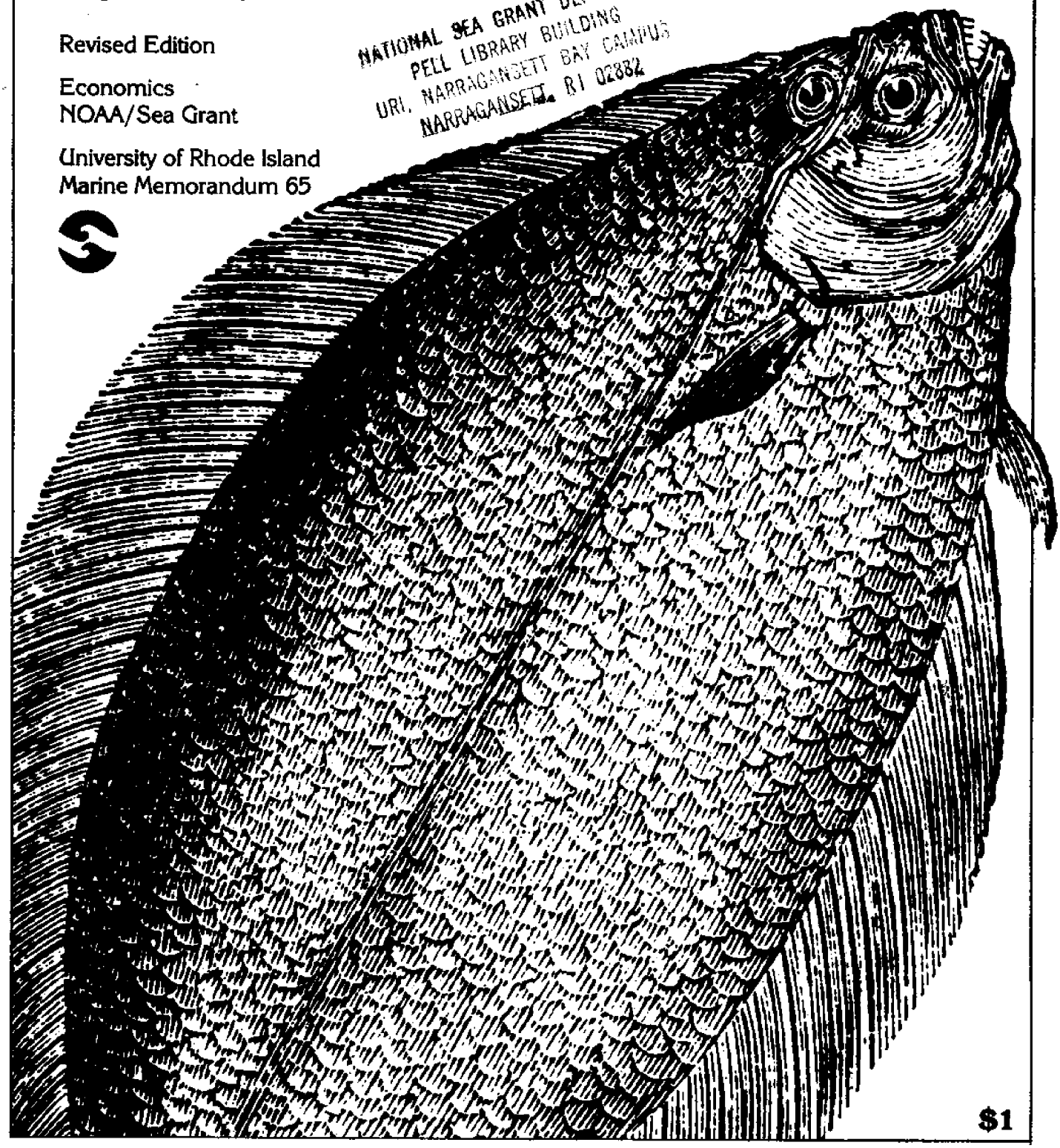
Current Developments in Ex-Vessel Groundfish Prices

Roger L. Corey **Joel B. Dirlam**

Revised Edition

Economics
NOAA/Sea Grant

University of Rhode Island
Marine Memorandum 65



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I. INTRODUCTION

In the spring of 1980, there was widespread dissatisfaction among fishermen, especially otter trawler owners and crew, with the level of price received ex-vessel. As the fishermen's costs rose due to the general inflationary trend, the ex-vessel prices of some types of groundfish fell below seasonal averages (see Graphs III a,b,c). Yet in the face of these declining dock prices the retail price of fish continued to rise, to a point where in June 1980 fish cost 225% more than it did in 1967, as compared with a 146% increase in meat prices and an 81% increase in poultry prices in the same 13-year period.[1] This paradox provoked both disbelief and discontent as the fisherman watched his slice of what appeared to be a growing pie somehow shrink.

Finally, there was a reaction; the fishermen in New Bedford protested with a 21-day strike. They voted on May 21, 1980, to remain at the docks and discontinue fishing until prices rose to acceptable levels, or until processors guaranteed a minimum price for their catch.[2] In an effort to bring pressure to bear on the New Bedford processors, the fishermen also sought to bar the entry of trucks carrying Canadian imports to these plants. This tactic proved ineffective, resulting only in some noisy confrontations between fishermen and the authorities, with one policeman accidently injured by an oncoming truck.[3]

In June 1980, in addition to ending the largely ineffective strike, the Fishermen's Committee, an ad-hoc group formed just prior to the strike, set certain guidelines to govern fishing operations. Trips were to be limited to 9 days, as opposed to the pre-strike practice of staying out up to 14 days, and the layover between trips was lengthened from the customary three days to four.[4] In addition, the boats were to depart in waves of 11 per day in order to stagger landings and avoid gluts. This plan was adopted on a conditional basis, with continued adherence contingent on how effective it was in raising prices.

The New England Fisheries Management Council had imposed a trip limit of 55,000 pounds per boat for 1980, to keep landings small and to preserve stocks. This led to several complaints, especially from owners of large boats, which the restriction primarily affected. They claimed that the rule was discriminatory and would raise the costs of fishing by forcing the boats to return early with a less-than-full load.

In 1981, during their July 28-29 meeting, the Council voted to propose a no-limit regulation that would instead require a minimum mesh size for nets.[5] This replaces an earlier proposal to limit landings to 60,000 pounds, no more than 33% of which could be yellowtail flounder. That proposal met with violent outcries from New England as well as mid-Atlantic fishermen and processors, who claimed, again, that the regulation would raise the cost of fishing and discriminate between smaller and larger boats.

The New Bedford strike, and, indeed, the decline in incomes of New England fishermen in other ports, are not isolated incidents specific to New England groundfishing. Mid-Atlantic fishermen's incomes have suffered, the Gulf Coast

shrimp industry is in difficulties, and last year, in Scotland, England, and France, groundfishermen and lobstermen were demonstrating and striking for higher prices and a reduction in import competition. In Canada, too, which has been blamed by both Europeans and Americans for flooding the market, the entire groundfish industry has been suffering from low prices.

Despite the fact that ex-vessel prices do not rise as fast as retail prices, middlemen as well are experiencing tough economic times. In 1980, on the West Coast, one of the largest processors has gone into bankruptcy, apparently dragged down by excess inventories of frozen and canned fish. More recently, a major processor in Rhode Island has filed for bankruptcy, citing excess capacity as the cause of its financial difficulties. Global Seafoods, of Gallilee, a processor of squid and butterfish, products with primarily foreign markets, cannot induce fishermen to land these fish, as they bring lower prices than fish such as cod and flounder. Burdened by heavy debt, this firm chose to close down "indefinitely" until a sufficient supply of fish could be assured. In August 1981, Gorton's of Gloucester laid off 115 employees, blaming a slump in sales. A spokesman for Gorton's claimed that industry sales are down 11% from last year.[7] Finally, a strike by employees of New Bedford's processors continued through the summer, with processors attempting to gain union acceptance of wage cuts in attempts to stay afloat.

A full-scale review of world developments in fisheries cannot be attempted here. Our purpose is to throw whatever light we can on the New Bedford, as well as the New England, ex-vessel market for species landed mainly by otter trawlers. But it should always be kept in mind that today's fish market is no longer geographically insulated. Worldwide transport of frozen blocks and fillets and air transport of fresh fish make every fish market susceptible, to a varying degree, to landings, processing, and shipments elsewhere, not merely in the United States but in South America, Africa, Europe, and Asia.

Events focusing on the New England market can best be analyzed, in the traditional economic fashion, by distinguishing between those that are registered in the demand side of the market and those that manifest themselves in supply. We shall, therefore, direct our report along those lines.

A review of the factors that shape the demand side of the market, followed by a summary of the most important determinants of supply, will enable us to pull together the forces that have resulted in the prices of recent years. And after the summary it should be possible to suggest what sorts of policies can be adopted to help the fisherman.

Low prices have had an especially harmful impact on New England fishermen because the reduced revenue had to be spread among a greater number of vessels than in recent years. Calculated revenue per otter trawler dropped from a high of $143,277 in 1978 to $137,914 in 1979, while the number of vessels rose from 652 in 1978 to 780 in 1979.[8] Unfortunately, as of this writing, 1980 data are unavailable.

At the same time, costs of operating vessels have risen, putting a squeeze on vessel profits. Deflating average vessel reported revenue by the price index from manufactured products producers, the decline in real receipts from 1978 to 1979 was 17%. Combined with this, operating costs are rising quickly. From January 1978 to August 1981, the price to fishermen of ice rose 43%; the price of diesel fuel in the same period rose 192%. Clearly, a near tripling of fuel costs, which makes up 5 to 15% of the operating cost of an otter trawler, and an almost one-half increase in ice costs--2 to 5% of total

costs--have combined with declining real gross revenues to drastically reduce net incomes of fishermen.

What lies at the root of this problem? Is the fisherman a victim of circumstance or has he brought on his own problems by allowing unfettered growth within his industry over the past several years? This report will attempt to focus on the factors that go into the determination of ex-vessel prices in the hope that some light can be shed on the problem facing the New England fishing fleet.

II. INFLUENCE OF DEMAND

A. Introduction

According to the economist's view, demand is registered in the quantities of a product that buyers are willing and able to purchase at different prices. The quantity demanded is affected first by the price: more will usually be bought at low rather than high prices. In addition, changes in the prices of substitutes affect demand: if the price of chicken or beef is relatively low, then potential consumers of fish may switch to these other products. Indeed, as substitutes, prices of frozen fish influence the demand for fresh fish, and vice versa. Incomes of buyers also influence demand: consumers, if their incomes drop, may reduce their purchases of fish and fish substitutes, even at low prices. Finally, and perhaps obviously, demand reflects tastes: some consumers will never buy fish, no matter what its price.

These four distinct factors influencing the quantities of fish purchased can be measured more easily at the retail level than at the ex-vessel level. This is because the ex-vessel price registers the behavior of derived demand. The quantity the consumer buys at the retail store or in restaurants affects the profits of the retailer or fish peddler. The retailer, in turn, will increase or decrease the quantity he buys at the wholesale level. Finally, the shift will then be registered at the dock, or ex-vessel, level. In the fishing industry, the sensitivity of demand to alterations in the purchase of fish by ultimate consumers is strongly influenced by the fact that a large share (no one is quite sure of the exact percentage) of the fish consumed is purchased as part of a package--that is, a meal, where the price of a fish is not directly compared with the price of a substitute protein.

The possibility of substituting frozen fillets for fresh fillets makes it difficult to predict the exact reaction of purchasers to a change in the price of either product. Switching consumption between species in response to alterations in taste also has to be taken into account. And when the fish must move through many marketing stages to reach the consumer, each stage creating costs that must be covered, a sizeable alteration in quantities purchased at a given retail price may be registered in a substantial change in price at the wholesale and ex-vessel levels, which is not yet reflected in retail price. The relative rigidity of the retail price makes movement in retail price an imperfect index of changes in consumer demand.

B. Long-term Changes in Demand

Fishermen and processors have been encouraged by an (irregular) increase in per capita consumption of fish since 1960. Although data giving the consumption of fresh as distinct from frozen fish are not available, Table VI does provide grounds for confidence that with each successive year the United States consumer, even at mounting relative prices of fresh and frozen fish, will add fish to his diet.

There has not been an adequate study made, as yet, of the determinants which over the long run affect fresh and frozen fish consumption in the United States. Fast-food fish is sold to consumers as an alternative to hamburgers; the fish comes largely from imported blocks. Its consumption may be an alternative to eating fresh fish, but this seems unlikely, given the circumstances of the meal. On the other hand, the fish sandwich may accustom consumers to fish and increase the number of buyers of fresh fish.

Greater availability of frozen fillets or blocks, can, however, substitute for fresh fish in hotels, restaurants, and institutions, so that if there are divergences in price that persist, fresh fish could lose part of its market. Whether or not consumers who habitually buy fresh fish for home consumption will switch to frozen because of a widening of the price gap, we cannot say with assurance.

C. Prices

The demand for fish at the dock reflects the demand at retail. If wholesalers and processors cannot dispose of fresh fish through normal channels, they will consider freezing. However, their demand for whole fish is determined by their anticipated margins. For example, the average monthly wholesale price of frozen cod fillets imported from Canada in 1980 was 89.4¢ per pound,[9] which means that the domestic price cannot be higher than this to remain competitive. In 1980, the average monthly ex-vessel price of cod was 28.4¢ per pound.[10] (This price is for drawn fish, not fillets, and must be converted to a fillet-equivalent price. It takes 2.63 pounds of drawn cod to make one pound of fillets, so the effective price of cod fillets is 74.7¢, or 28.4¢ x 2.63.)[11] The processor's cost of cod fillets, then, is 74.7¢ per pound, and this leaves only a 14.7¢ markup (16% of price) to cover his other processing costs and still make his product price-competitive with the Canadian product. The differential between this wholesale price and the 1980 wholesale price of fresh cod fillets of $1.92 per pound explains, in part, the unwillingness of the processor to absorb excess supplies that he cannot sell fresh.

Although the demand for fresh fish at retail will shift with price, the incompressibility of retailing costs prevents wide variations in retail price (see Graphs V and VI). Moreover, the supermarket retailer has little to gain by lowering prices to reflect short-run declines in wholesale costs--fresh fish is usually a small proportion of total sales, and a lower price will not attract a sufficiently large number of new customers to make this practice worthwhile. Fish must "earn its keep," since it is competing with other perishable items for shelf space.

An analysis of relative changes in wholesale and ex-vessel prices over periods of several weeks, including seasonal rises and declines, will show that the two prices move together; for a given rise or fall, the relative drop in the ex-vessel price is larger than that of the wholesale price. This is due in part, of course, to the fact that a given drop in the ex-vessel price of, say, 10¢ per pound represents a larger proportion of price than an equivalent 10¢ drop in the wholesale price.

In addition, fishermen have a larger proportion of total costs tied up as fixed costs--boat, debt, etc.--than do processors. Much more of the processors' costs are variable costs, such as energy, labor, and the like.

Therefore, in the short run, since the fishermen's costs are largely fixed, the variability of price can be larger without large fluctuations in supply. The price of the fish to the processor, a variable cost, is a substantial proportion of total costs--39% of the wholesale price of fresh cod, for example, in 1980.[12] In the short run, variable costs must be covered for a firm to remain in production, and as the processor has relatively high variable costs, the fluctuation in wholesale price must be relatively less than the fisherman's to continue production.

It is important to point out that, for several reasons, the data are imperfect with respect to retail prices. First, the New York state retail prices collected by the State Department of Agriculture are ranges of price, from which simple averages are taken by the National Marine Fisheries Service for reproduction in the Food Fish Market Review. We have no inkling as to what the (more accurate) weighted average price would be.

Second, the U.S. Department of Labor's Bureau of Labor Statistics does not compile separate retail price index series on relevant species; its composite fish price index lumps fresh and frozen fish for all species.

Finally, there is no easy way, short of an extensive survey of restauranteurs, of determining the average retail selling price of fish sold in restaurants. The price of a fish dinner is given on a menu, yet there is much more to a fish dinner than the fish itself, making the menu price very inaccurate as a measure of fish prices. This is a real difficulty in our analysis, as so much of the retail fish market is channeled through such institutions as restaurants, hotels, etc. Furthermore, other institutions such as prisons, hospitals, and the armed services do not sell meals at a clear price.

Still, it is possible to examine the relative behavior of retail, wholesale, and ex-vessel prices in the face of changing consumer demand for fish. The important concept to take into consideration when analyzing customer response to price changes is that of price elasticity of demand--the measure of the relative change in the quantity demanded resulting from a change in price. All the elasticity studies that have been made seem to show that at the ex-vessel level demand is elastic; that is, a certain percentage change in price will cause a percentage change in the quantity demanded of an extent greater than the change in price.[13] Furthermore, econometric analysis has shown that at the retail level, also, demand is elastic.[14] The implication in both cases is that if there is an increase in supply, the price will fall, but by a smaller percentage than the relative increase in supply.

The above conclusions, as regards the ex-vessel level, contradict the conventional assumption that demand at the dock is inelastic; to sell a greater supply of fish, the price must drop more than proportionately. Indeed, if in fact ex-vessel demand is elastic, the recent increases in supply, though having the effect of depressing prices, should have resulted in higher total revenues to the fishermen. Total industry revenues are up; however, due to the greater number of boats, per trawler revenues are down. The conflict between intuitive expectations of inelasticity and findings of elastic demand may arise in part from the difference in price measures. The above-mentioned studies rely on monthly averages of price, rather than on daily transactions, from which intuition is more closely based. Whenever the time period of an analysis of price elasticity is extended, the coefficient of elasticity increases in absolute size; that is, the response of the consumer to a change in price, as registered in a change in the quantity demanded,

increases. This is due, in part, to the greater availability of substitutes for the product (given a rise in fish prices) which occurs as the time period increases.

However, this still leaves largely unanswered the question of why ex-vessel prices dropped so much in 1980. It must be understood that other factors have affected the New Bedford fish market in addition to landings. Imports and inventory changes, discussed in Part III, influence ex-vessel prices, and it will be shown how these factors may have contributed to declining ex-vessel prices.

At the retail level, the conclusion that demand is elastic does not necessarily mean that the retail price will fluctuate to the same extent--by the same proportion--as does the ex-vessel price. For one thing, the ex-vessel price of fish is only a small part of the price at the retail level, since processing, wholesaling, and retailing costs must be added to it. Hence, a small drop in the ex-vessel price will not be reflected in an equal percentage drop in the retail price, under any circumstances. A common observation by the fisherman is that the price he receives for his fish may drop precipitously without a concurrent proportional drop in the retail price. What is not taken into consideration oftentimes are the absolute changes in price: a 10¢ drop in ex-vessel price represents a considerably greater percentage drop than does an equivalent 10¢ drop in retail price.

Moreover, the retailer is unlikely to vary his price daily merely to reflect a fall or rise in the wholesale price--he is accustomed to maintaining the price at some conventional level and to changing it moderately. He will not alter significantly the amount of fish he buys simply because of sudden changes in the wholesale price--to cover his costs and provide a reasonable profit over a season, he usually prices to enjoy, on the average, a 50 to 60% margin. True, this margin may be quite volatile in the very short run.

Assume the retailer applies a 60 to 70% markup--the average in New York for 1980--to his wholesale cost, and the processor in turn applies markups to his ex-vessel costs, so that a 50% drop in ex-vessel price would appear as only a 15% drop at the retail level. Hence, the increase in the derived amount demanded (the middleman's demand, which is derived from the consumer demand) would, assuming an elasticity coefficient of -2 (= % change in quantity demanded/% change in price), amount to only 30%, to offset an ex-vessel price decline of 50%.

This, in fact, would appear only if the retailer chose to reduce his price. Of course, he may do so--the NMFS data, taken from the New York state prices, do vary from month to month, but by not so much as the ex-vessel price variations.

This conclusion seems to contradict the findings that demand at the ex-vessel level is elastic. In the above illustration, a 50% decrease in price would be accompanied by only a 30% increase in the quantity demanded. But the above studies are based on long-term relationships, smoothing out short-term price fluctuations.

D. Prices of Substitutes

The retail prices of substitutes for fish play a large part in the consumer's demand for fish. Relative prices are important factors in

household food purchases, as evidenced by past consumer behavior in the face of swiftly rising prices of coffee, sugar, and hamburger meat.

The relation between the retail price of fish and the prices of substitutes has altered in recent years (see Graph VII a,b). In the past decade, as the price of fish climbed more rapidly than that of close substitutes, the latter grew more attractive. Indeed, that fresh fish continued to find a market in recent years, when, in complete contrast to pre-World War II price relations, it became more expensive per pound than hamburger, pork, or chicken, can only be explained by a rise in incomes and the loyalty of consumers who have a strong attachment to fish. In 1979 and 1980, as Graph VII a,b shows, the relative prices of close substitutes dropped rapidly, particularly in the early months of 1980.

The retail prices of fresh cod and flounder were very high relative to fish substitutes such as hamburger, pork, and poultry in 1980. After the sizeable increases in late 1978 and early 1979, meat prices actually fell or leveled off in 1980. Retail price indices of hamburger, pork, and poultry fell 1.7%, 7.8, and 5.3%, respectively, from January to June 1980.[15] Conversely, the price index for "fresh and frozen fish and seafood" rose 1.9% in the same period. For the year, all price indices rose: 1.8% for hamburger, 10.6% for pork, 7.8% for poultry, and 11.3% for fish.[16] More specifically, the relevant retail prices for fresh cod and flounder fillets were 2% and 5% higher in June 1980 than in January.[17] Actually, both prices rose 7% from the January level in March (for cod) and April (for flounder), and declined subsequently.

In the first four months of 1981, fish substitute prices once again declined, as they did in the first half of 1980: 4.2% for hamburger, 4.7% for pork, and 2.8% for poultry. The fish category showed no change.[18] Fresh cod fillets are also unchanged; fresh flounder fillets have dropped about 2%.[19]

When viewed over a longer period of time, the trends in prices become more obvious. Using 1967 as a base year, April 1981 retail price indices for hamburger, pork, and poultry were 265, 217, and 197, respectively; yet the fish price index was 355.[20] Clearly, the relative price of fish has risen remarkably when compared with fish substitutes. Since 1967, fish has risen in price 55% more than hamburger, 118% more than pork, and 163% more than poultry. These popular sources of protein are close substitutes for one another. Over the years, it is probable that the lethargic growth in per capita consumption of fish, especially when compared with that of the relatively less expensive poultry, is due in part (there are numerous factors that influence demand for these products) to changes in relative prices.

In addition to non-fish substitutes for fresh fish, some frozen fish prices are more attractive than fresh fish, and this may play a part in the consumer's demand for fish. As total fish demand, per capita, rises at a moderate rate in the long run, then the rising fresh fish prices may cause the consumer to shift from fresh fish to frozen, a highly substitutable alternative. Retail prices for frozen cod fillets declined 10.1% from January to April 1980, after a rise in 1979 of 11.2%, while for the same period in 1980 frozen flounder fillets rose 2.9%, following a 1979 rise of 20.4%.[21] Thus, from analyzing retail prices alone, one would expect a shift in consumer demand in 1979 away from frozen cod and flounder, whose prices rose relatively quickly, to fresh cod and flounder, whose prices dropped (flounder) or rose only slightly (cod).

While in 1979 fresh fish prices became relatively more attractive, in 1980 the opposite occurred. In 1980, this may have caused a tendency for demand to shift from fresh to frozen fillets as prices for fresh fillets rose compared to relatively stable frozen fillet prices. In the early months of 1981, fresh fish prices jumped significantly: the average monthly price in the first four months of 1981 for fresh cod fillets was 18% higher than that of 1980; for flounder, prices jumped 23%. Frozen cod fillets in the same period rose only 4.4%; frozen flounder fillets, only 1.3%. For the time being, then, we may reasonably expect a continued tendency for consumer demand to shift away from fresh fillets and toward the relatively less expensive frozen fillets.

To some extent, frozen fish sticks and portions could be considered a substitute for fresh groundfish. The consumption of fish sticks and portions has enjoyed an irregular increase in the last 20 years. This is due in large part to the proliferation of fast-food establishments. Record consumption to date was in 1979, at a level of 490 million pounds.[22] Due to declining real restaurant sales, resulting from the 1980 recession, consumption last year dropped 6%, to just over 460 million pounds.

Wholesale prices for cod and haddock sticks and portions, while showing overall increases in 1979, varied in amount of change. Prices of cod sticks and portions in 1979 increased 5.9% and 4.7% respectively, less than the overall inflation rate of 13.3%.[23] Yet haddock sticks and portions, priced at an average of 3.1% over cod in 1979, rose 14.2% and 18%, respectively, in 1979.

E. Changes in Incomes

New England personal income rose 10.4% in 1978, 12.2% in 1979, and 11.8% in 1980.[24] The general rates of inflation for those years were 9.0%, 13.3%, and 13.5%, respectively.[25] More and more care must be taken by the household in allocating income between various substitutes within general expenditure categories. If nominal income (the number of dollars) rises at a rate less than the rise in the general price level, then the purchasing power of the income, or the "real" income, falls: the consumer can buy fewer goods and services, even though the amount of money received as income has risen. As mentioned, personal income from 1978-80 rose at a rate less than the rise in the price level--less can be bought with a family's income, and less necessary or more costly items must be sacrificed. As fish has risen in price more than its substitutes, less can be expected to be purchased.

An analysis that takes into account personal income changes and prices of fish substitutes, in addition to fresh and frozen fish prices, may be expected to portray the demand for fish more accurately. Per capita personal income in New England did not keep up with inflation in 1977-80. Consumers may then be expected to shift from foods that are relatively more expensive to foods that are not as expensive, in an attempt to salvage declining real income.

Not only can we expect to find a tendency for demand to shift from fish to relatively less expensive substitutes, but within the food fish group, as divided between fresh and frozen fish, demand can be expected to have shifted. Frozen fish prices, especially for cod, have risen less than prices of fresh fish, making frozen fish, which is a clear substitute for fresh, relatively less expensive.

To summarize, declining real personal income can be expected to have caused consumers to look more closely at relative food prices. Fish

substitutes--in particular, hamburger, pork, and poultry--are relatively less expensive than fish, creating a tendency, at least, to look away from fish products toward substitutes. In addition, frozen fish is relatively less expensive than fresh fish, and this causes a tendency for consumers to shift away from fresh fish, the market for which most of New England's landings are used.

III. DETERMINANTS OF SUPPLY

A. Introduction

The supply of fish at any one time is a result of factors affecting both the number of suppliers and the quantity supplied by each. The economic law of supply holds that as the price of a product rises, everything else remaining equal, the quantity supplied will increase. But many other factors, changing over time, influence supply. The major immediate determinant of the supply of fresh fish is the level of domestic landings. The volume of domestic landings is affected by the number and size of boats, the cost of operations (including food, fuel, and crew), and the availability of fish. As the number of boats increases, the aggregate level of landings should also increase, but not necessarily in proportion. The number of trawlers has increased in the past several years and, from 1977 to 1979, increased 30%, due primarily to the extension of the United States fishing limits. Aggregate landings have increased also, yet not in proportion. Average landings per trawler have decreased.[26]

One study, which was based on experience for 1976 to 1979, found that the long-run supply is elastic, and, therefore, increasing demand will not cause prices to rise in the long run. While per capita consumption of fish from 1972 to 1979 rose 11% and the extended fishing limits initially increased per trawler revenues, the resulting increase in the number of boats has caused (seasonally adjusted) prices to remain fairly constant. In fact, the increase in boats continued in 1980, reducing revenue further by increasing the aggregate supply of fish relative to demand, despite the fact that 1979 real gross revenues were down significantly.[27] This lag in the reaction of suppliers to profits has been hypothesized by Nancy Bockstael as the time period between planning the entrance into fishing--plans for boat-building, etc.--and the actual entrance as a supplier; perhaps two years between beginning plans and beginning fishing. Thus, equilibrium levels of supply are overshot--an illustration of the "cobweb theorem" common in agricultural economics. A qualification to this theory would be the possibility that fishermen have bought boats from Southern shrimp fishermen. These boats require modifications for groundfishing, yet the lag time before entrance into the industry may still be considerably shorter.

A prime determinant of landings, of course, is the price the fishermen expect to receive for their catch at the dock. If the price is low, the revenue received will be lower for a given catch. On the one hand, this expected low price may induce the fisherman to restrict his catch in the hope of helping to drive the price up by a short supply. On the other hand, as the fisherman is only one of many, a decision such as this that isn't taken collectively by all fishermen in the market may not succeed in affecting the price and may only serve to bring a lower total revenue to that fisherman. Therefore, in anticipation of a low price, the fisherman may choose to try to increase the quantity of fish he brings in in order to maintain total revenue received for the catch.

In a study on processors' capacity,[28] it was concluded that the ex-vessel price drops suddenly when processors reach capacity. This is due to the findings that marginal costs (the additional costs resulting from additional output) are fairly constant for output up to capacity. Up to this point, the volume of landings will not greatly influence ex-vessel prices. It may be implicitly assumed that the definition of "capacity" here includes the capacity of the marketing channels through which fresh fish is sold, particularly the likelihood that a given customer will continue to buy the same amount of fish as in the past. At full capacity, if increased landings are large enough so that processors can no longer market all the fish they fillet in fresh form, the fish is frozen and the ex-vessel price will drop sharply below the level that could be predicted using the usual determinants--income, prices of substitutes, and tastes.

Another determinant of supply is imported fish. Canada is the chief source of fresh groundfish imports into the Northeast United States. With considerable subsidization, Canada can offer fresh and frozen fish at very attractive prices to American processors, restaurants, and retailers--so much so that some restaurants adjacent to Rhode Island fish piers buy some species of seafood from Canadian suppliers at a lower cost (including transportation) than they have to pay fishermen in the area.[29]

Domestic fishermen argue that imports of fish pose a problem for the United States economy as a whole, as well as for the domestic fishing industry itself. According to their presentation before the International Trade Commission, United States imports of groundfish fillets and steaks increased 8.5% in the first six months of 1979 compared to the same period in 1978.[30] From 1967 to 1977, it was alleged, the trade deficit relating to bottomfish rose 613%, to almost $600,000.[31] This deficit is rising steadily, creating further pressure on the United States for imposition of quotas and tariffs to reduce the imbalance of trade.

Finally, inventories of frozen fillets and blocks of fish held by processors are a source of supply in the frozen market. Processors will react to an increase in customer demand, given stable sources of their supplies, by reducing inventories in the short run, to stabilize market conditions with their customers. In the longer run, however, there is a "desired" level of inventories, which is influenced by interest rates. Given changes in customer demand, of interest rates, and the resulting short-run changes in inventories, processors will adjust their demand for fish accordingly. Similarly, given stable customer demand, processors will react to changes in supply (e.g., landings) by changing the price offered to fishermen in order to maintain optimal revenue/cost patterns in their operations. Accepting increased landings, for example, will raise processors' costs of processing fresh fish, freezing it, and holding inventories, and to offset this the processor will offer lower prices to the fishermen.

It has been suggested that inventories are primarily a function of ex-vessel price, which, in turn, is a function of the level of landings.[32] This is due to the fact that the ex-vessel price is a cost to the processor of inventories. In addition, there is substantial relationship between ex-vessel price and seasonal shifts in landings, the latter being a significant factor in determining optimal or "desired" inventory levels.

These, then, are the main determinants of supply discussed in this analysis: landings, imports, and holdings of fish. Together they influence the supply of fish to the marketing channels through which the fish travel to

reach the ultimate consumer. Supply is the opposite side from demand of the coin under discussion here--the determination of fish prices. We will now examine the supply side of the market forces which determine the prevailing prices in fish markets and the quantities of fish that will equilibrate demand and supply and clear the market.

B. Landings

A major function contributing to the relatively low ex-vessel price of groundfish has been the significant increase in landings of cod, haddock, and yellowtail flounder in 1980 and the first seven months of 1981 compared with 1979 (see Graphs I and II). New England landings of these species increased dramatically in 1980: 40% over 1979 levels for haddock, nearly 20% for cod, and 7% for yellowtail flounder.[33]

For the first seven months of 1981, cod landings in New England ports totaled almost 40 million pounds, a decrease of 10% from the same period in 1980. Haddock landings increased 11%, to just over 26 million pounds, and landings of flounder dropped 14%, to just under 15 million pounds. This compares with substantial changes of 36%, 45%, and 44% for cod, haddock, and yellowtail for the same period between 1979 and 1980.

The weekly totals of groundfish landings were generally much higher in 1980 than for corresponding weeks in 1979, making the year-to-date figures throughout the first half of 1980 higher than for 1979. For cod and haddock, landings in 1979 were lower than for 1978, making the increased supply of these fish in 1980 somewhat surprising. For all three types of groundfish under consideration, the year-to-date figures throughout 1980 were substantially higher than the 1979 data.

In the first half of 1981, landings of groundfish have again been above 1979 levels, yet only for haddock are current 1981 levels exceeding those of 1980--due primarily to some extraordinarily high landings in February of this year (otherwise, 1981 haddock landings, too, are close to 1980 levels).

The rise in landings in recent years may be attributed, in part at least, to the growth of the New England fishing fleet. According to the New England Fisheries Management Council, the number of otter trawlers increased from 641 in 1976 to 996 in 1979. This increase was concentrated mainly in the smaller boats, those from 5 to 60 gross registered tons (GRT). In addition, these boats make up about 60% of the total fleet (over 5 GRT, which does not include numerous very small fishing boats). A large number of new boats may have been drawn into the industry by the increased opportunities created by the expansion of the United States fishing limits, effective in 1977. To offset this influx of boats, primarily to protect the long-term potential of the fishing grounds, the NMFS imposed quotas on landings and restrictions on fishing in spawning areas. While strict compliance with these quotas kept 1979 landings about the same as those in 1978, there was growing circumvention of these quotas in 1980, resulting in higher volumes of landings in that year.[34]

For several weeks preceding the 1980 strike, the weekly landings in New Bedford were substantially higher than for corresponding weeks in 1979. In addition, prices generally declined during that period in 1980, relative to corresponding 1979 prices, especially for cod and haddock--the species for which landings were much higher in 1980 than in 1979 (see Graph II a,b,c).

Here we see a highly unusual phenomenon. In the short run, as ex-vessel

prices fall, landings may actually increase! This negative-supply elasticity holds only in the short run, however, when landings are relatively fixed. In the long run, depressed dock prices will cause a decline in the supply of fish--the expected outcome--and, vice versa, as fishermen have more time to adjust supply (including the alternative of shutting down altogether if prices are low enough). Thus, this downward-sloping supply curve is a limited phenomenon, for if prices fall far enough fishermen will discard their catch, or refuse to go out at all.

With a relatively stable consumer demand for fish, the increased landings in 1980 had no ready fresh fish market, and processors had to pay the additional costs of processing and freezing fish that eventually would be worth less to the processors. Thus, they could not offer what the fishermen considered "fair" prices for the increased landings. As the economy has substantially recovered from the 1980 recession, some markets for fresh fish, sold largely through institutions, restaurants, etc., have begun to open up, enabling more of the increased landings in 1981 to be sold fresh.

Generally, prices at the dock for cod, haddock, and flounder have been significantly higher in 1981 than in 1980. To the extent that this reflects changes in landings, it is partly a result of improved fishing habits of the New Bedford fishermen--primarily the younger fishermen, who make up a substantial proportion of the New Bedford fleet and who have only recently begun to learn the ways of the New England fishing industry. Landings tend to be higher in spring and summer; dock prices are usually lower during these few months, and fishermen must "weather the storm" until prices begin to rise again. In 1980, however, a combination of lengthened boat trips (attempting to offset low prices with increased volume) and low ice-to-fish ratios caused fish quality to deteriorate; together with a higher quantity of fish, this caused prices offered to fishermen to drop even lower than normal seasonal levels. In the summer months of 1980, the 55,000-pound landings limit, even though poorly enforced,* had the effect of keeping the fishermen ashore more often, where the newer fishermen became acquainted with the older ones and learned more about the industry. The importance of keeping adequate supplies of ice on fish and limiting trip lengths to keep fish fresh was emphasized, and the younger fishermen began to realize how important fish quality is to processors, and that high prices are more likely with a good-quality landing.[35]

C. Imports

Canada, as an exporter of fresh fish into the United States, is an extremely important rival of the United States fishing industry. Since the vast majority of domestically landed fish is sold fresh, and since this market, due to the perishability of fish and to other considerations, is highly volatile, the availability of inexpensive, plentiful fresh fish from

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*One reason offered to explain the lack of enforcement is that Coast Guard patrols were largely diverted from the region to the waters off Florida during the 1980 Cuban refugee inflow, leaving few patrols available to enforce the regulations (National Fisherman, May 1981).

Canada has potentially detrimental effects on New England fishermen. Furthermore, Canada subsidizes its fishing industry, and competes with United States fishermen off the United States coast.

Data on 1980 Canadian imports of fresh whole fish into New England ports indicate increases from 1979 (an average of almost 4%) for most types of groundfish (see Table VII). Total fresh fillet imports, however, decreased 14% from 1979 to 1980. For the first five months of 1981, an extraordinary increase in fresh fish imports occurred--led primarily by flatfish--averaging 85% over the same period in 1980 for fresh whole fish and 35% for fresh fillets.[36]

The year-ending totals for fresh whole cod imports in 1979 increased 79% over 1978, and in 1980 dropped 3% from 1979 levels. For the first five months of 1981, imports of fresh whole cod were up 58% over the same period in 1980. Fresh cod fillet imports, however, which had increased 91% from 1978 to 1979, actually fell 18% in 1980. The data for 1981, through May, indicate an increase of only 6% over January-May 1980.

Total 1979 imports of fresh whole haddock increased 12.5% over 1978, and rose 16% in 1980, with an increase of 99% for the first five months of 1981 over the same period in 1980. Fresh haddock fillet imports also increased 21% in 1979, yet declined more than 5% in 1980. Imports have risen 86% so far in 1981 compared with 1980.

Flatfish imports have shown the most varied changes of the three types of groundfish here. Fresh whole flatfish imports increased 64% in 1979, yet dropped 14% in 1980. Most remarkably, imports through May 1981 are up 191% over that period in 1980. Imports of fresh fillets rose 58% from 1978 to 1979, and dropped 12% in 1980; this year, these imports are up 172% over the first five months of 1980.

Total fresh groundfish imports from Canada (fresh whole fish plus fillets of cod, haddock, and flatfish), then, rose from 17.4 million pounds in 1978 to 26.3 million pounds in 1979, or a percentage increase of 52%. Total imports in 1980, however, declined 5%, to 25 million pounds. In the first six months of 1981, fresh groundfish imports were up over 8 million pounds, or 5.8% over the same period in 1980.[37]

The majority of fish imported into the United States from Canada is frozen, primarily in the form of fillets and blocks. Imports of frozen groundfish fillets in 1979 rose over 8% from 1978, yet declined 0.5% in 1970. As of May 1981, such imports rose 92% over corresponding 1980 levels. Frozen blocks fell 4% in 1980, following a rise of 28% from 1978 to 1979. For the first five months of 1981, a more modest increase of 17% occurred--however, within that composite, haddock blocks rose 424% following a rise of only 18% from 1979 to 1980.

Turning to New England imports from Canada, it appears that recent increases in United States imports have been concentrated in this region. There were substantial increases in fresh whole fish imports in 1979, averaging 42%, yet 1980 increases only registered a 4% rise. For 1981, imports through May are 88% higher than corresponding levels in 1980, led by haddock--a rise of 3.1 million pounds, or 99% over 1980. Following a 56% rise in 1979, fresh fillet imports fell 6% in 1980, and have risen 35% as of May this year--again, led by haddock, which rose 91%, to 2.7 million pounds.

Frozen groundfish imports constitute the majority of imports into New England, and are worth considering because of their competitive impact on the processing industry. Frozen groundfish fillet imports, after rising 7% in

1979, were offset by an 8% decline in 1980. However, imports jumped 100% in the first five months of 1981 over January-May 1980. Imports in 1981 were led by a 230% rise in flatfish fillets--which was surprising, since these imports fell almost 20% in 1980. Imports of blocks are up a moderate 20% this year, though haddock blocks specifically are up 436%. In 1980, imports of blocks fell 5% overall, despite a 150% increase in pollock blocks; however, such blocks constituted only 2% of the 1980 total. Block imports in 1979 rose 30%, caused primarily by a 39% rise in cod blocks.

Overall, New England imports of groundfish products are up significantly in 1981, following moderate declines in 1980 and increases in 1979. To the extent that subsidized imports drive domestic landings from the processing market and/or depress prices paid to United States fishermen, competing Canadian supplies damage the domestic fishing industry. As mentioned, most imports are frozen, as United States fishermen cannot sell fish at prices low enough to compete with frozen imports, and thus the frozen fish market must be filled from outside sources.*

Resolving the import problem requires modification in trade policy between the United States and Canada. There are two general forms of trade policy: free trade, without government intervention; and "protectionism," with subsidies, tariffs, and quotas--with advantages and disadvantages to each policy. A policy advocating "laissez-faire" capitalism might, in the competitive world of fishing, result in lower prices of fish products to the consumer and, due to the high level of competition, in less waste and more efficient use of resources such as energy, labor, etc. However, without some form of regulation, short-term considerations may cause fishing grounds to be overfished, depleting the resource, so that in the long run the fishing industry will be damaged. Also, "cutthroat" competition may drive out smaller or less efficient fishermen and force people out of what may have been a traditional, "family" business.

"Nationalism," spurred by concern for the traditional trade that fishing has been for much of New England, is the alternative policy, manifesting itself in subsidies to fishermen to offset rising energy costs and other expenses, quotas to limit the quantity of fish imported into the United States, and tariffs to raise the price of imports. The benefits from nationalism accrue in the form of increased domestic business activity and greater employment in the fishing industry. Disadvantages include higher prices to consumers (thus, a decline in the consumption of fish) and economic waste in the forms of dead-weight losses and transfers of income from consumers to fishermen and from efficient fishermen to relatively less efficient fishermen.

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*It should be noted that Canadian imports are offered at relatively low prices not only because of subsidization of the industry by Canada, but because Canadian fishermen are willing to accept lower revenues per boat than are New England fishermen, as they have fewer alternative employment opportunities. In addition, Canadian processors operate on a larger scale and are more completely vertically integrated (many own their own large trawlers) than are United States processors, increasing their efficiency and ability to offer processed fish at lower prices.

D. Cold Storage Holdings

As postulated in a study on processors' capacity by Daniel Georgianna et al.,[38] once capacity (including, implicitly, the size of the consumer market) is reached, ex-vessel prices drop sharply. When cold storage holdings, processors' inventories, exceed what is desired, or considered "optimal," processors will offer only very low prices to fishermen. The sizeable difference in price between fresh and frozen fish products illustrates why processors are unwilling to pay "fair" prices for what will ultimately be a much less valuable product for them than would otherwise be the case (the majority of landings are sold fresh). The increases in landings, the fish above the amount that can be sold through existing marketing channels, must be frozen, and ex-vessel prices will drop.

Changes in inventories are a major component in the supply of fish in general, and of frozen fish in particular. Increases and decreases in cold storage holdings of fish reflect changes in supply and demand (at the retail and wholesale levels, as well as at the ex-vessel level) and may tell us much about market conditions and expectations of processors regarding future market conditions.

In winter, weather conditions are rough, keeping fishermen in, resulting in shorter trips and less area covered per trip than is the case in the spring and summer months. Thus, landings are usually lower in winter, reducing the availability of fish from that source of supply. Processors and middlemen prepare for this seasonal shortage by building up inventories so that they, in turn, can conduct a stable business with their customers.

The seasonal trend in holdings in the past few years has been a decline from January through the spring, stabilizing in late spring and early summer as demands on inventories ease with improved fishing conditions (see Table X). The pressure on inventories may also ease somewhat from a decline in demand; for example, due to the ending of Lent or an increase in sportfishing.

Because of the combined effects of increased domestic landings and sluggish demand by consumers for fish, both at the restaurant and the fish market, a surplus of fish appeared in 1980. This surplus must be frozen, the only way to store fish for any period of time. Therefore, cold storage holdings in the first half of 1980 were substantially higher than in previous years.[39] In the latter half of the year, holdings of haddock and flounder were still above the levels of the previous two years, yet cod holdings declined precipitously after August and bottomed out during February 1981. Current holdings levels are still below corresponding levels in 1978-80.[40] This year, landings are high once again, and, as noted, imports (primarily of frozen fish) are very high, resulting in substantial increases in holdings of both haddock and yellowtail flounder.

IV. CONCLUSION

As this study has shown, the problem of falling ex-vessel prices for groundfish is a result of squeezes from both the supply and the demand sides of the market, with the fisherman--due in part to his relatively weak market power--caught in the middle. The large increases in landings in 1980 compared to 1979 and, to a lesser extent, the increases in imports from Canada have been the major factors in the growth in the supply of fresh fish. On the demand side, while actual data are hard to come by, it is generally accepted that retail sales of fresh fish have not grown significantly in recent years, compared with the rise in landings. Furthermore, increases in imports, especially in 1981, have further increased the supply of groundfish in the United States--particularly in New England--and put downward pressure on ex-vessel prices.

Dock prices tend to fall every year in the spring and early summer months, yet prices in the spring of 1980 fell below seasonal levels. This appears to have been caused by a number of factors, including the continued expansion of the New England fishing fleet since the passage of the FCMA, and the decline in demand for fresh fish during the 1980 recession.

Ex-vessel prices were higher in 1981 than in 1980, though there was the yearly decline in the spring. This decline again aroused the anger of the fishermen, and stirred suggestions of another strike. However, the voluntary restraints of the fishermen, plus the unavailability of some species of groundfish, helped keep prices higher this year than in corresponding weeks in 1980, and it was understood that prices would eventually move upward as the summer progressed.

A substantial cause of the problem that is the subject of this report is the behavior of the fishing industry itself. Apparent failure of many fishermen in 1980 to observe quotas in trip sizes and the restrictions on trip durations set by their own representatives as a result of the market conditions leading to the strike led to economic injury largely self-imposed. Fishermen new to the industry, viewing the trade more as a money-making proposition rather than the traditional occupation that the older fishermen see it as, were the initial agitators in the spring of 1980, and again in 1981. When prices declined--as they do seasonally--net revenues were squeezed, but this is a temporary phenomenon; as the summer progressed, prices again rose.

Older fishermen tend to ride out lean months more calmly; Boston has a greater proportion of this type of fisherman, which is why the pressure was not experienced there to the extent that it was felt in New Bedford. This is due in part to better financing by older fishermen, and thus to less panic resulting from possible overextended debt to financial institutions.

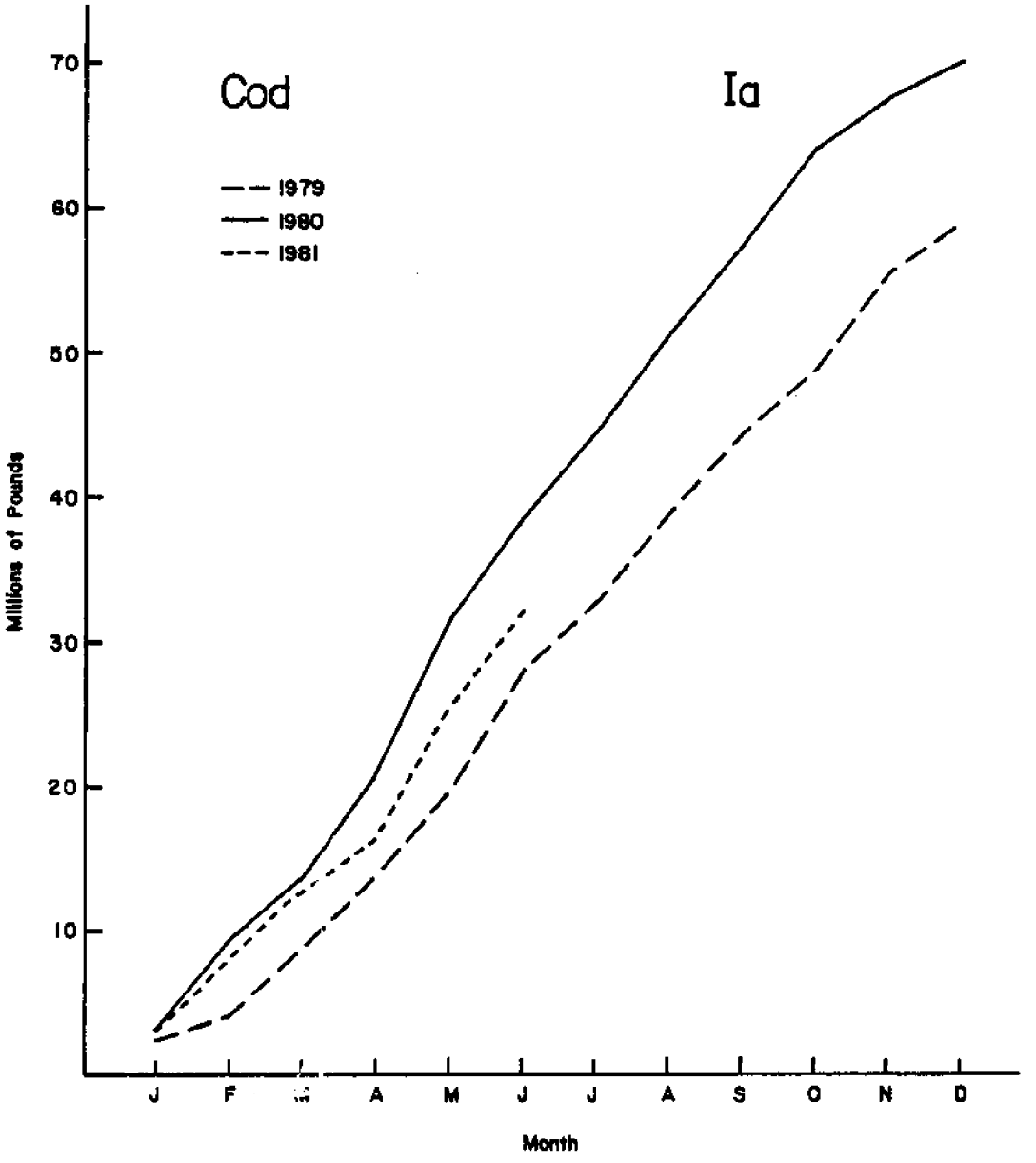
According to one source in NMFS, the trip limits in 1980 had the beneficial effect of causing fishermen to stay ashore more often, where the newer fishermen learned more about the New England industry. It was pointed out to these fishermen how important fish quality is, and that maintaining proper ice-to-fish ratios as well as shortening trip lengths help keep fish quality high and thus assure higher prices.

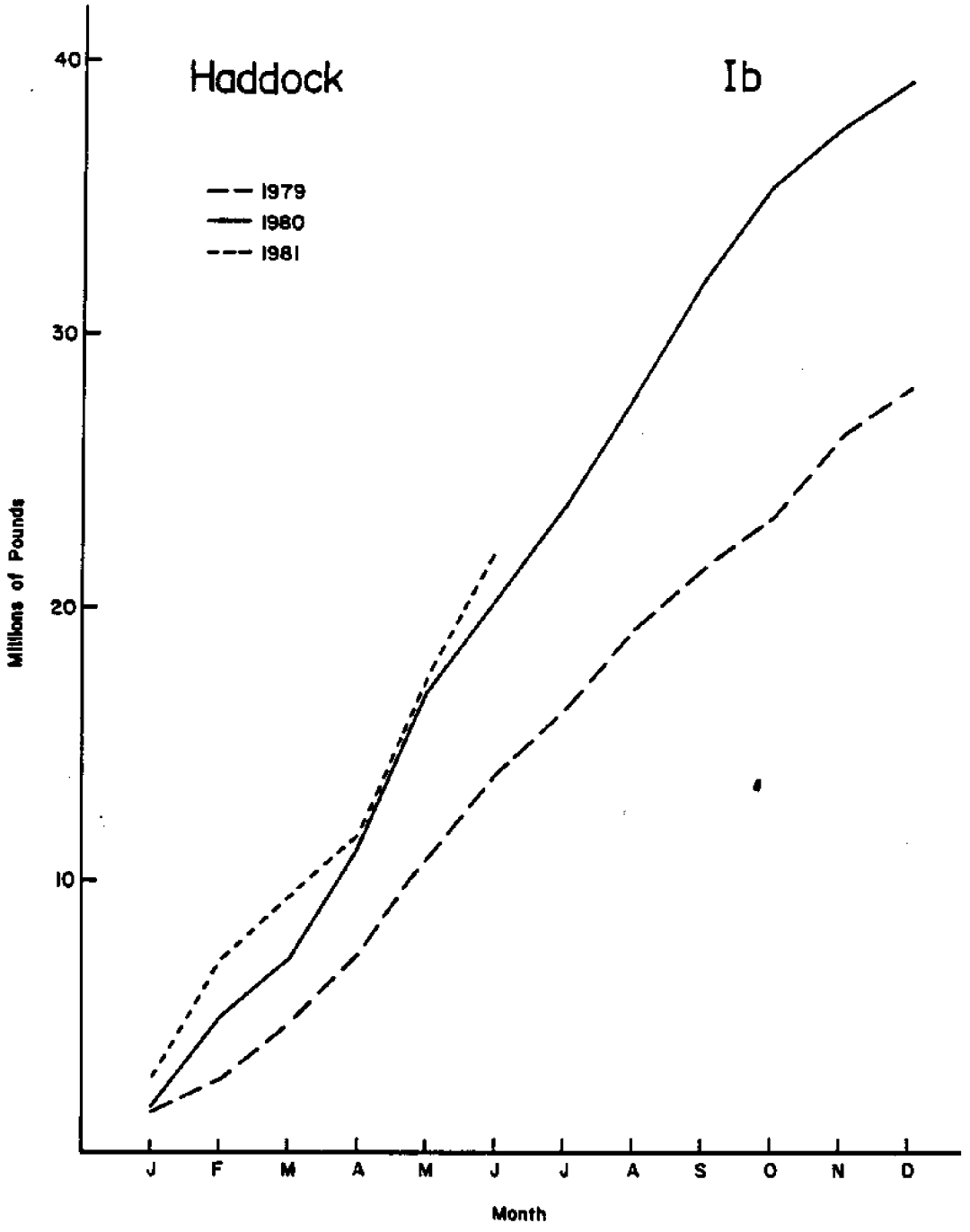
Market forces appear to be working in the New England fishing industry, yet, due to the common-property nature of the resource, intervention by government authority, such as the Fisheries Management Council, is considered important and vital to the preservation of the long-term value of the fishing grounds. Relatively free entry into the fishing industry and the independent nature of the fishermen inhibit outside interference however, making it difficult to invoke policies that may preserve the future incomes of the fishermen.

GRAPHS AND TABLES

The graphs were drafted from information from the following sources: Graphs 1 through III, NMFS, Blue Sheets. Graphs IV through VI, NMFS, Food Fish Market Review. Graph VII, BLS, "CPI Detailed Report."

I. Landings at Eight Major New England Ports, Year-to-Date, 1979-81




Haddock
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Millions of Pounds
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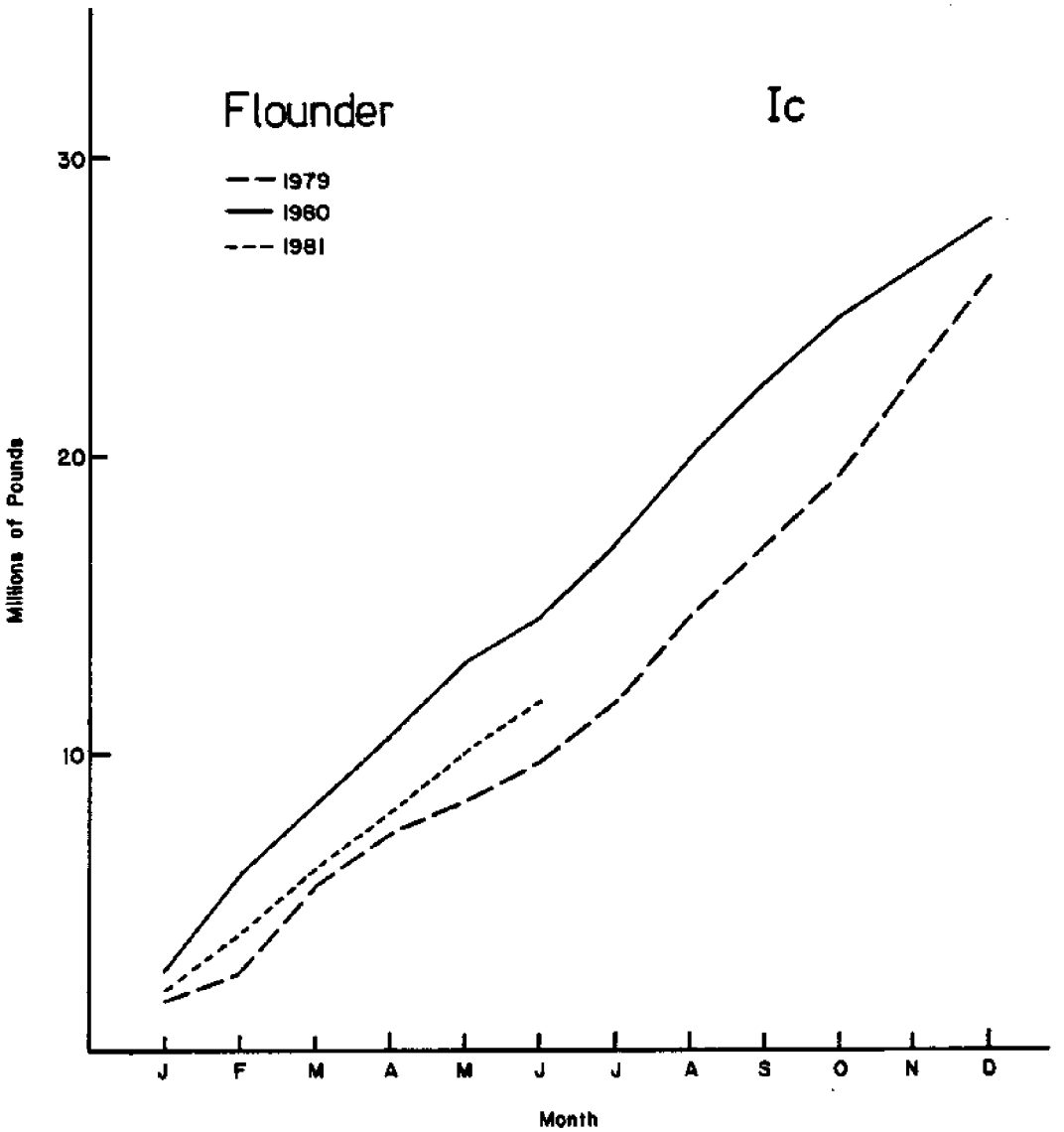
Flounder
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1981
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Millions of Pounds
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S
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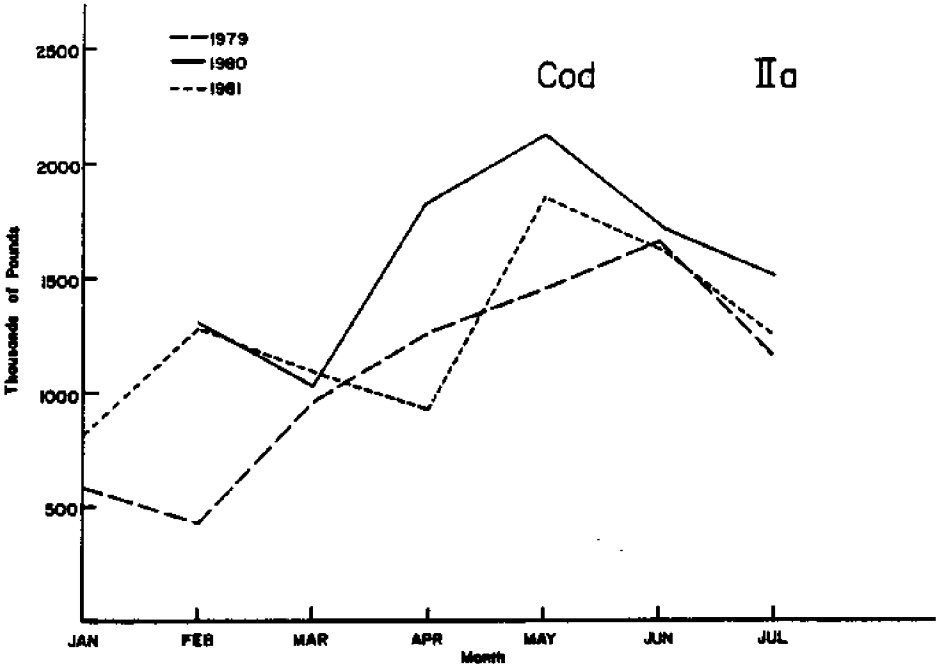
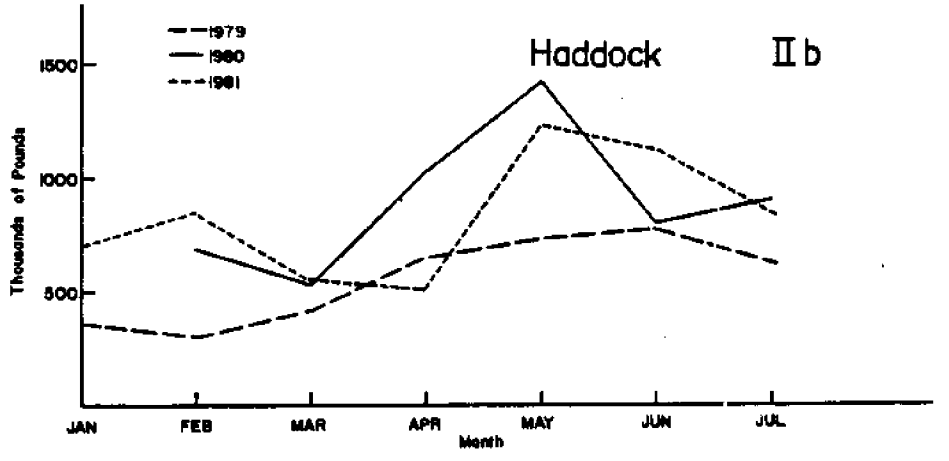
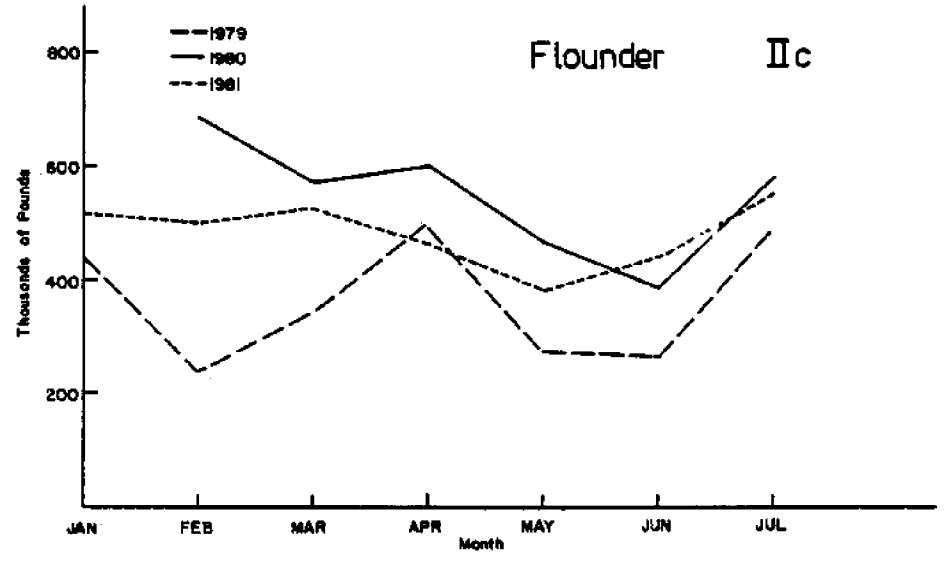
Month

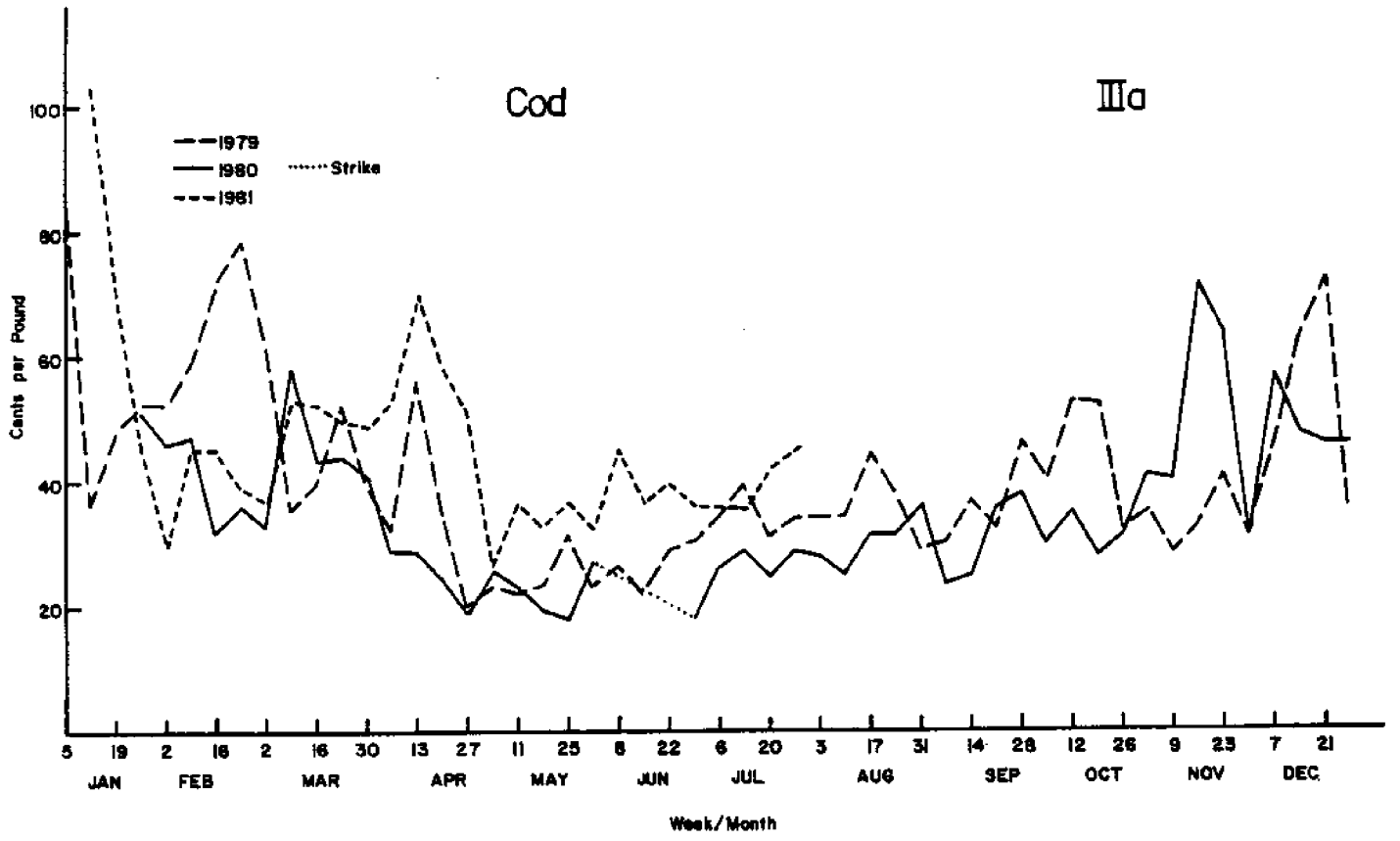
II. Landings at Eight Major New England Ports, Weekly, 1979-81

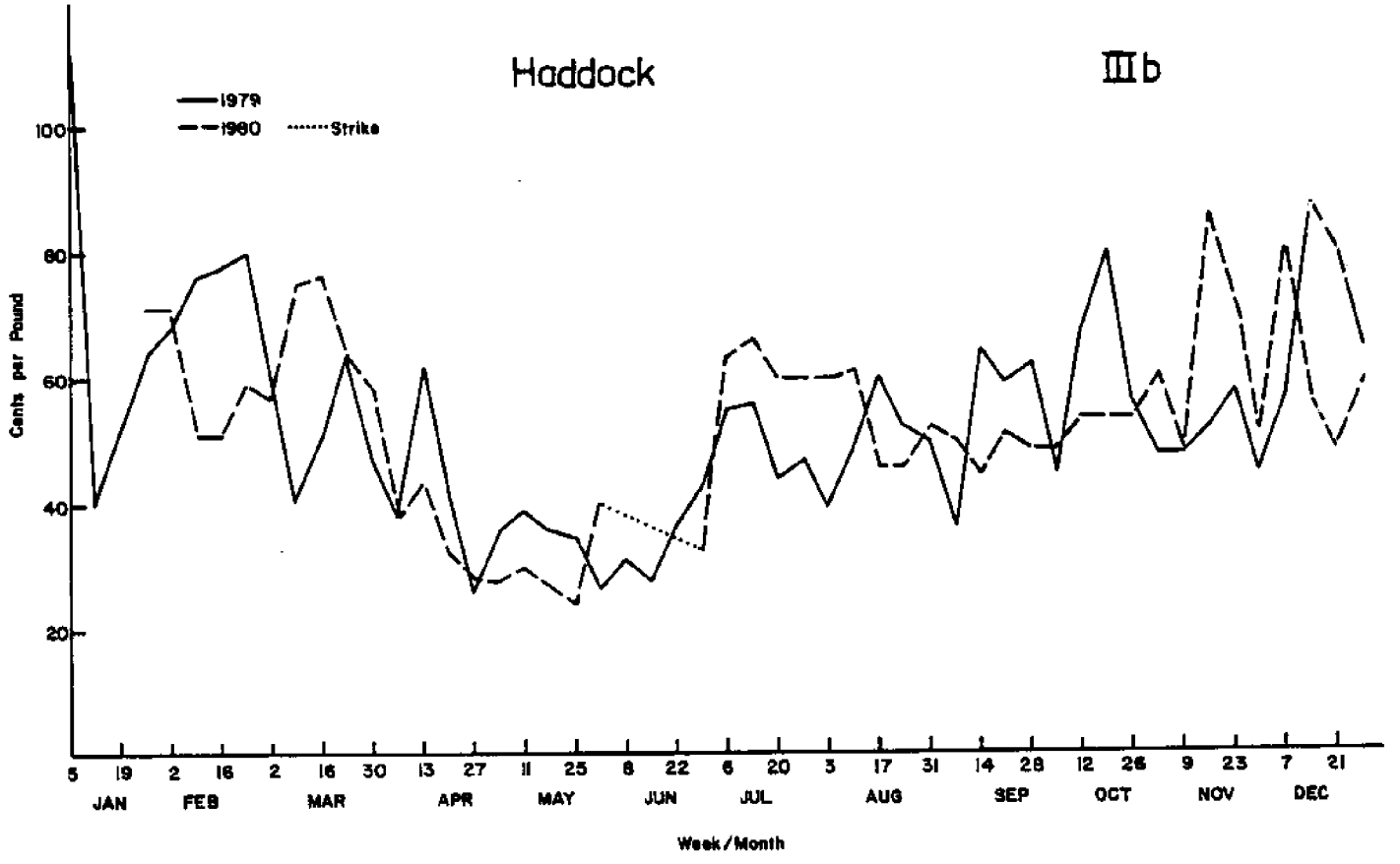


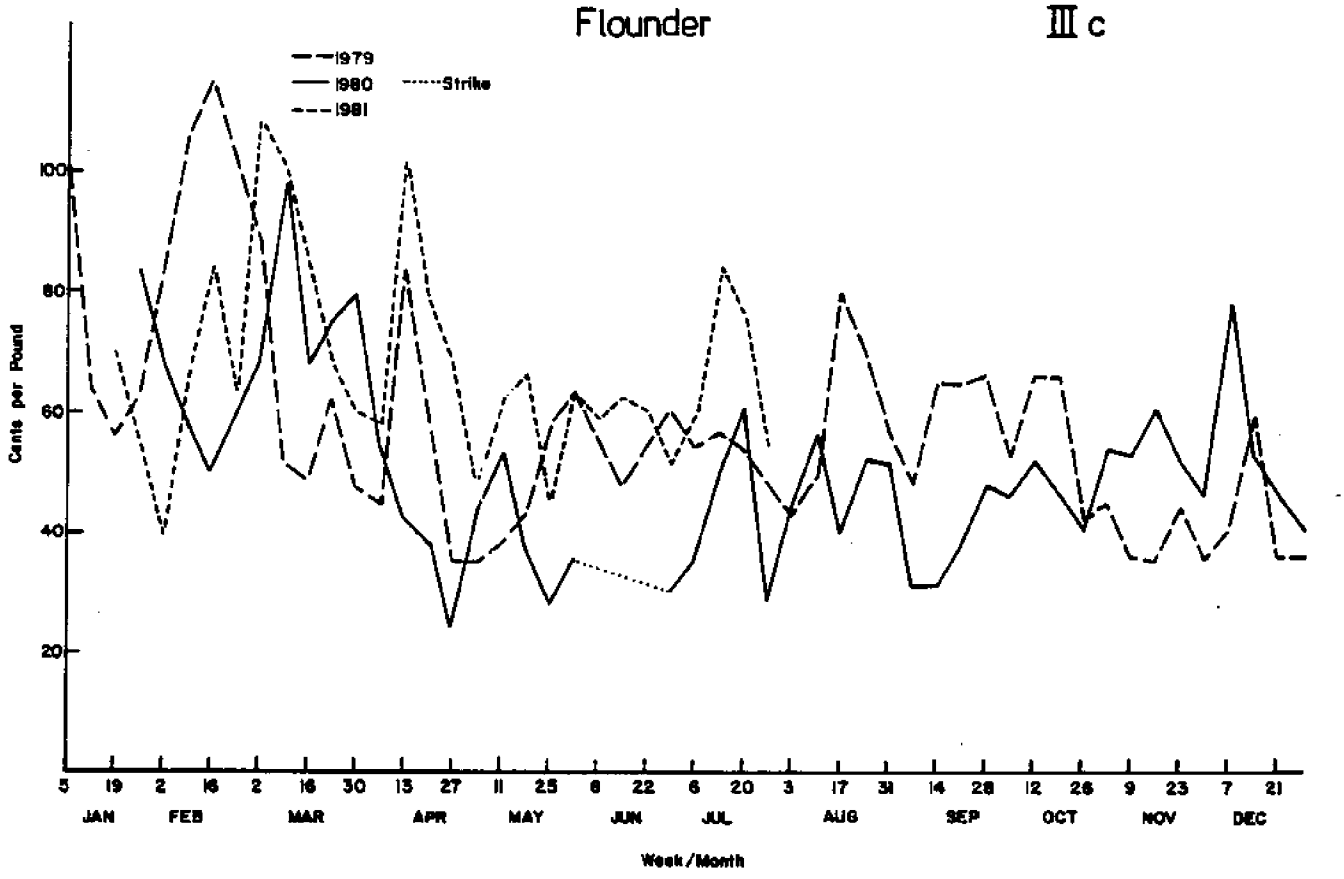




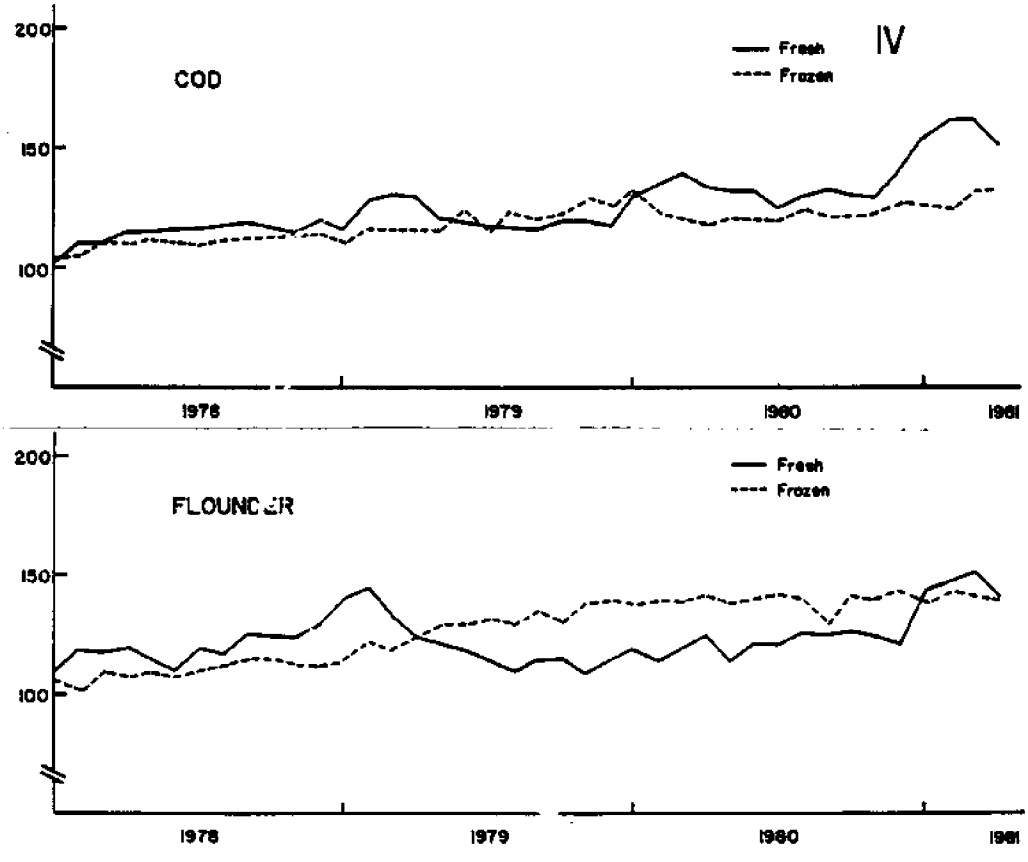
III. Ex-Vessel Prices at New Bedford, Weekly Averages, 1979-81







IV. Retail Price Indices of Fresh and Frozen Fillets for Cod and Flounder, 1978-81



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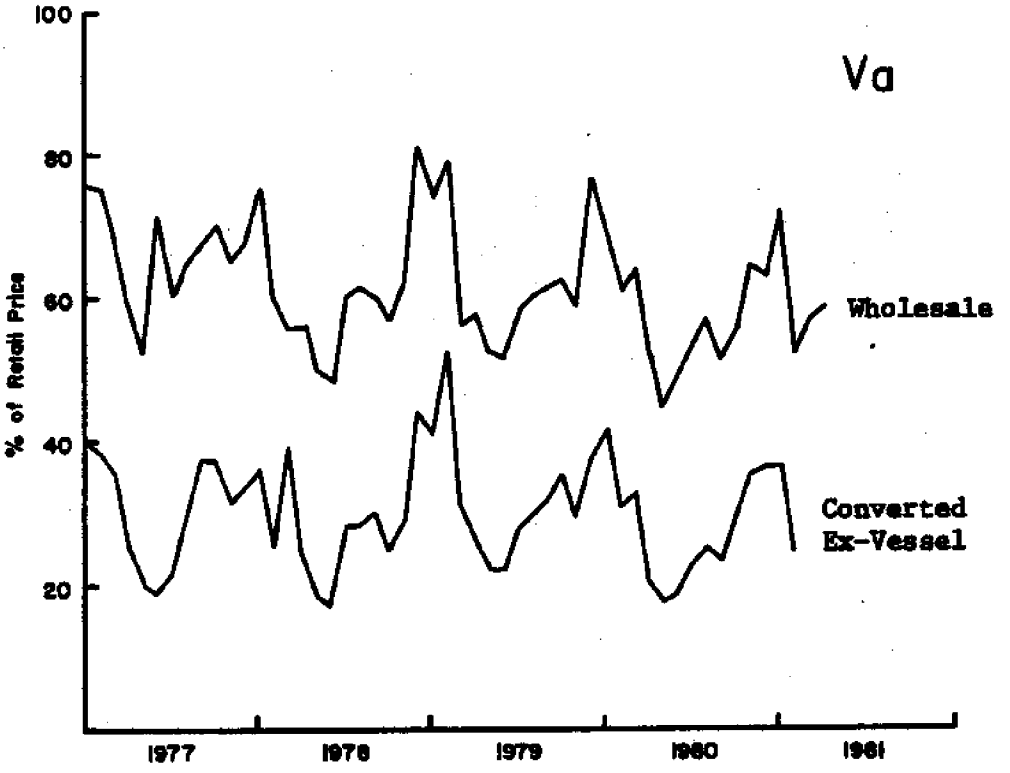
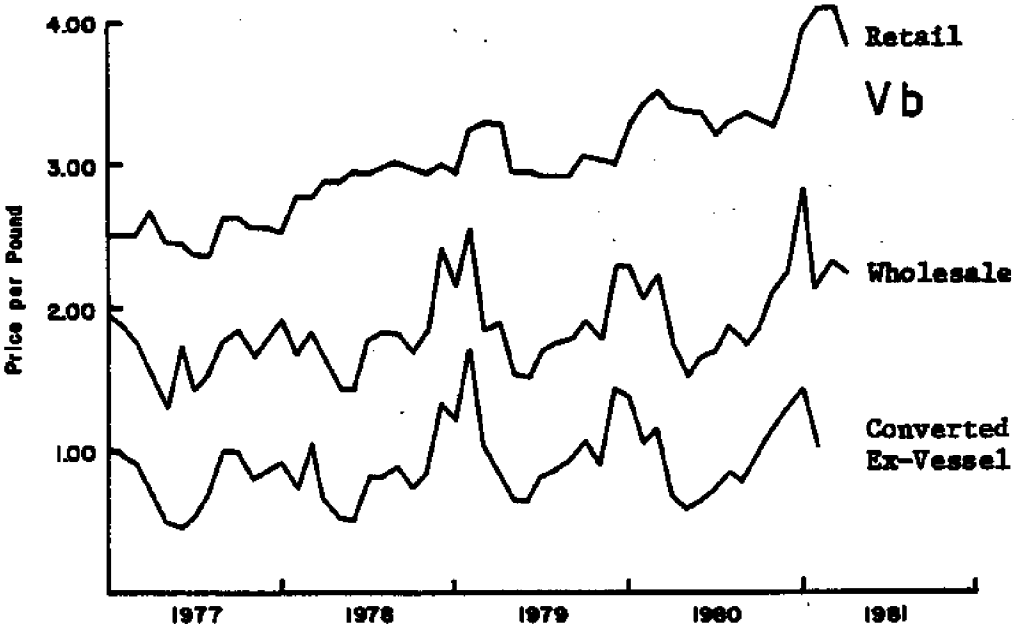
V a. Wholesale Price and Converted Ex-Vessel Price as Percent of Retail Price of Fresh Cod Fillets, 1977-81



V b. Retail, Wholesale, and Converted Ex-Vessel Prices of Fresh Cod Fillets, 1977-81



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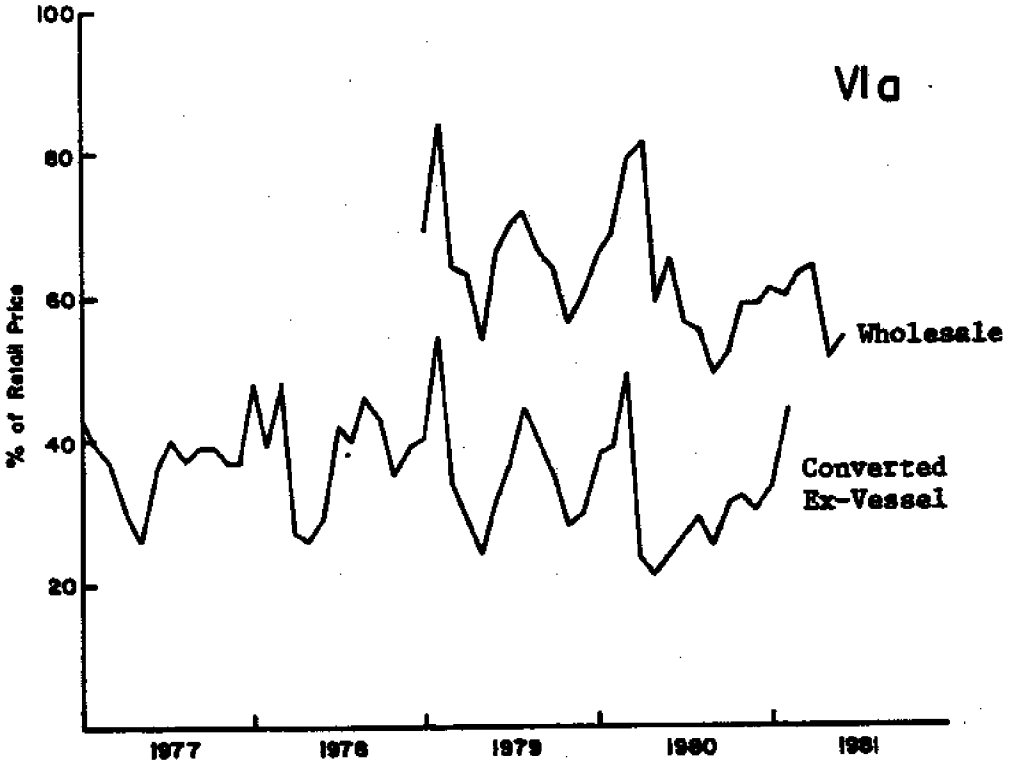
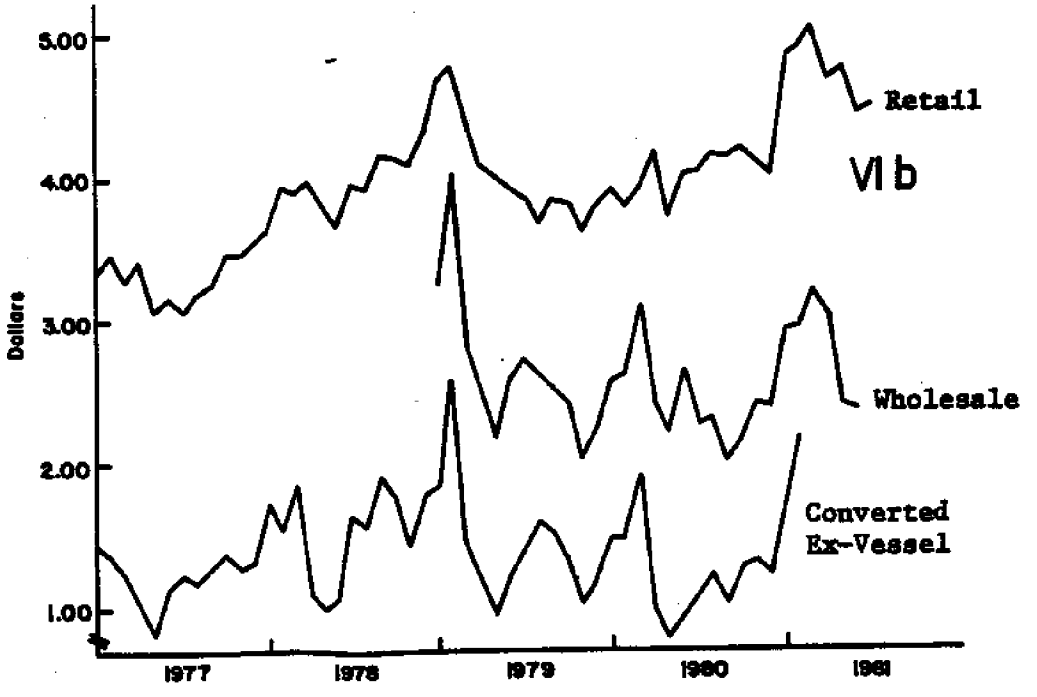
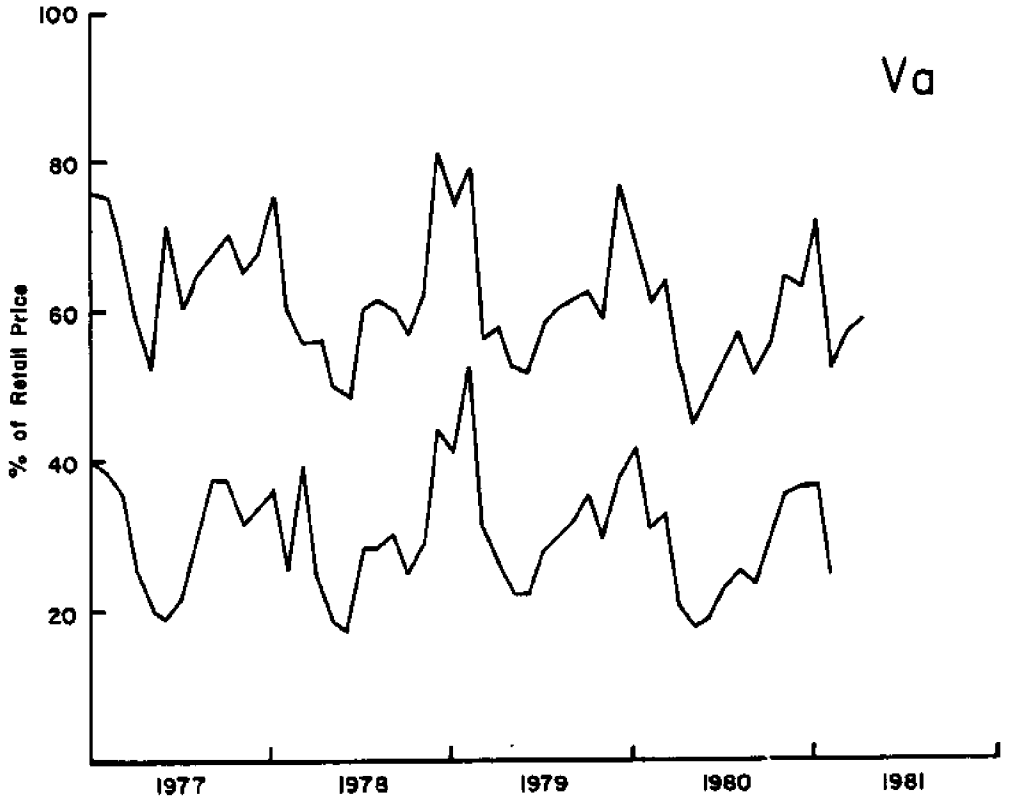
VI a. Wholesale Price and Converted Ex-Vessel Price as Percent of Retail Price of Fresh Flounder Fillets, 1977-81



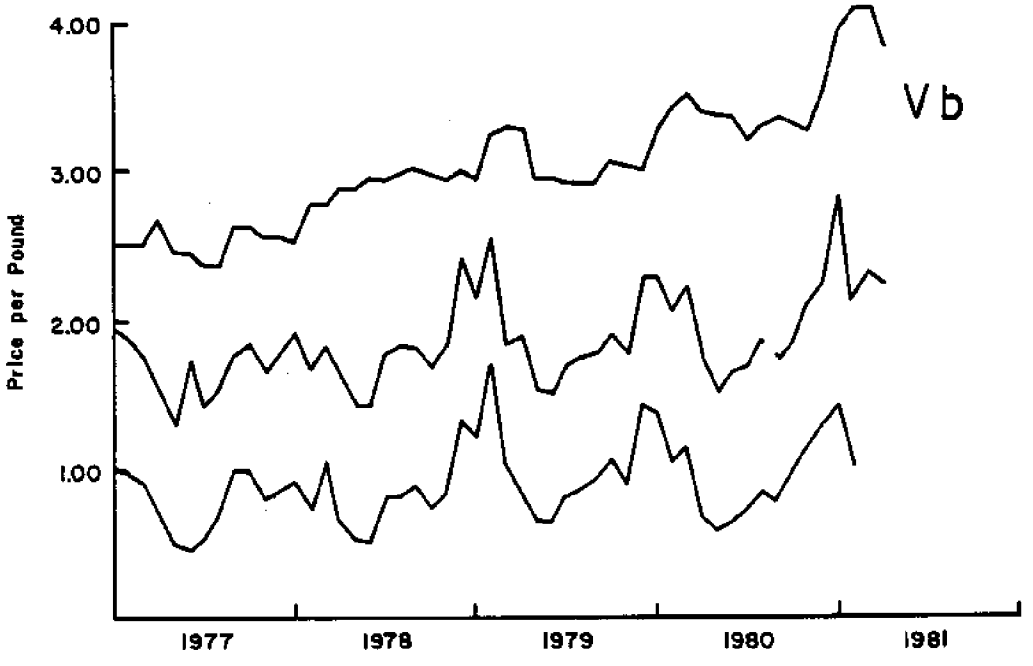
VI b. Retail, Wholesale, and Converted Ex-Vessel Prices of Fresh Flounder Fillets, 1977-81



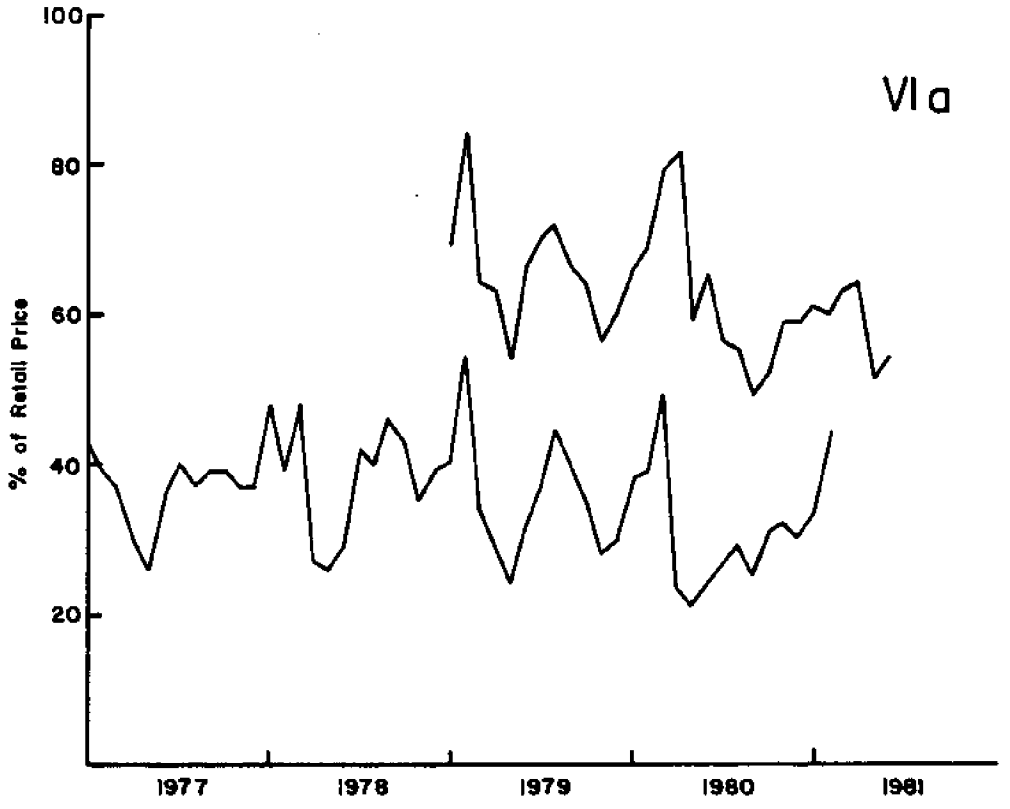
V a. Fishermen's and Wholesalers' Shares as Percent of Retail Value of Fresh Cod Fillets, 1977-81



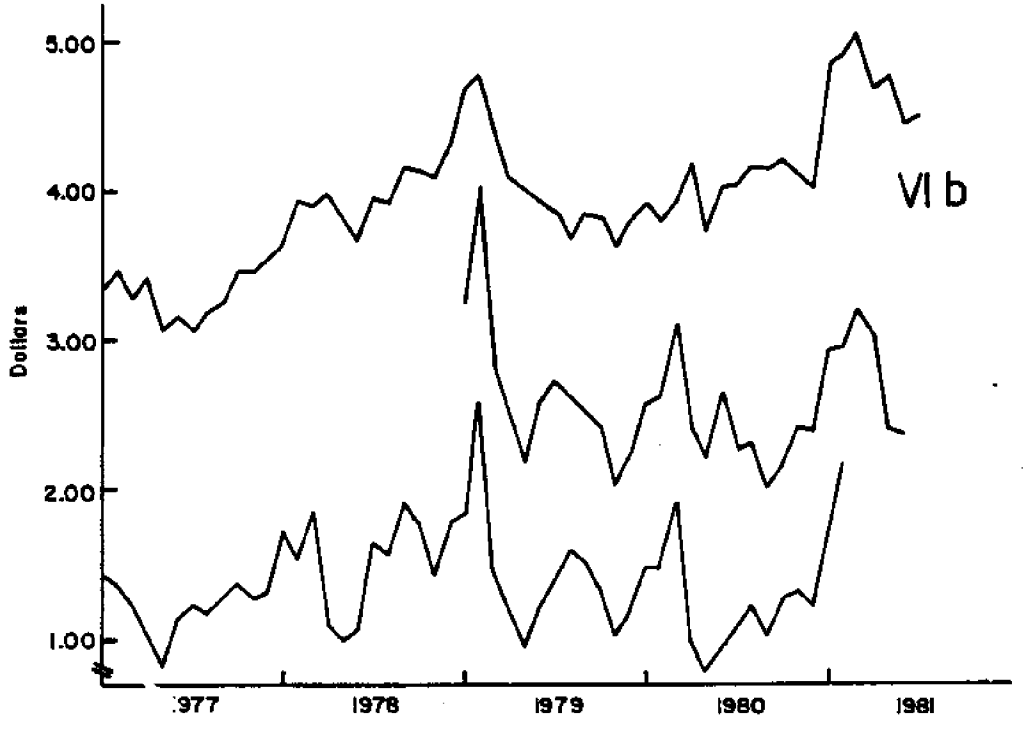
V b. Converted Ex-Vessel, Wholesale, and Retail Prices of Fresh Cod Fillets, 1977-81



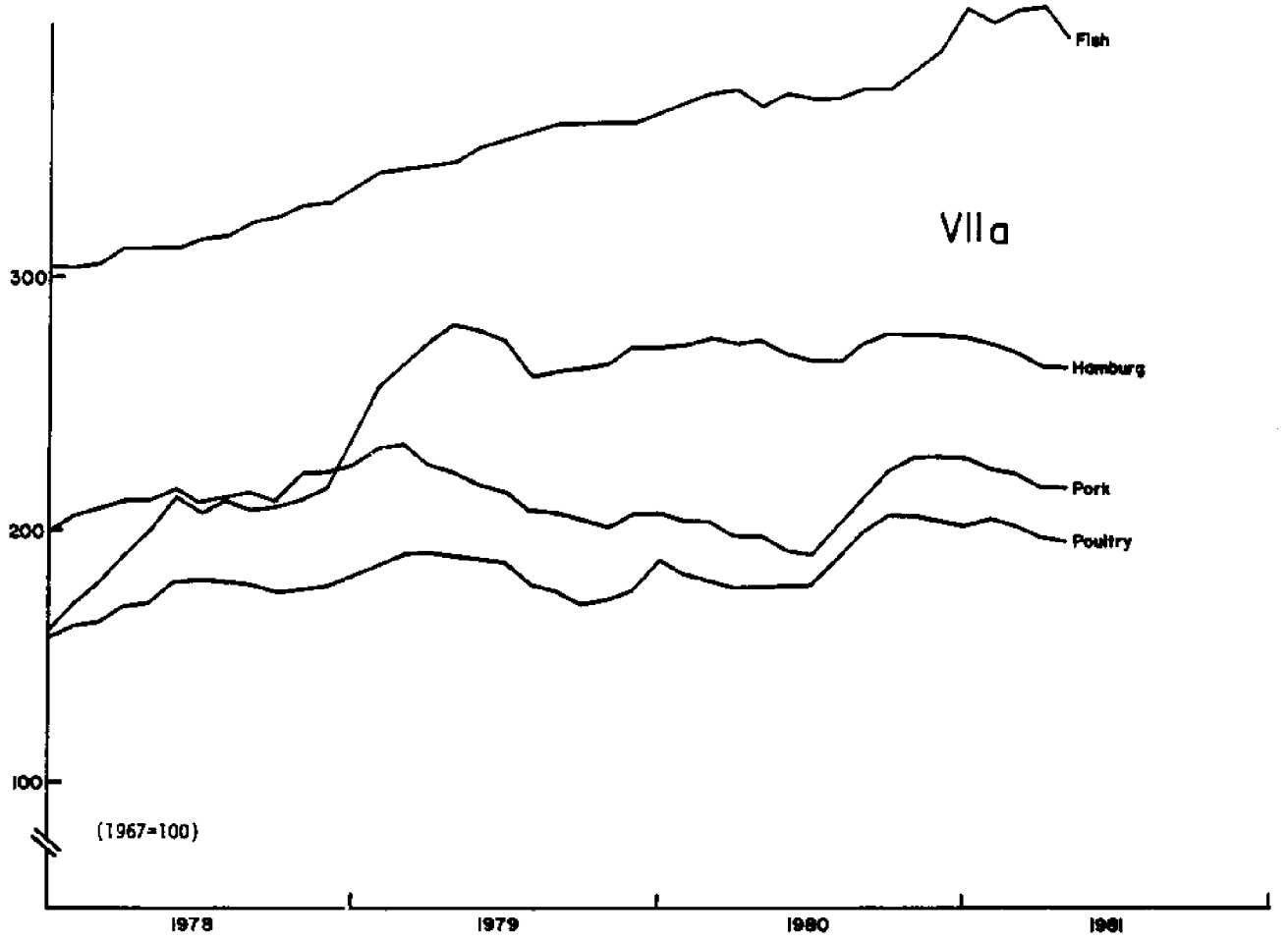
VI a. Fishermen's and Wholesalers' Shares as Percent of Retail Value of Fresh Flounder Fillets, 1977-81



VI b. Converted Ex-Vessel, Wholesale, and Retail Prices of Fresh Flounder Fillets, 1977-81



VII. Consumer Price Indices for Selected Food Products, 1978-81



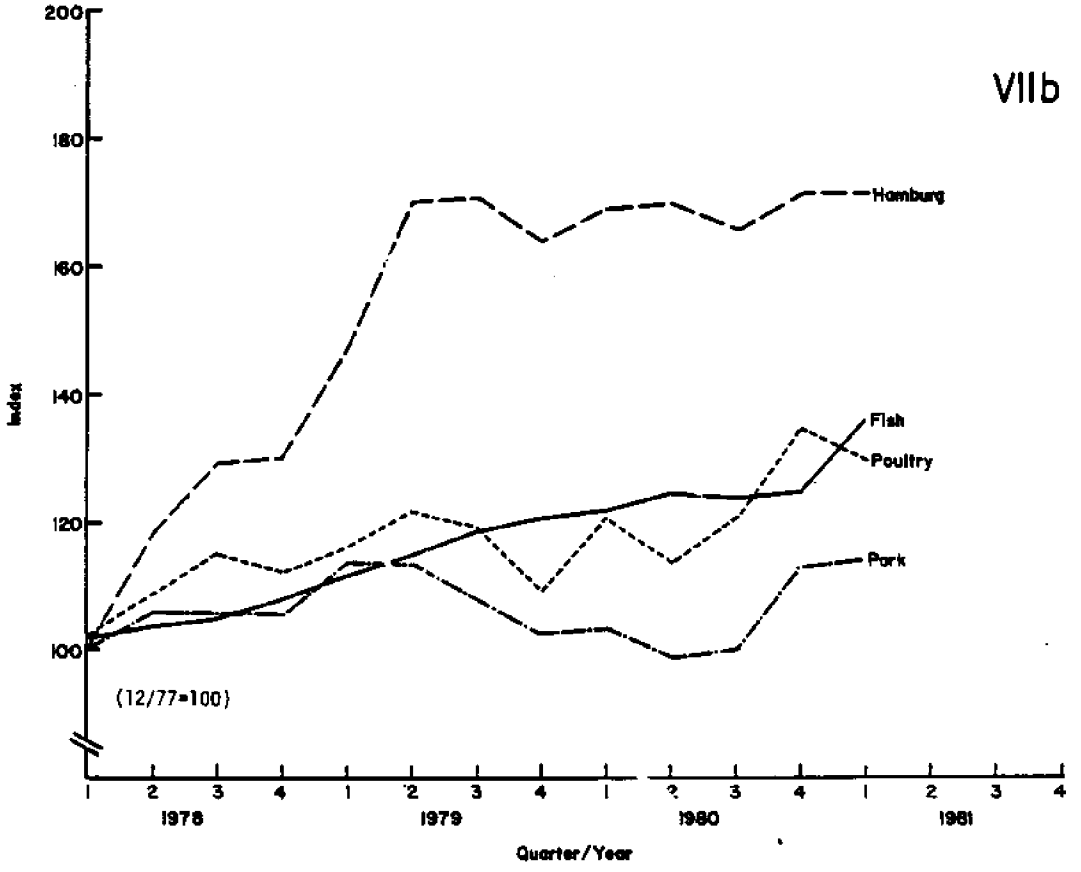


Table I. Ex-Vessel Price Indices for Cod, Haddock, and Yellowtail Flounder, 1967-80 (1967 = 100)

Year	Cod	Haddock	Flounder
1967	100.0	100.0	100.0
1968	90.6	115.5	97.8
1969	106.0	154.7	122.9
1970	140.2	195.8	136.8
1971	153.3	212.8	148.0
1972	209.0	250.0	185.0
1973	224.5	256.7	217.2
1974	228.6	248.8	251.1
1975	285.2	232.5	339.8
1976	312.5	290.2	497.6
1977	284.6	246.8	432.4
1978	287.5	241.0	558.2
1979	335.7	299.7	497.7
1980*	325.0	285.2	438.3

*Preliminary.

Source: NMFS, Fisheries of the United States, 1973, 1979.

Table II. Retail Price Indices for Selected Fish Products
(December 1977 = 100)

	Cod Fillets		Flounder Fillets	
	Fresh	Frozen	Fresh	Frozen
1978				
Jan.	99.0	98.3	101.9	102.4
April	112.1	104.6	111.9	103.3
July	114.0	103.4	111.4	105.3
Oct.	115.5	108.0	116.5	110.0
1979				
Jan.	114.4	106.9	131.1	110.5
April	127.6	110.9	114.7	119.1
July	113.6	112.1	108.4	126.3
Oct.	118.3	116.7	106.8	126.3
1980				
Jan.	127.6	125.9	109.8	133.0
April	132.1	113.2	117.7	136.8
July	123.9	113.8	113.4	137.3
Oct.	128.8	116.7	118.0	138.3
1981				
Jan.	152.8	119.5	136.4	133.0
April	148.3	126.4	131.6	136.4

Source: NMFS, Food Fish Market Review, May 1981.

Table III. Wholesale Price Indices for Fish Sticks and Portions (January 1978 = 100)

	Cod Sticks	Haddock Sticks	Cod Portions	Haddock Portions
1978				
Jan.	100.0	100.0	100.0	100.0
April	99.6	99.6	96.5	98.3
July	99.6	99.6	96.5	98.3
Oct.	99.7	100.3	97.7	98.4
1979				
Jan.	100.0	102.6	100.9	98.7
April	100.0	102.6	100.9	98.7
July	104.3	109.0	103.0	102.1
Oct.	104.3	109.0	103.0	110.6
1980				
Jan.	105.9	117.0	105.5	117.3
April	108.5	122.6	103.0	120.3
July	107.4	122.6	105.7	120.6
Oct.	107.6	122.6	106.1	120.8
1981				
Jan.	125.6	132.1	116.5	117.0
April	120.0	120.1	115.6	114.4

Source: NMFS, Food Fish Market Review, May 1981.

Table IV. Consumer Price Indices for Selected Food Products (1967 = 100)

	Hamburger	Poultry	Pork	Seafood*	All Food	Fuel Oil
1977						
Jan.	156.5	144.5	180.1	238.0	183.4	261.2
April	156.3	157.7	181.7	244.0	190.9	278.2
July	156.3	161.2	192.0	254.3	194.6	280.0
Oct.	156.1	158.5	194.2	260.3	194.4	281.7
1978						
Jan.	161.3	157.5	199.0	266.3	199.2	290.8
April	190.1	169.3	211.3	271.6	208.1	295.7
July	207.4	179.5	211.6	275.6	213.9	297.5
Oct.	209.2	175.4	211.1	281.7	217.3	302.5
1979						
Jan.	235.7	181.2	226.7	290.4	224.5	312.3
April	273.7	189.9	225.9	295.6	232.7	348.1
July	274.5	186.2	215.1	304.3	235.0	416.2
Oct.	263.4	170.3	204.3	311.5	238.9	475.6
1980						
Jan.	271.4	187.8	206.4	316.7	244.8	514.0
April	272.9	177.4	197.1	325.3	248.4	556.4
July	266.6	187.9	200.3	370.2	254.8	585.0
Oct.	275.8	209.1	225.8	373.5	262.4	581.5
1981						
Jan.	276.3	202.4	228.2	406.2	268.6	656.0
April	264.8	196.8	217.4	406.8	272.9	727.0

*"Seafood" is the BLS's category of "fresh and frozen fish and seafood."

Source: BLS, "CPI Detailed Report."

Table V. Fresh Fish Price Margins (Cents per Pound)

	Flounder Fillets Retail Price Minus Converted Ex-Vessel Price*	Cod Fillets Retail Price Minus Converted Ex-Vessel Price*	Cod Fillets Wholesale Price Minus Converted Ex-Vessel Price*
1977			
Jan.	182.4	165.5	106.2
April	236.5	210.4	99.4
July	177.8	192.0	96.1
Oct.	205.0	178.1	100.9
1978			
Jan.	183.2	176.1	113.3
April	286.1	233.5	106.4
July	225.0	222.7	106.7
Oct.	229.2	234.7	105.7
1979			
Jan.	275.0	191.1	113.6
April	285.3	255.9	116.3
July	240.4	222.1	100.6
Oct.	240.0	212.4	97.4
1980			
Jan.	237.2	209.1	110.1
April	318.9	281.1	117.6
July	289.8	256.4	106.9
Oct.	286.2	246.8	99.8
1981			
Jan.	317.3	270.7	160.0

*"Converted ex-vessel price" converts whole fish/pound to the equivalent fillet price/pound.

Source: Calculated from NMFS, Food Fish Market Review, May 1981.

Table VI. U.S. Per Capita Consumption of Selected Food Products, 1960-79, in Pounds

Year	Fresh and Frozen Fish	Beef	Pork	Chicken
1960	3.8	64.3	60.3	27.8
1961	3.9	65.8	57.6	29.9
1962	3.9	66.2	59.1	29.8
1963	3.8	69.9	61.1	30.8
1964	3.8	73.9	60.9	31.2
1965	3.8	73.6	54.7	33.3
1966	3.9	77.1	54.3	35.6
1967	3.6	78.8	59.8	36.4
1968	4.0	81.2	61.4	37.7
1969	4.4	82.0	60.6	38.4
1970	4.5	84.1	62.0	40.5
1971	4.3	83.6	68.2	40.4
1972	4.8	85.9	62.9	42.0
1973	5.2	81.1	57.6	40.7
1974	4.5	86.4	62.2	41.1
1975	5.0	88.9	51.2	40.6
1976	5.6	95.7	54.6	43.3
1977	5.2	93.2	56.7	44.8
1978	5.6	88.8	56.5	47.5
1979	5.5	79.6	64.6	51.1

Source: USDA, "Food Consumption, Prices and Expenditures."

Table VII. Canadian Exports of Groundfish Products into New England Customs Districts, 1978-80, in Thousands of Pounds

Product	1978	1979	1980	% Change 1978-80
Whole, fresh				
Cod	1,492	3,138	3,140	110.5%
Haddock*	5,799	6,534	7,639	31.7
Flatfish	1,514	2,790	2,215	46.3
Filleted, fresh				
Cod	2,548	5,259	4,605	80.7
Haddock*	2,541	2,664	3,044	19.8
Flatfish	472	730	480	1.7
Filleted, frozen				
Cod	33,991	40,251	41,980	23.5
Haddock*	15,796	16,987	15,900	0.7
Flatfish	47,965	57,231	38,071	(20.6)
Blocks, frozen				
Cod	61,877	86,009	82,258	32.9
Haddock	2,117	2,251	2,496	17.9
Pollock	1,593	740	1,890	18.6
Flatfish	14,438	14,811	12,078	(16.4)

*"Haddock" includes cusk, hake, haddock, and pollock.

Source: NMFS, Resource Statistics Division.

Table VIII. Canadian Exports of Groundfish Products into New England Customs Districts, First Six Months of 1980 v. First Six Months of 1981

Product	First 6 Months 1980	First 6 Months 1981	% Change
Whole, fresh			
Cod	2,523	4,258	68.8%
Haddock*	3,573	7,166	100.6
Flatfish	298	797	167.5
Filleted, fresh			
Cod	3,405	4,200	23.4
Haddock*	1,578	2,964	87.8
Flatfish	131	833	535.9
Filleted, frozen			
Cod	20,903	36,214	73.3
Haddock*	6,252	10,617	69.8
Flatfish	12,394	26,901	117.1
Blocks, frozen			
Cod	40,358	38,422	(4.8)
Haddock	1,193	6,559	449.8
Pollock	861	1,216	41.2
Flatfish	3,744	5,899	57.6

*"Haddock" includes cusk, hake, haddock, and pollock.

Source: NMFS, Resource Statistics Division.

Table IX. Cold Storage Holdings of Selected Groundfish, Steaks and Fillets, 1978-81, in Pounds (Represents 70-75% of Total New England Holdings)

Cod				
	1978	1979	1980	1981
Jan.	11,517	14,647	17,675	8,782
April	13,025	11,506	16,200	11,297
July	16,263	19,646	18,502	12,732
Oct.	20 767	22,806	14,679	

Haddock				
	1978	1979	1980	1981
Jan.	4,795	4,529	3,786	5,560
April	3,780	2,408	3,634	4,196
July	4,034	2,848	4,370	4,770
Oct.	5,363	3,177	5,351	

Flounder				
	1978	1979	1980	1981
Jan.	6,065	2,597	3,690	4,249
April	5,012	2,763	3,664	4,639
July	7,392	4,667	5,788	6,714
Oct.	11,492	7,798	12,924	

Source: NMFS, Blue Sheets.

Table X. State Per Capita Disposable Personal Income, 1978-80

State, Region	Total (in Millions of $)			Per Capita		
	1978	1979	1980	1978	1979	1980
Connecticut	23,809	26,604	29,929	7,641	8,540	9,664
Maine	6,063	6,754	7,567	5,554	6,156	6,733
Massachusetts	38,789	43,024	47,871	6,721	7,458	8,356
New Hampshire	5,607	6,332	7,115	6,451	7,140	7,675
Rhode Island	6,088	6,696	7,416	6,530	7,205	7,840
Vermont	2,768	3,103	3,440	5,680	6,291	6,725
New England	83,123	92,513	103,339	6,776	7,527	8,378
United States	1,454,309	1,624,705	1,795,810	6,664	7,383	7,960

Source: Survey of Current Business.

Table XI. U.S. GNP and Disposable Personal Income, Annual Rate, 1978-80

Quarter	GNP		Disposable Personal Income		
	Current $	1972 $	Current $	1972 $	Per Capita in 1972 $
	(In Billions of $)		(In Billions of $)		(In Dollars)
1978					
First	2,032	1,402	1,398	966	4,361
Second	2,129	1,432	1,441	976	4,389
Third	2,192	1,447	1,482	986	4,422
Fourth	2,272	1,466	1,531	998	4,464
1979					
First	2,341	1,480	1,580	1,006	4,487
Second	2,375	1,473	1,613	1,007	4,480
Third	2,444	1,488	1,664	1,016	4,506
Fourth	2,496	1,491	1,710	1,018	4,501
1980					
First	2,572	1,502	1,765	1,021	4,503
Second	2,565	1,463	1,784	1,008	4,435
Third	2,637	1,472	1,841	1,019	4,468
Fourth	2,731	1,486	1,897	1,026	4,488
1981					
First	2,853	1,516	1,948	1,033	4,511
Second	2,881	1,509	1,985	1,037	4,516

Source: Dept. of Commerce, Bureau of Economic Analysis, Business Conditions Digest.

Table XII. Average Gross Return to Otter Trawl Fleet, 1970-79

Year	No. of Vessels	%Δ	Actual Return (in Current $)	%Δ	Return (in 1976 $)	%Δ
1970	573	-	$72,280	-	$119,984	-
1971	580	1%	66,333	(8%)	106,796	(11%)
1972	575	(1)	73,297	11	112,877	6
1973	564	(2)	81,840	12	110,484	(2)
1974	586	4	83,778	2	96,344	(13)
1975	597	2	96,918	16	100,795	5
1976	599	1	109,095	13	109,095	8
1977	602	1	124,676	14	117,195	7
1978	652	8	143,277	15	126,083	8
1979	780	20	137,914	(4)	104,814	(17)

Source: Jim McKirky, NMFS, Woods Hole, Mass.

Table XIII. Vessels by GRT Classes for Cod, Haddock, and Yellowtail Flounder in New England, 1970-79.

Year	5-60 GRT		61-125 GRT		126 GRT	
	No. of Vessels*	%Δ	No. of Vessels	%Δ	No. of Vessels	%Δ
1970	330	-	169	-	70	-
1971	335	1.5%	169	0.0%	73	4.3%
1972	341	1.8	175	3.6	73	0.0
1973	367	7.6	176	0.6	72	(1.4)
1974	344	(6.3)	182	3.4	78	8.3
1975	348	1.2	179	1.7	79	1.3
1976	385	12.1	175	2.3	81	2.5
1977	395	2.6	190	8.6	99	22.2
1978	458	16.0	200	5.3	114	15.2
1979	566	23.6	232	16.0	198	73.7

Year	Total: All GRTs		Percent of Total Composed of		
	No. of Vessels	%Δ	5-60 GRT	61-125 GRT	>125 GRT
1970	569	-	58%	30%	12%
1971	577	1.4%	58	29	13
1972	589	2.1	58	30	12
1973	615	4.4	60	29	11
1974	604	(1.8)	57	30	13
1975	606	0.3	57	30	13
1976	641	5.8	60	27	13
1977	684	6.7	58	28	14
1978	772	12.9	59	26	15
1979	996	29.0	57	23	20

*The number of vessels (greater than 5 GRT) landing cod, haddock, or yellowtail, or any combination of these.

Source: New England Regional Fisheries Management Council.

NOTES

1. Department of Labor, Bureau of Labor Statistics, "CPI Detailed Report."
2. Providence Journal, May 29, 1980.
3. Providence Journal, June 3, 1980.
4. Maine Commercial Fisherman, July 1980.
5. Commercial Fisheries News, September 1981, p. 40.
6. James Lenahan, NMFS, New Bedford, Mass.
7. Commercial Fisheries News, September 1981.
8. New England Regional Fisheries Management Council.
9. NMFS, Food Fish Market Review, May 1981.
10. Ibid.
11. Susan Capalbo, "Description of Data Concerning Groundfish Marketing Channels," photocopy, NMFS, Washington, D.C., n.d.
12. NMFS, Food Fish Market Review, May 1981.
13. Nancy Bockstael, "Fisheries Investment and Market Behavior," Ph.D. thesis, University of Rhode Island, 1976, Table 3.4, p. 107, and sources cited therein.
14. Nancy Bockstael, Op. cit.
15. BLS, "CPI Detailed Report."
16. Ibid.
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18. BLS, "CPI Detailed Report."
19. NMFS, Food Fish Market Review, May 1981.
20. BLS, "CPI Detailed Report."
21. NMFS, Food Fish Market Review, May 1981.
22. Ibid.
23. Ibid.
24. Federal Reserve Bank, Boston.
25. BLS, "CPI Detailed Report."
26. Nancy Bockstael, "Are Fisheries Economists Asking the Right Questions?," Staff Paper No. 79-12, Dept. of Resource Economics, University of Rhode Island, 1979, Table 1.
27. Ibid.
28. Daniel Georgianna et al., "Estimating Fish Processing Capacity in Massachusetts and New Hampshire," Southeastern Massachusetts University, North Dartmouth, Mass., 1979.
29. Kevin Farrell, Point Judith restaurant employee, in an interview on August 15, 1980.
30. "In the Matter of Certain Fish," brief for West Coast fishermen before the ITC, Investigation #TA-201-41, November 13, 1979, Table 16.
31. Ibid., Table 2.
32. Nancy Bockstael, "Are Fisheries Economists Asking the Right Questions?" p. 84.
33. NMFS, Blue Sheets.
34. National Fisherman, August 1980.

35. James Lenahan, NMFS, New Bedford, Mass., in a phone interview on August 5, 1981.
36. NMFS, Resource Statistics Division.
37. Ibid.
38. Daniel Georgianna et al., Op. cit.
39. NMFS, Food Fish Market Review, May 1981.
40. NMFS, Blue Sheets.