

Thalassorama

Fishermen's Response to Revenue Changes: The Norwegian Coastal Mackerel Fishery

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Introduction

It is well known from economic theory that rent seeking is an important factor in explaining fishermen's behaviour in open-access situations. However, in the fisheries economics literature (and particularly in empirical work) the focus has been on stock and cost effects, and the effect of changes in revenue has received little attention.¹ Some exceptions do exist though. Wilen and Homans (1994) showed that fishermen will respond to changes in the regulatory system by changing their products in order to obtain higher revenues. Several authors have also shown that the timing of the harvest can be important, since the quality of the fish, and, therefore, the price one receives, may change throughout the year (Conrad 1982; Anderson 1989; Kellogg, Easley, and Johnson 1988; Önal *et al.*, 1991). Larkin and Sylvia (1999) showed that the regulatory system can be essential for exploiting the opportunities that seasonal fluctuations in quality give.

Here, we will describe a somewhat different case that we think is of interest, since it illustrates how responsive fishermen can be to revenue changes in an open-access fishery, and how increased revenues, thereby, intensify the race to fish. It also demonstrates the importance of the political game played by fishermen and regulators, and gives an example of how quota allocation is endogenous in the management system. The case we look at is the Norwegian coastal fishery for mackerel, where the fishermen experienced almost a doubling of the price of their catch from 1995 to 1996, while their total quota remained the same.

Background

The total Norwegian catch of mackerel has varied around 150,000 tons annually in the 1990s, being as high as 260,000 tons in 1994 (see table 1). The coastal mackerel

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¹ However, the effects are well understood theoretically, see Munro and Scott (1985).

Table 1
Total Mackerel Quotas and Landings and for the Coastal Fleet, 1990–99

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999 ^a
Total Quota, 1,000 tons	146	177	207	226	248	200	133	133	157	157
Total Catch 1,000 tons	147	180	208	223	260	202	136	137	158	161
Coastal Fleet:										
Quota, 1,000 tons	18	20	20	19	19	20	20	20	30	30
Catch, 1,000 tons	16	17	18	15	21	17	21	20	29	29

Source: Norwegian Directorate of Fisheries

fishery has historically yielded about 20,000 tons per year, increasing to 29,000 tons in 1998 and 1999. This makes the coastal mackerel fishery a rather small part of the total Norwegian mackerel fishery, constituting less than 15% of the total landings in most years. Due to its modest economic significance, it has received little attention over the years. However, as with all coastal fisheries in Norway, it is important for political reasons, as coastal fisheries remain a major source of employment in smaller communities along the coast.

In the mackerel fishery, a coastal vessel is defined as any vessel below 21.35 meters in total length. The vessels use different types of gear, including purse seine, troll net, and longline, with the former being the most powerful. The coastal mackerel fishery has undergone major regulatory changes in recent years. A global TAC for this fleet segment was not introduced until 1995. In contrast to other fisheries, the coastal mackerel fishery remained an open-access fishery until quite recently, allowing free entry of new vessels below the maximum length limit.²

The Effect of a Price Increase

Table 2 shows landings, revenue, and average price per kilogram for the coastal mackerel fishery.

The most important thing to note is that the average price (in NOK) increased by as much as 78.8% from 1995 to 1996. This is due to changed market conditions in Japan, which is the main market for Norwegian mackerel, as the Japanese mackerel quotas were significantly reduced.

The higher price substantially increased the potential rent in the fishery. Revenue from the fishery increased from 56 million NOK (US\$7.2 million) in 1995, to 124 million NOK (US\$15.9 million) in 1996, or 121%. The quota, however, stayed the same, although landings increased by 4,000 tons. Hence, most of the increase in revenue can be regarded as higher potential rents in the fishery.

Since the coastal fleet's quota remained at 20,000 tons, one would not expect any change in effort in a well-managed fishery. However, such a significant price increase gives strong incentives to expand fishing effort in an open-access fishery. Coupled with a global TAC, a race for fish is also likely to develop. This is exactly what happened.

² Open access in Norwegian fisheries still implies that the fishermen have to comply with the Law of Participation. This states that all fishing vessels are subject to an occupational permit. Such a permit can be obtained if the owner of the vessel, or the majority share holders in the case of a company, has had fishing as his main occupation during at least three of the last five years (as of January 1, 2000), down from at least three of the last ten years previously. The occupational permit is conditional on regional considerations and the state of the resource base. There is a general exception from the Law of Participation for vessels below 50 feet (15.68 meters) in total length.

Table 2

Catch, Revenues, and Price per Kilo for the Coastal Fleet, 1990–99. Real Values (1999=1)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999 ^a
Catch, 1,000 tons	16	17	18	15	21	17	21	20	29	29
Value, mill NOK	55	54	45	38	53	56	124	97	134	130
Average price NOK/kg	3.40	3.25	2.54	2.44	2.58	3.26	5.83	4.84	4.58	4.44
Exchange Rate USD/NOK ^b	6.26	6.48	6.21	7.09	7.06	6.34	6.46	7.07	7.54	7.82
Value, mill USD	8.5	8.0	6.9	5.1	7.2	8.5	18.4	13.2	17.4	16.6
Average price USD/kg	0.52	0.48	0.39	0.33	0.35	0.49	0.86	0.65	0.59	0.57

Source: Norwegian Directorate of Fisheries

^a Preliminary numbers.^b An annual average exchange rate based on monthly exchange rates from the Central Bank of Norway (<http://www.norges-bank.no/stat/>).

Table 3 shows the number of vessels participating in the coastal mackerel fishery by category. The total number of coastal vessels fishing for mackerel increased from 442 to 693, or by 57%, from 1995 to 1996. In 1997, the number had grown to 765, an additional 10% increase from 1996, even though the price decreased from 1996 to 1997. These numbers also understate the real increase in capacity, as many new entrants had relatively more powerful vessels, and already participating vessels were upgraded. Purse seiners larger than 13 meters are the most catch-efficient coastal vessels. Table 3 shows that the number of vessels in this category increased by 87% from 1995 to 1996. In the same period, the number of vessels employing nets and longline increased by 195%, from 19 to 56. Since this is the most common type of vessel in other coastal fisheries, it is not surprising that this group has the largest increase in number of vessels, indicating a transfer of fishing power from other coastal fisheries. However, in pelagic fisheries, the fishing power of these vessels is less than that of the purse seiners. Finally, the number of smaller vessels below 13 meters rose from 368 to 534, or 45%, from 1995 to 1996.

The Political Game

The substantial increase in fishing effort following the price increase was a surprise to regulators and fishermen's organizations. However, the actions that followed illustrate fairly well how fisheries management is also very much a political issue.³ Since the price increase made the coastal mackerel fishery much more valuable, the fishermen's organizations immediately began lobbying for larger quotas for their respective groups. Coastal fishermen have substantial political clout in Norway. It is, therefore, not too surprising that the quota for the coastal vessels was increased from 20,000 tons in 1997 to 30,000 tons in 1998, at the expense of the larger purse seiners (above 21.35 meters).

Within the coastal group there was also substantial conflict of interest. In particular, the new coastal purse seiners were regarded as foreign elements within the coastal group. Many of these vessels were just below the length limit that allowed them to be defined as coastal vessels and were certainly among the most powerful vessels of the fleet. In 1997, a license based on former participation was introduced for purse seiners between 13 and 21.35 meters in total length, restricting access to

³ This illustrates one way of endogenous quota setting in management systems. That quotas are endogenous in the system is also discussed in various forms by Johnson (1995) and Homans and Wilen (1997).

Table 3
Catch and Participation in the Coastal Mackerel Fishery by Vessel Category, 1993–99

	1993	1994	1995	1996	1997	1998	1999 ^a
Total catch (tons)	18,000	23,000	20,000	23,000	20,000	29,000	29,000
Total No. of vessels	515	553	442	693	765	763	662
<i>Purse seine 13–21.35 m</i>							
No. of vessels	48	54	55	103	89 ^b	89 ^b	80 ^b
Catch	15,060	19,842	15,882	14,616	10,112	15,500	14,600
<i>Net/line 13–21.35 m</i>							
No. of vessels	32	26	19	56	70	91 ^b	76 ^b
Catch	459	1,249	1,186	1,860	3,387	4,900	4,700
<i>All vessels < 13 m</i>							
No. of vessels	435	473	368	534	606	642	546
Catch	2,376	2,311	3,033	6,309	7,056	8,600	9,900

Source: Norwegian Directorate of Fisheries

^a Preliminary numbers.

^b Limited entry scheme introduced.

the coastal fishery. Although the final decree was less excluding than the original proposal from the Fisheries Director, the closure effectively barred further entrance into this fleet segment. Moreover, the coastal fleet's quota was divided into two shares—one for purse seiners above 13 meters, and one for the remaining coastal vessels. In 1997, the split was even, allocating 10,000 tons to each segment, while in 1998, the purse seiners above 13 meters got 17,500 tons out of a total quota of 30,000 tons. In 1999, the split was again even with 15,000 tons allotted to each group. This should be seen in contrast to the years before this arrangement, when purse seiners above 13 meters accounted for between 63% and 86% of the coastal mackerel landings.

The restricted access to the coastal purse seine fishery may also have triggered an increase in the number of larger conventional vessels, which increased from 19 in 1995 to 70 in 1997. In 1998, restricted access, based on former participation, was introduced also for vessels between 13 and 21.35 meters employing net or longline. Still, the number of such vessels participating in the coastal mackerel fishery increased further to 91 in 1998. This may be explained by the fact that fishermen wanted to ensure their right to participate in the mackerel fishery in the future, as this right is conditional on the fishermen's mackerel landings in certain base years, which are decided upon annually.

It is also interesting to note that the rent seems to have been fully dissipated already in 1998 even with the higher quota, as the number of vessels in all classes was reduced in 1999.

Concluding Remarks

It has been shown how potential profits caused by a large price increase led to a substantial increase of effort in the Norwegian coastal mackerel fishery. Since quotas were initially not raised for this group, this case also provides a good example of how quickly rent can be dissipated when capacity is available from other fisheries, and, therefore, how valuable good management can be. Moreover, the increased revenue from the fishery also illustrates how important politics might be in managing a

fishery, particularly when it comes to distributive issues. In our example, small-scale fishermen succeeded both in winning quota shares from other fleet segments, as well as limiting access for the larger vessels within the coastal group.

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