

Thalassorama

Trade Disputes and Productivity Gains: The Curse of Farmed Salmon Production?

FRANK ASCHE

Centre for Fisheries Economics, Foundation for
Research in Economics and Business Administration

Introduction

Since the early 1980s, there has been a tremendous growth in farmed salmon production, from about 16,300 tons in 1982 to about 532,000 tons in 1995. Atlantic salmon is the main species with a production of 461,000 tons in 1995, but the quantity of Pacific salmon (mostly Coho) is also substantial with a production of 74,000 tons in 1995. Total production of farmed salmon by main producing countries are shown in table 1.

Norway is the largest producer, and supplied about 46% of total world production in 1995. This share has been declining, as can be seen in figure 1, where the share of the production for the main producers are shown from 1984–95. Norwegian farmers produce only Atlantic salmon, and their share of production is accordingly even higher here, with 54% in 1995. Chile is the world's second largest producer of farmed salmon with 20% of the production in 1995, and the largest producer of farmed Pacific salmon. Scotland is still a larger producer of Atlantic salmon than Chile, but this is expected to change in the near future. Hence, most of the world's farmed salmon production is concentrated in a few countries. Other important producing nations are Canada, United States, Ireland, the Faroe Islands, and Japan.

There are three main markets for farmed salmon: the European Union, Japan, and the United States. Hence, most of the farmed salmon are produced in other nations than where it is consumed, although there is also some production domestically in the main markets. Farmed salmon is thus internationally traded to a large extent.

Following the increases in production, prices have decreased significantly. The Norwegian export price for fresh salmon in 1995 was, in real terms, only 36% of the 1982 price (the export price is graphed in figure 1), and a similar trend seems to be the case for all the producer countries. In periods, this has led to poor profitability for many producers.

Poor profitability together with few producer nations, where some producers are located within the main markets for salmon and some outside, has left fruitful grounds for international trade disputes. Because Norway is the largest producer, it has been the main target, and restrictions on trade have been implemented on several occasions. Recently Chilean producers have also received some attention from U.S. producers on this matter.

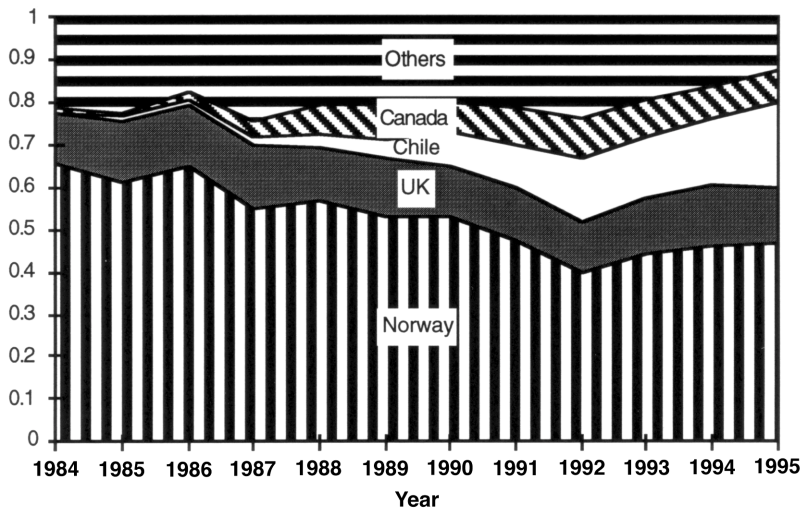
Frank Asche is research associate at the Centre for Fisheries Economics, Foundation for Research in Economics and Business Administration, Breiviken 2, N-5035 Bergen-Sandviken, Norway; e-mail: Frank.Asche@snf.no.

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Table 1. Production of Farmed Salmon 1984–95 ('000 tonnes)

Year	Total	Canada	Chile	Faroe I	UK	Ireland	Japan	Norway	USA	Others
1984	33.9	0.3	0.1	0.1	3.9	0.4	5.0	22.3	1.1	0.5
1985	48.1	0.5	0.5	0.9	6.9	0.7	7.0	29.5	1.5	0.6
1986	70.6	1.1	1.1	1.4	10.3	1.2	7.5	45.7	1.2	1.1
1987	86.1	3.1	1.9	3.2	12.7	2.3	12.2	47.4	1.6	1.7
1988	142.2	9.9	4.2	3.4	18.0	4.1	16.5	80.5	2.5	3.1
1989	207.0	16.9	8.8	7.9	28.6	5.5	19.8	110.1	3.6	5.9
1990	274.8	18.5	23.3	13.0	32.0	6.3	23.6	146.0	3.6	8.4
1991	327.9	29.1	34.1	17.9	40.7	9.3	25.7	154.9	7.1	9.1
1992	310.5	30.3	46.6	18.4	36.3	9.7	25.5	124.1	10.3	9.2
1993	371.2	32.7	55.2	17.7	48.8	12.4	21.1	163.6	10.9	8.8
1994	444.1	33.6	69.1	14.9	64.3	12.5	22.8	205.7	10.9	10.4
1995	532.0	41.0	103.0	8.0	72.0	12.0	16.0	249.0	17.0	14.0

Source: FAO, Kontali Analyse

**Figure 1.** Production Shares for the Main Producers of Farmed Salmon

In this paper we will focus on the relationship between productivity developments and price declines in salmon farming using Norwegian data. However, as a background for why this is of interest, a brief review of the trade conflicts in relation to farmed salmon is given in the next section.

Trade Disputes in Relation to Salmon

There have been a number of trade disputes in relation to salmon during the last decade, both in the United States and the European Union. Norwegian producers have been the primary target, because of Norway's large share of production. In the disputes, the domestic farmers complain about low prices, blaming Norwegian producers. The aim of the complaints is to reduce foreign salmon's access to the domestic market.

In the European Union the complaints have been of two varieties, informal complaints in cooperation with Irish and Scottish politicians to make the EU Commis-

sion do something, and formal dumping complaints. So far, the first strategy has been the most successful. The EU Commission has on several occasions implemented minimum import prices (MIP) for all Atlantic salmon, although it is Norwegian producers that are the primary target.¹ Scottish and Irish farmers have also argued in favor of import quotas, but so far the Commission has not been willing to use this measure. However, after pressure from the European Union, and to avoid more serious measures, the Norwegian government has administered feeding stops and has in place a system with feed quotas in order to restrict production. Moreover, no new licenses for salmon farms have been awarded since 1988. That this is a binding restriction can be seen from that fact that licenses are currently being traded at values between U.S.\$750,000 and U.S.\$1,500,000. Irish and Scottish farmers have also, on several occasions, made formal dumping complaints against Norwegian farmers, and Norwegian farmers are also currently under investigation for dumping.² These complaints have not been successful thus far.

After a dumping complaint from U.S. farmers, where Norwegian farmers were found guilty, imports of fresh salmon from Norway have faced a countervailing tariff since 12 April 1991, on average 26%, but dependent on firm.³ As shown in Anderson (1992), this effectively closed the U.S. fresh salmon market for Norwegian producers. However, the exclusion of Norwegian fresh salmon seems not to have benefited domestic farmers much, as Chilean and Canadian farmers seem to have taken over most of the Norwegian market share. Recently, U.S. farmers have been working on a dumping complaint against Chile. However, this complaint seems to have been put on ice, partly because some U.S. firms also have interests in Chile and partly because the tariff one expects if Chilean farmers were found guilty (2-7%) would be too low to make the cost of a complaint worthwhile.⁴

The merit of the trade measures taken are questionable. Certainly, Norwegian salmon is excluded from the U.S. market, but domestic producers have not benefited by either higher prices or larger market shares. The effect of both the European Union's and the Norwegian measures are also at best questionable. However, this is mostly as expected due to the many substitutes for farmed salmon, including wild-caught salmon, and the global nature of the market, as shown in a number of studies.⁵

Productivity

A huge increase in productivity is always mentioned as one of the main factors behind the expansion of farmed salmon production. If the markets are fairly competitive, one would expect a productivity increase to lead to larger production and lower

¹ Minimum import prices on Atlantic salmon have been in operation during the following periods: 8 November 1991 to 29 February 1992; 1 March 1992 to 31 May 1992; 19 November 1993 to 31 January 1994; 4 February 1994 to 15 March 1994; 16 March 1994 to 17 May 1994; and 15 December 1995 to 30 June 1996. During the last period, the minimum import prices only applied to Atlantic salmon from the EFTA countries. Thanks to Ulf Eriksen at the Norwegian Ministry of Fisheries for providing these dates, and the other details regarding trade measure discussed in this paper.

² Dumping complaints have been delivered to the Commission three times, 24 November 1989, 10 November 1991, and 19 July 1996.

³ The duties are a equalization tariff on 2.27% and a countervailing duty varying from 15.65% to 31.81%. Recently, a few Norwegian firms that have been able to prove in U.S. courts that they did not dump, have been exempted from the duties.

⁴ The source for this information is the 4 February 1997 issue of the Norwegian newspaper *Fiskaren*.

⁵ Studies of demand for salmon include Herrmann and Lin (1988); Bjørndal, Salvanes, and Andreassen (1992); Herrmann, Mittelhammer, and Lin (1992); DeVoretz and Salvanes (1993); Herrmann, Mittelhammer, and Lin (1993); Wessells and Wilen (1993); Bjørndal, Gordon, and Salvanes (1994); Wessells and Wilen (1994); Asche (1996a); and Asche, Salvanes, and Steen (1997).

Table 2. Costs in Norwegian Salmon Farming 1982–95 per kg Salmon Produced

Type of Cost	1982	1984	1986	1988	1990	1992	1993	1994	1995
Smolt	8.74 (16.85)	9.91 (19.97)	13.38 (23.09)	9.35 (25.30)	5.68 (14.99)	5.10 (14.54)	4.49 (16.10)	3.84 (18.93)	3.74 (20.06)
Feed	18.10 (34.92)	16.92 (34.09)	16.17 (27.91)	13.37 (36.17)	14.58 (38.47)	12.70 (36.22)	10.79 (38.73)	9.94 (48.97)	9.15 (49.09)
Wages	8.19 (15.79)	8.01 (16.14)	7.78 (13.43)	4.33 (11.72)	3.82 (10.08)	3.45 (9.83)	2.69 (9.65)	2.24 (11.06)	1.85 (9.92)
Capital	7.64 (14.75)	7.36 (14.84)	11.30 (19.50)	7.28 (19.70)	6.62 (17.45)	5.43 (15.49)	3.14 (11.26)	1.20 (5.91)	0.96 (5.15)
Insurance	-	-	2.33 (4.02)	1.24 (3.34)	1.26 (3.32)	0.87 (2.49)	0.64 (2.31)	0.50 (2.47)	0.40 (2.15)
Other costs	9.17 (17.69)	7.42 (14.94)	6.99 (12.06)	4.52 (12.23)	5.94 (15.67)	7.51 (21.41)	6.12 (21.95)	2.57 (12.67)	2.53 (13.57)
Operating costs per kg	51.84	49.63	57.95	36.96	37.91	35.08	27.87	20.30	18.64

Sources: Profitability studies for fish farms, various years, The Norwegian Directorate of Fisheries, and Salvanes (1988).

Notes: Values in 1995 prices. Percentage cost shares in parentheses.

^a Due to changes in the definition of the different types of costs, there is some uncertainty associated with comparing these over time.

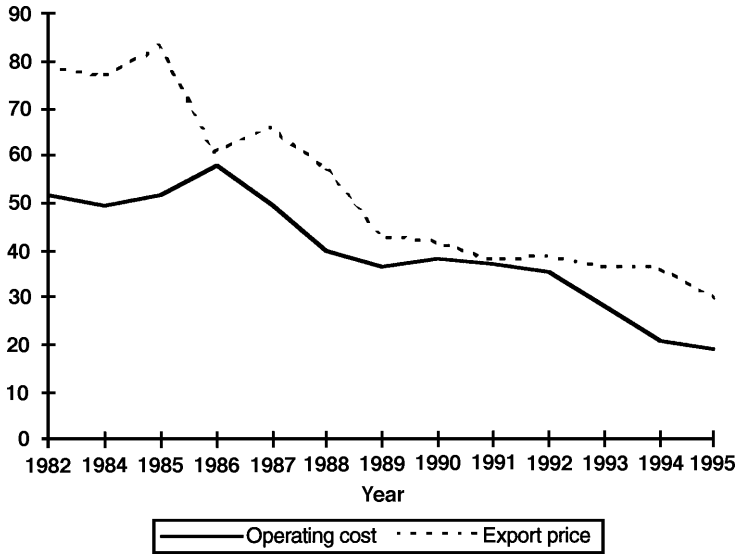


Figure 2. Production Cost and Export Price per kg for Norwegian Fresh Salmon in Real Values (1995)

prices, to the benefit of consumers. Here I will compare Norwegian production costs and export prices, to try to assess the importance of productivity gains for the declining price.

The average cost of production per kilogram for Norwegian farmers is shown in table 2, and are also graphed in figure 2.⁶ Feed is the factor with the highest cost share, and its share has been increasing over time. The cost shares of the other factors are rather constant or decreasing. As feed is the factor most closely related to the production volume, this development can be explained by increased production on each farm. The productivity increase is substantial as the average cost of production in 1995 is only 36% of the cost in 1982.⁷ The most important reasons for this are higher survival and growth rates. It might be of interest to note the only increases in production costs correspond to periods of disease. In particular, in 1986 one had the Hitra disease, while in 1990–92 one had the Ila disease and Furunculosis.

Production cost per kilogram is graphed together with export price per kilogram for fresh salmon in figure 2.⁸ One must be careful when comparing the levels of the data series, as production costs are measured at an earlier stage in the production process than export price. However, one can compare the development in the series

⁶ Production costs in Norwegian salmon farming have been discussed several places, recently in Bjørndal and Salvanes (1995).

⁷ Subsidies are not a big issue here. In the U.S. dumping case, it was found that some farmers received subsidies in the form of cheap loans (regional policy). However, as one can see in table 1, capital costs do not have a too large cost share, and the possibility to receive these kinds of loans has been reduced anyway.

⁸ The Directorate of Fisheries are sometimes criticized for including the costs of the farms that are affected by disease, because all salmon on a farm where a disease is found is destroyed. This leads to increased production cost pr/kg in the statistics as this is counted as zero production, while the cost remains. Hence, in the years when disease is a large problem, the numbers overstate the cost of production for the marketed salmon.

over time. Both production costs and export prices have a clear downward trend, and the differences are never very large. It might be of interest to note that the average export price in 1995 was 37.7% of the price in 1982 while, as noted above, the production cost in 1995 was 36% of the cost in 1982. Hence, the profit margin for the average Norwegian farmer actually seems to have increased slightly from 1982 to 1995, although it is basically the same.

The important message here is that there is a close relationship between the development of productivity and the falling export prices. Productivity gains are able to explain a great deal of the decline in farmed salmon prices. It is also of interest to discuss who is to benefit from increased productivity. Consumers buy larger supplies at lower prices, or producers with higher profits. In the case of farmed salmon, it is clearly the consumers who have received most of the gains. Whether this will continue depends on to which extent trade restricting measures are undertaken.

Concluding Remarks

The combination of few major markets and few producers leaves the market for farmed salmon a fruitful ground for trade disputes, in particular when price is declining. However, productivity gains are able to explain a large part of the increase in farmed salmon production and the following price decline. The trade disputes therefore seem to be closely related to the question of who is going to get the benefits of the productivity gains—producers by higher profits, or consumers by lower prices. To some extent the disputes are also related to who is going to survive in the industry, those who have the best productivity and largest growth potential, or those located inside the main markets.

Demand studies indicate that demand for fresh salmon, the most important product form for the farmers, has become less elastic over time and is today at best barely elastic.⁹ As the income for farmers therefore does not increase with greater production, and may even decrease, the struggle of who will survive in the salmon market is likely to intensify. More trade disputes can therefore be expected.

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⁹ How the elasticity has changed using a demand system specification and review of the literature on demand for salmon can be found in Asche (1996b).

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