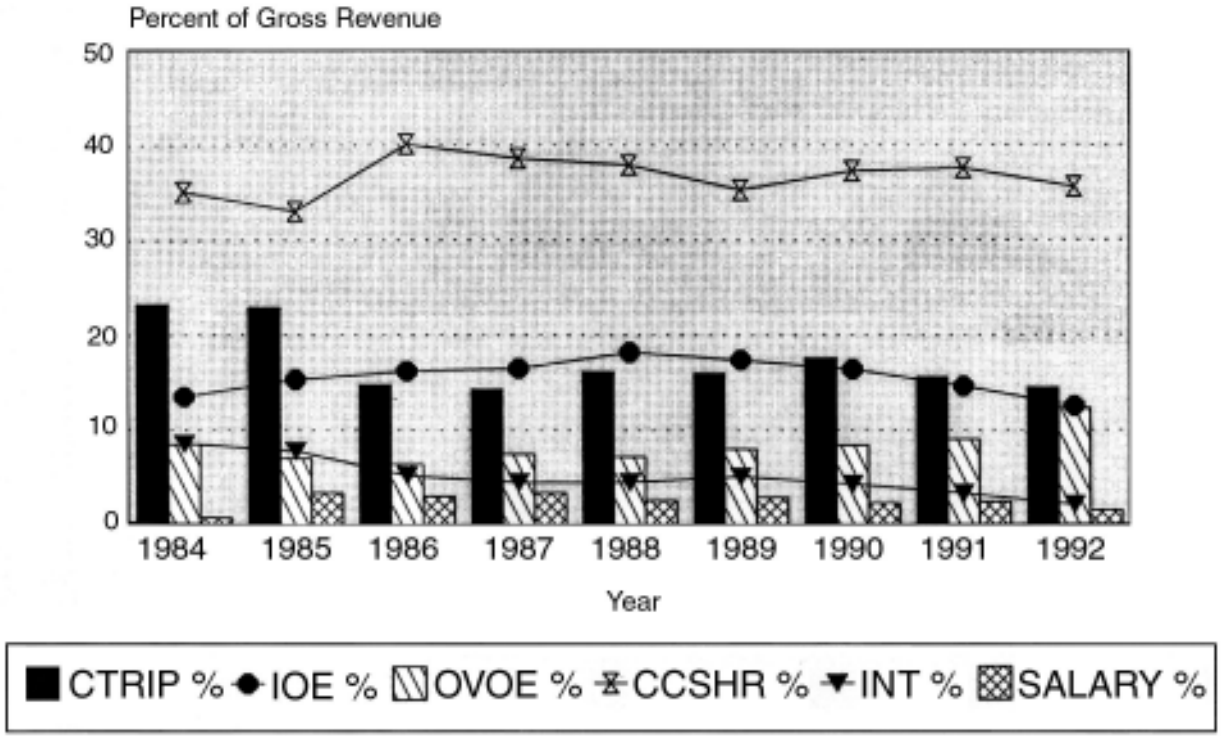

Figure 4. Costs of key variables as a percent of gross revenue for all vessels during 1984-92

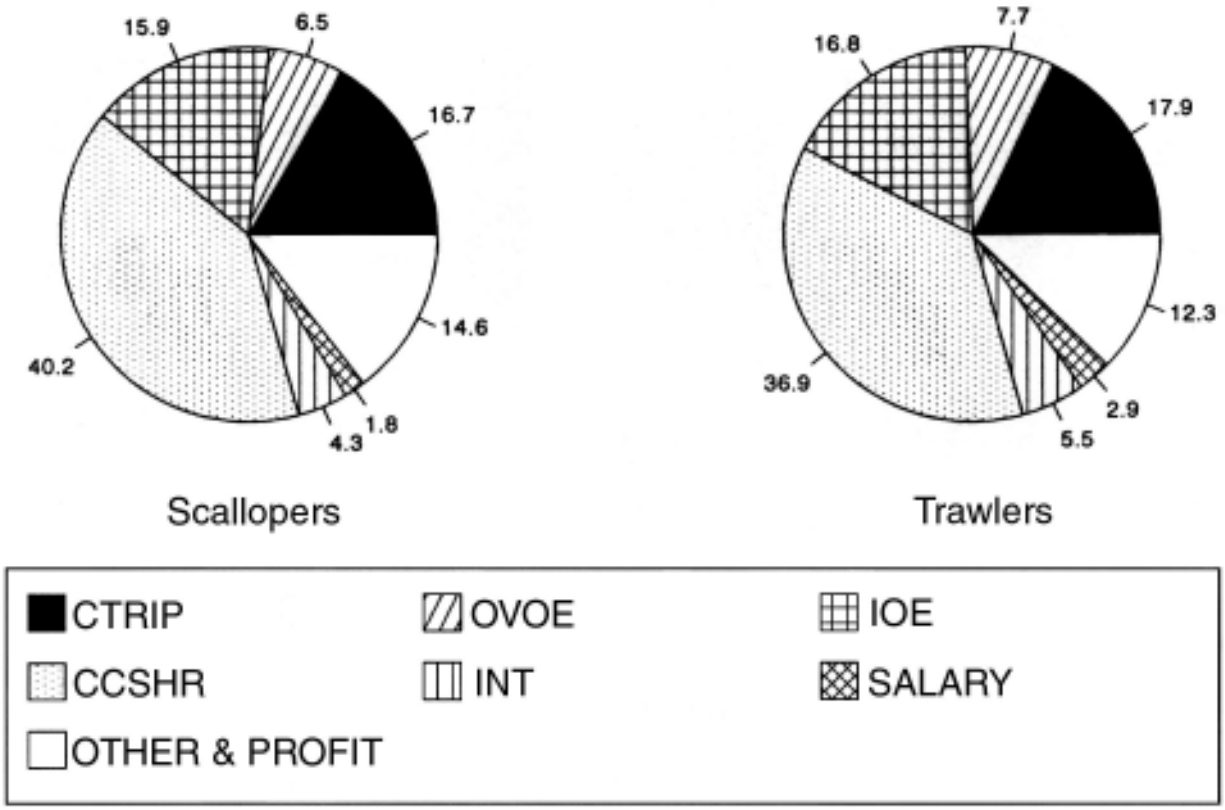

Figure 5. Costs of key variables as a percent of gross revenue for scallop dredgers and otter trawlers during 1984-92

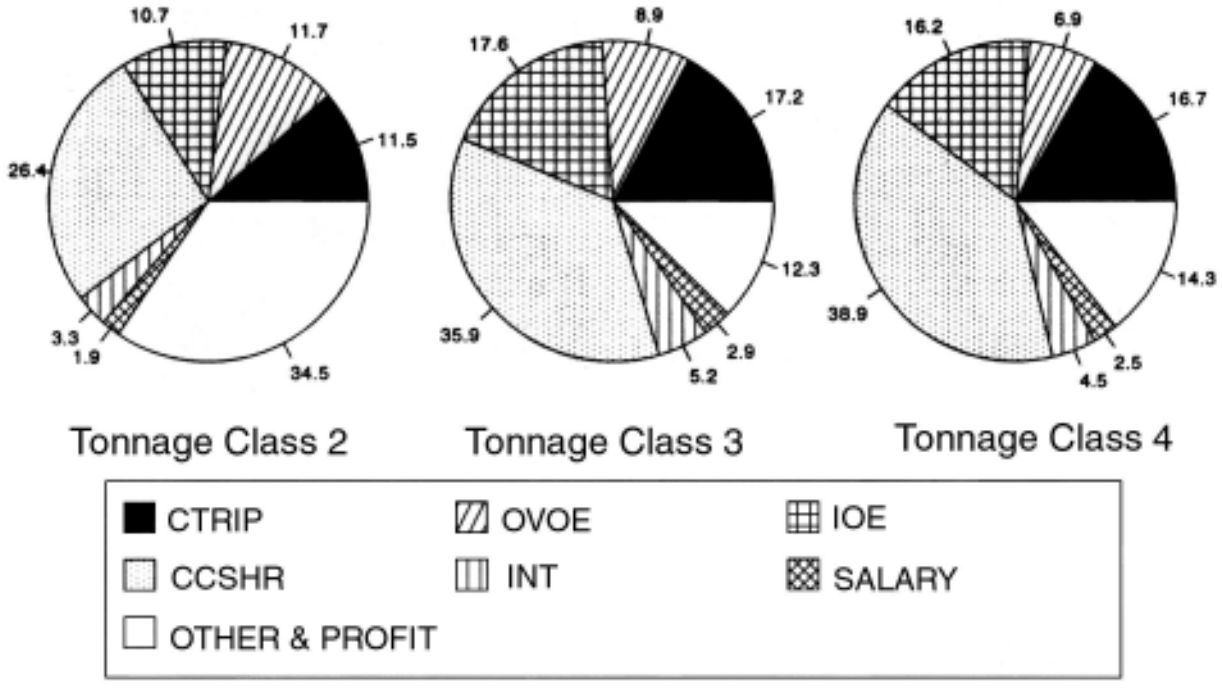

Figure 6. Costs of key variables as a percent of gross revenue by tonnage class

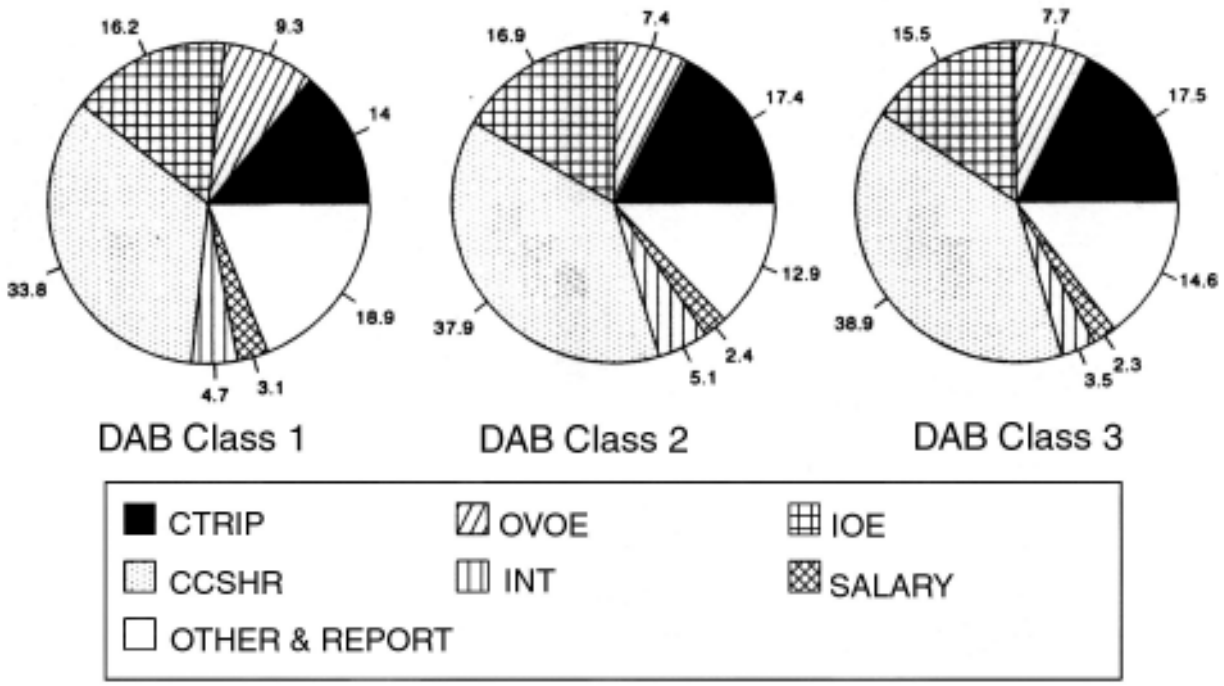

Figure 7. Costs of key variables as a percent of gross revenue by days absent

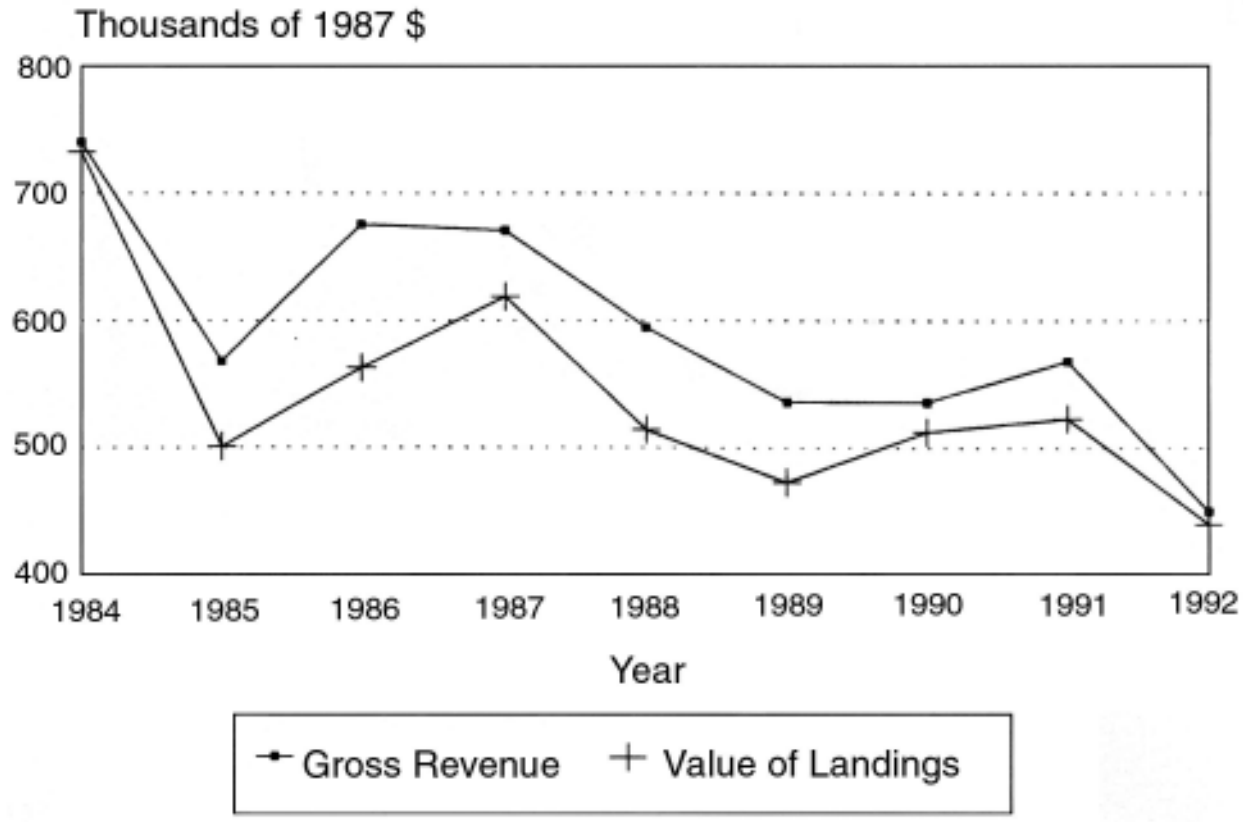

Figure 8. Average real landings values and gross revenue of all vessels during 1984-92

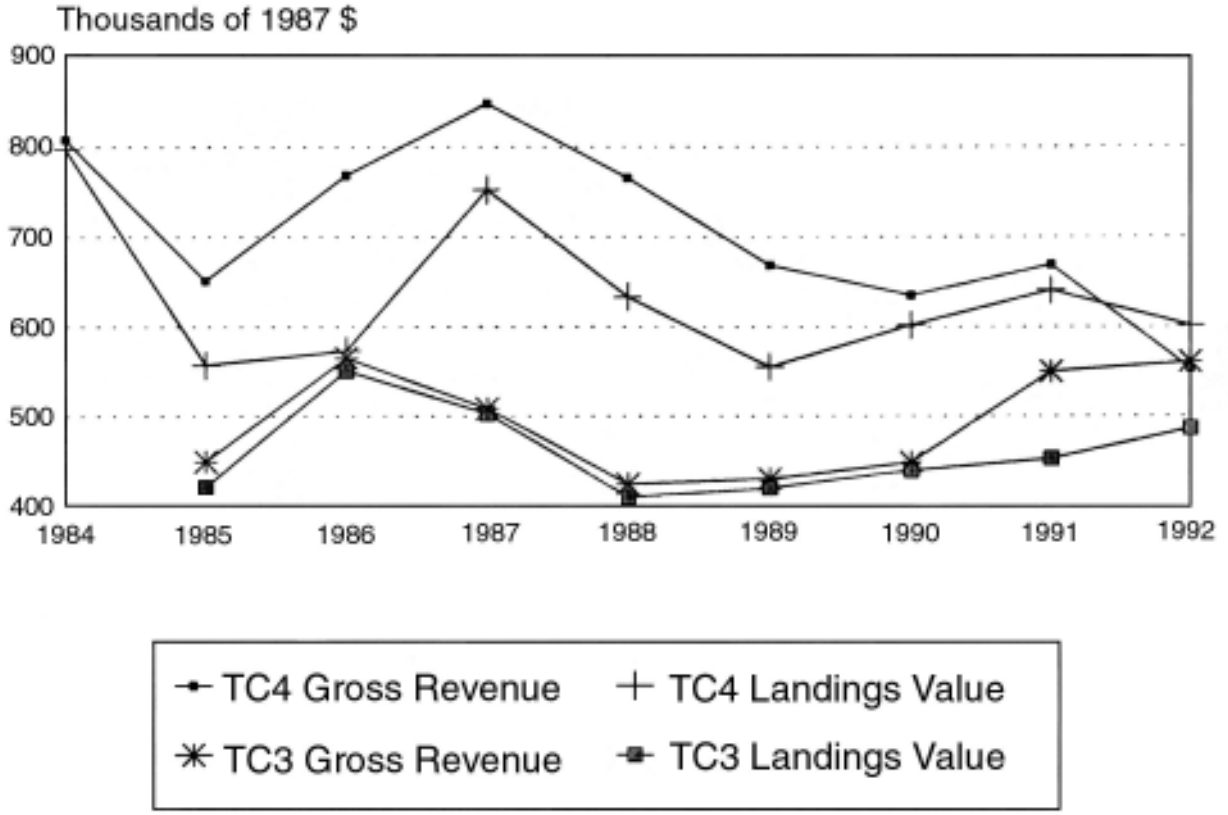

Figure 9. Average real landings values and gross revenue of tonnage class 3 and 4 vessels during 1984-92

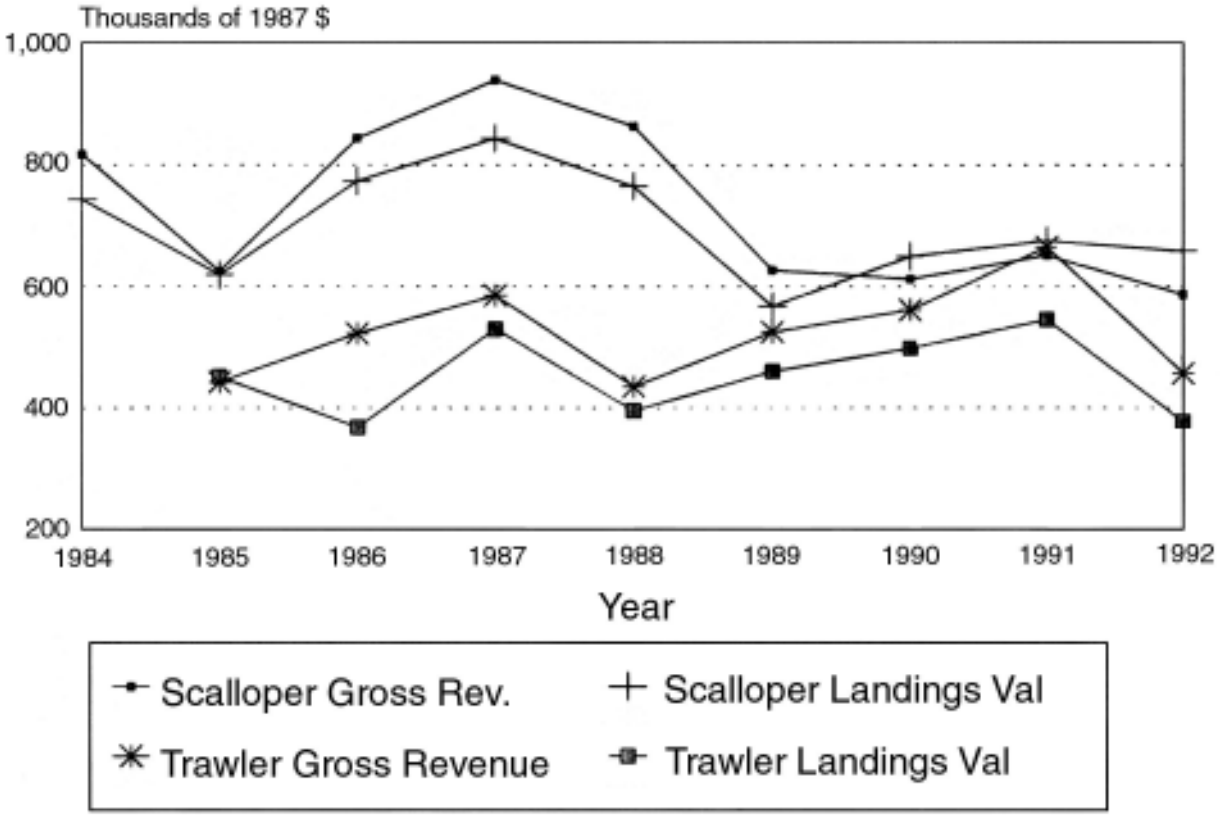

Figure 10. Average real landings values and gross revenue of scallop dredgers and otter trawlers during 1984-92

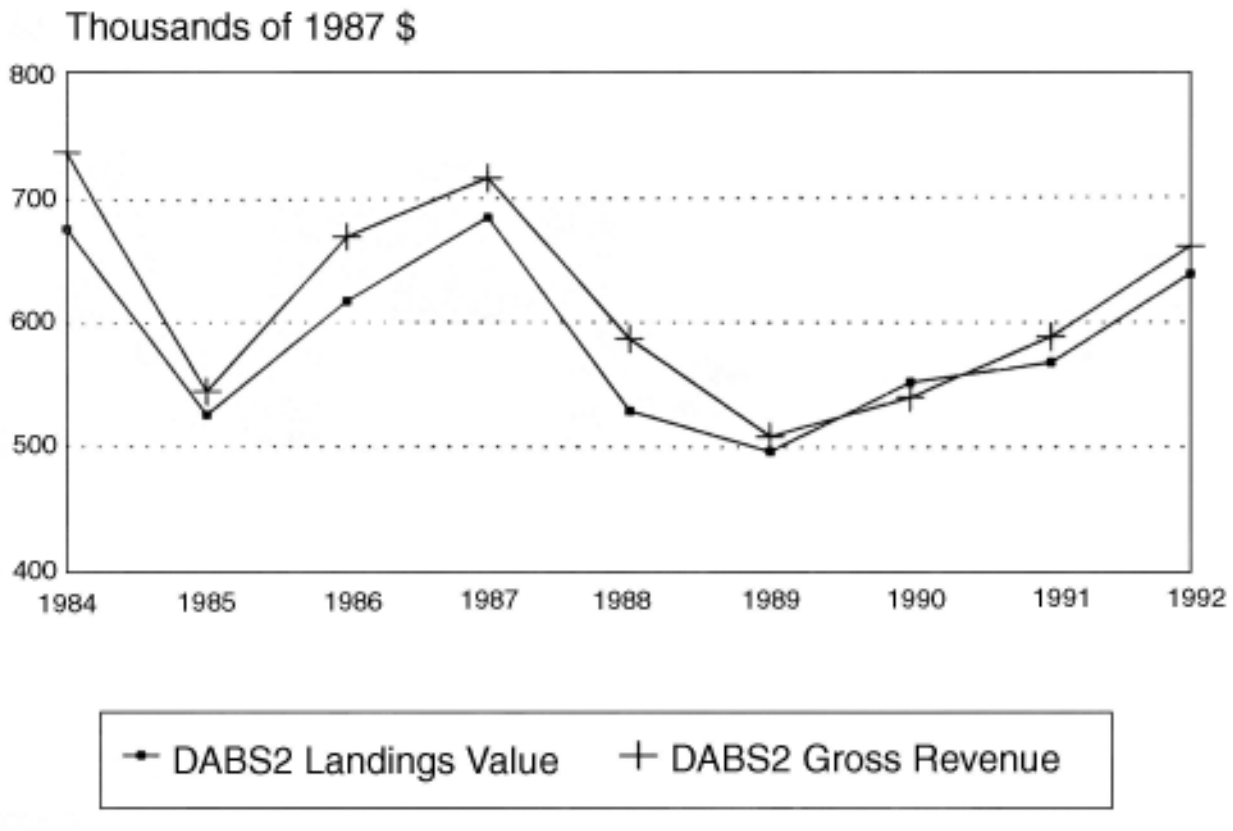

Figure 11. Average real landings values and gross revenue of DAB class 2 vessels (110-219 days absent per year) during 1984-92

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