Salmon imports
Impacts on the Australian farmed Atlantic salmon industry
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ABARE submission to the Industry Commission study

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Australian Bureau of Agricultural and Resource Economics
GPO Box 1563 Canberra 2601

Telephone (06) 272 2000  Facsimile (06) 272 2001
Internet http://www.abare.gov.au

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ABARE project 1433
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Summary

- Imports of uncooked salmon have been banned in Australia under the Quarantine Act since 1975. At the time the ban was imposed, salmon was not produced in Australia. The Australian farmed Atlantic salmon industry began operation in 1985, and the first commercial exports were sent to Japan in 1987.

- Since production started in 1985, the Australian farmed Atlantic salmon industry has grown rapidly and is now the second highest valued aquaculture industry in Australia, and the highest valued fishery in Tasmania, with output worth $58.5 million in 1995-96.

- Supplies to both the export and domestic markets have increased over the past ten years. Growth in supply to the domestic market has been particularly strong in recent years, and it now accounts for around two-thirds of the volume of production. Predominantly fresh whole salmon is supplied to both markets.

- As total production of Australian farmed Atlantic salmon has increased, average farmgate prices have fallen. Export prices have been variable, but have tended to fall as world supplies have grown rapidly.

- Australia has consistently received a price premium compared with fresh salmon supplies from other countries in the major export market, Japan. Over the year to February 1996, the price for Australian salmon was on average 16 per cent higher than the average price for other fresh salmon supplies in the Japanese market.

- Changes in the quarantine restrictions to allow the entry of salmon imports from North America could affect both the domestic and export markets for Australian farmed Atlantic salmon.

- The fact that Australian salmon currently competes effectively with salmon supplies from North America and other countries in export markets indicates that, in the absence of disease, the industry is cost competitive. Imports are unlikely to affect the cost structure of the industry, in the absence of disease.
SALMON IMPORTS

- There are some features of the industry which suggest that it may have been possible for Australian producers to restrict output to the domestic market, and hence keep prices up. The industry has been dominated by three firms which produce salmon and process it for sale to both the export and domestic markets. Most of the small producers do not supply directly to markets, but instead sell their salmon to one of the three large processing companies. Furthermore, a single company, owned jointly by the industry and the Tasmanian government, had a legislated monopoly over smolt production until 1995.

- However, there is no substantive evidence that Australian producers have been restricting output to keep prices high. Supply to the domestic market has been growing rapidly, average farmgate prices have been falling, and the legislated monopoly on smolt production, a possible barrier to entry of competing suppliers, has now expired. Imports may not, therefore, add further competitive pressure to the Australian salmon market.

- Imports may have a significant impact on export prices for Australian salmon. If imports result in a disease outbreak, most of Australia's price premium in the Japanese market is likely to be lost. Australian salmon could no longer be marketed as disease free and free of the chemicals and medicines required to treat and manage disease. A disease outbreak is also likely to increase production costs.

- Even if prices in the Australian market have been kept above competitive levels, allowing imports would be a second best way to encourage competition, if imports bring with them a significant risk of a costly disease outbreak. It is better to address any anticompetitive elements in the domestic market directly, by removing any institutional arrangements which may give rise to market power.
1. Introduction

Background

The Industry Commission (now the Productivity Commission) was asked by the Commonwealth government to undertake a study of the Australian farmed Atlantic salmon industry, and the potential economic and social impacts of salmon imports from North America. Imports of uncooked salmon have been banned under the Quarantine Act since 1975.

In January 1994 Canada and the United States requested GATT consultations with Australia on the quarantine restriction on imports of fresh and frozen salmon. (Such consultations now come under the jurisdiction of the World Trade Organisation.) As part of this process, the quarantine restriction is currently the subject of an Import Risk Analysis by the Australian Quarantine and Inspection Service (AQIS). The Industry Commission study is separate from the science based quarantine assessment. The Commission has indicated, however, that it will take into account relevant reports prepared as part of the Import Risk Analysis, including an assessment by ABARE of the possible impacts of salmonid disease introduction (ABARE 1996).

As the Industry Commission’s study is a short term research project and not a formal inquiry, it has asked that submissions concentrate on providing data and information on the salmon industry. In this submission the aim is to concentrate on some of the topics that the Commission has identified as central to the study.

Focus in this submission

The Industry Commission’s Terms of Reference specifically refer to the need to examine the impacts of imports on prices for Australian salmon. The focus in this submission is the possible ways in which salmon imports could influence prices for Australian salmon in export and domestic markets.

Exports currently account for around a third of Australian salmon production. Australian salmon is sold at a price premium compared with salmon from other countries in the key export market, Japan. In a report prepared for the salmon Import Risk Analysis, ABARE noted that a key determinant of the cost of removing import bans would be the possible loss of Australia’s export price premium should Australia lose its disease free status (ABARE 1996). The
nature and extent of the export price premium and the possible impacts of imports on it are analysed in this submission.

Salmon imports could also influence competition and prices in the domestic salmon market. The size of these impacts on the domestic market depends on the extent to which salmon prices are already at competitive levels in Australia, and the extent to which imports are close substitutes for the Australian salmon. It is difficult to reach firm conclusions about the likely impacts of the removal of the import ban on competition and prices in the domestic salmon market. However, the underlying issues are identified.

The Industry Commission has indicated that it is assuming imports do not result in a disease outbreak. However, the disease free status is a distinguishing feature of the Australian Atlantic salmon industry. A balanced assessment of the economic and social impacts of removing the import ban must therefore recognise the possible impacts of a disease outbreak. In this submission the possible impacts of imports both with and without disease are examined.

Key features of the Australian salmon industry and markets are discussed in the following chapter. This provides the basis for analysis of the possible impacts of imports on the export market, then the domestic market.
2. Key features of the Australian salmon industry

Australian salmon production

Farmed Atlantic salmon is currently the only type of salmon commercially produced in Australia. Most of the production is in the south east of Tasmania, where husbandry conditions are suitable. The techniques used by Australian salmon producers are based on those employed in Norway and Scotland. Salmon are hatched in freshwater facilities and after several months are transferred to acclimatisation tanks where the salinity is gradually increased. This process is termed smolting. After approximately eight months the salmon are transferred to open sea cages, and after a further twelve to fifteen months they are ready for sale. During the time in the open sea cages the salmon grow from around 80 grams to around four kilograms (ABARE 1996).

Harvesting of salmon in Australia has traditionally taken place in the warmer months of September to March. Other major southern hemisphere salmon producers, Chile and New Zealand, have also tended to harvest mainly in these months. Northern hemisphere suppliers, predominantly Norway, Canada and the United States, have tended to supply in the warmer northern months. However, in recent years most suppliers, including Australia, have extended their harvesting periods.

Prior to 1975, there were no restrictions on importing salmon products, including fresh and frozen salmon, and quantities of fresh and frozen salmon imports entered Australia, mainly from North America (AQIS 1996). In 1975 the Quarantine Act was amended, banning commercial imports of all salmon except those which have been cooked or heat treated.

The Atlantic salmon industry began operation in Australia in 1985, with the first commercial exports of around 20 tonnes (product weight) in 1987. By 1995-96, salmon was the second highest valued aquaculture industry in Australia and the highest valued fishery in Tasmania, with output valued at $58.5 million (Tasmanian Department of Primary Industry and Fisheries 1996b). Production has increased from 1750 tonnes in 1989-90 to 6500 tonnes in 1995-96 (table 1). It is estimated that Tasmanian production could increase to 10 000 tonnes by the year 2000 (Tasmanian DPIF 1996a).

The Tasmanian salmon industry was established through a joint venture between the Tasmanian government, a Norwegian salmon company, Noraqua,
SALMON IMPORTS

Tasmanian salmon production

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<td>2 650</td>
<td>3 300</td>
<td>3 500</td>
<td>4 000</td>
<td>6 192</td>
<td>6 500</td>
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</tbody>
</table>

a Product weight. p Preliminary estimate from Tasmanian DPIF (1996b). 
Source: ABARE (1995)

and Australian private interests. The joint venture set up an umbrella company, Salmon Enterprises of Tasmania Pty Ltd, known as Saltas. Saltas has been responsible for research and development for the salmon industry in Tasmania, as well as the operation of a salmon hatchery. The Salt Water Salmonid Culture Act 1985 specified that Saltas be the only commercial supplier of smolt in Tasmania. Saltas was funded through compulsory levies on the sale of all smolt. Only farmers holding shares in Saltas could produce salmon in Tasmania, and therefore total production could be controlled, which was 'seen as a crucial factor in the early days of the industry' (Stanley 1993). Salmon farmers also had to be licensed by the Tasmanian government.

Saltas’s legislated monopoly on smolt production expired in 1995. Further hatcheries may now be established under the Marine Farming Planning Act 1995 (Tasmanian DPIF 1996a). There are currently a few salmon farmers produce some of their own smolt, but most still rely on Saltas for some smolt supplies.

While there are currently 36 Atlantic salmon production permits in Tasmania (ABARE 1996), only around ten firms are currently producing salmon for sale. The industry is dominated by the three largest Tasmanian firms, the principal company being Tassal, followed by Aquatas and Nortas Aquaculture (Tasmanian DPIF 1996a). These three firms have integrated processing facilities where they process their own farmed fish. Gutting and packaging of salmon for sale to both export and domestic markets occurs in the processing stage of production.

The smaller firms do not have processing facilities, so most sell their output to the larger processors. One of the smaller producers grows salmon under contract for Tassal (Tasmanian DPIF 1996a). With control over the processing facilities, the three largest firms have been responsible for the majority of production and determining the allocation of sales between the export and domestic market.
Salmon markets and prices

Supply to both the domestic and export markets is predominantly of whole fresh fish. Around two-thirds of Australian salmon production is sold as whole fresh fish which are gutted and gilled (Tasmanian DPIF 1996a). The remainder is sold frozen or as salmon products such as smoked salmon or salmon steaks.

In both the export and domestic markets, the whole fresh salmon competes with other premium quality foods, largely for consumption in restaurants. The trend to more frequent dining out, together with the perception of salmon as a healthy food, has driven the strong growth in demand. In export markets, Australian salmon competes with farmed Atlantic or Pacific salmon from other countries, high quality wild caught Pacific salmon, and other premium foods. In the Australian market, there are no competing supplies of Atlantic or Pacific salmon. The main sources of competition are therefore other premium quality foods, especially seafood.

While exports accounted for over half of total production in the early years, local sales now account for around two-thirds of the volume of production (figure A; ABARE 1995). The growth in the domestic market has been more rapid, from a lower base, as Australian consumers have gradually become aware of the availability of fresh salmon. In 1995-96 the domestic market accounted for 68 per cent of the volume of Australian salmon sales.

Average farmgate prices for salmon have been declining in recent years (table 2), in both real and nominal terms. As supplies have increased, average farmgate prices have fallen.
SALMON IMPORTS

2 Average farmgate prices for Australian salmon

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<tbody>
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<td>t</td>
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<td>3,300</td>
<td>3,500</td>
<td>4,000</td>
<td>6,192</td>
</tr>
<tr>
<td>Value</td>
<td>$'000</td>
<td>31,800</td>
<td>39,600</td>
<td>49,000</td>
<td>48,000</td>
<td>55,728</td>
</tr>
<tr>
<td>Average price</td>
<td>$/kg</td>
<td>12.00</td>
<td>12.00</td>
<td>14.00</td>
<td>12.00</td>
<td>9.00</td>
</tr>
</tbody>
</table>

p Preliminary estimate from Tasmanian DPF (1996a).

Comparable price series for Australian salmon supplied to the export market and the domestic market are not available, so it is not possible to draw firm conclusions about the relative prices in the two markets. The prices in table 2 are average farmgate unit values, provided annually to ABARE by the Tasmanian Department of Primary Industry and Fisheries. The farmgate prices are for salmon that have been processed to the head on, gilled and gutted stage. No distinction is made between prices for output that goes to the domestic and the export market, or for output which is sold as whole fish, frozen or smoked.

Data on the price at which salmon is actually sold on the domestic market are not publicly available, as salmon is not traded on major wholesale seafood markets. Trade tends to be directly between the major processors and the major seafood buyers such as restaurant owners and seafood retailers.

Data on the value of salmon leaving Australia for export markets are collected by the Australian Bureau of Statistics. The average export unit values shown in table 3 are free on board — that is, freight and insurance costs are not included. The unit values shown in table 3 indicate that export prices have been more variable than the average farmgate prices, reflecting trends in world salmon supply and demand (discussed in the following chapter).

An interesting feature of the export prices is that they were low in the early 1990s compared with later years, and also compared with the farmgate prices

3 Average prices for Australian salmon exports a

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<td>552</td>
<td>1,678</td>
<td>1,997</td>
<td>2,519</td>
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<tr>
<td>Value</td>
<td>$'000</td>
<td>10,998</td>
<td>5,446</td>
<td>20,780</td>
<td>26,339</td>
<td>26,529</td>
</tr>
<tr>
<td>Average price</td>
<td>$/kg</td>
<td>9.93</td>
<td>9.88</td>
<td>12.38</td>
<td>13.19</td>
<td>10.53</td>
</tr>
</tbody>
</table>

a Exports of fresh, frozen and smoked salmon, landed in Australia. p Preliminary estimate.
shown in table 2. Between 1990-91 and 1992-93, average export prices were actually below the average farmgate prices. This implies that domestic market prices must have been above the export prices. Both export and domestic prices could not have been below the average farmgate prices.

The relatively low prices on the export market could have reflected a number of factors. For example, Australian suppliers may have been prepared to accept relatively low prices in the early years, in order to establish a strong export market. Another possible reason could have been the differing degrees of competition in the domestic and export markets. As noted earlier, in export markets Australian salmon competes with Atlantic and Pacific salmon from several countries. In the domestic market, salmon supplies have been controlled by a few firms, and there are fewer competing supplies of salmon. It is therefore possible that Australian producers had more scope to charge relatively higher prices in the domestic market.

However, it is important to note that in recent years farmgate prices have fallen and production has been increasing rapidly, with a growing share of output going to the domestic market. This suggests that even if the industry had been able to discriminate between the two markets, and charge a higher price in the domestic market, in recent years it has moved to more competitive pricing. Removal of the legislated monopoly on smolt production and the introduction of the Marine Farming Planning Act 1995 is intended to open the way for further hatcheries to be established (Tasmanian DPIE 1996a). These developments are likely to further increase competitive pressures on producers, and limit any scope that they may have had to restrict output and keep prices above the competitive level. (A theoretical analysis of price discrimination versus competitive pricing is presented in appendix A.)

The broad features of, and trends in, Australian domestic and export salmon markets and prices provide a useful starting point for the analysis of the possible impacts of imports. However, in order to assess the possible impacts it is necessary to examine the markets involved more closely. The export markets for Australian salmon are examined in the following chapter.
3. Export markets for Australian salmon

Australia is a relatively small player in world salmon trade. However, it appears to play a key role in supplying high quality fresh salmon in times of high demand. Reflecting these factors, Australian salmon tends to be sold at a price premium compared with exports from other countries in the major export market, Japan.

Major markets
While its share of total Australian salmon exports has been declining, Japan continues to be the major export market for Australian salmon. In 1990-91, Japan accounted for 95 per cent of Australian whole (fresh and frozen) salmon exports. In contrast, the share was only 69 per cent in 1995-96. Over the same period, exports to other markets, particularly Taiwan and Hong Kong, have been steadily increasing (figure B). In 1995-96, Taiwan accounted for 10 per cent of Australia’s salmon exports.

The mix of products supplied varies across the export markets. For example, fresh salmon is the major export to the Japanese market, accounting for 97 per cent of the volume of Australian exports to that market in 1995-96 (table 4). In contrast, predominantly frozen salmon is supplied to Taiwan. In 1995-96, only 42 per cent of the salmon exported to Taiwan was fresh. Overall, 85 per cent of Australia’s salmon exports are fresh whole fish.
SALMON IMPORTS

Australian salmon exports, by type and destination, 1995-96

<table>
<thead>
<tr>
<th></th>
<th>Fresh</th>
<th>Frozen</th>
</tr>
</thead>
<tbody>
<tr>
<td>Japan</td>
<td>1358</td>
<td>38</td>
</tr>
<tr>
<td>Taiwan</td>
<td>86</td>
<td>118</td>
</tr>
<tr>
<td>South Korea</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>United States</td>
<td>10</td>
<td>-</td>
</tr>
<tr>
<td>Hong Kong</td>
<td>19</td>
<td>23</td>
</tr>
<tr>
<td>Other</td>
<td>268</td>
<td>79</td>
</tr>
<tr>
<td>Total a</td>
<td>1747</td>
<td>266</td>
</tr>
</tbody>
</table>

*a The total differs from that in table 3 because smoked salmon is included in table 3. In 1995-96, smoked salmon accounted for 2 per cent of the volume of Australian salmon exports, and 5.5 per cent of the value.

Source: Australian Bureau of Statistics.

Reflecting the supply of predominantly higher priced fresh salmon to the Japanese market, Japan accounts for 74 per cent of the value of Australian salmon exports (fresh, frozen and smoked), compared with only 68 per cent of the volume.

Over the past 25 years, Japan has moved from being one of the world’s largest seafood exporters to the world’s largest importer. This transformation can be attributed to many factors including the reduction in domestic supplies through stock depletion, increased domestic demand and the strength of the yen against other currencies. Seafood has traditionally been a major source of animal protein in the Japanese diet. In 1992, seafood accounted for 45 per cent of total animal protein consumption, the other 55 per cent shared between pork, poultry and beef consumption (Reynolds et al. 1994).

In 1987, salmon accounted for 7.6 per cent of total Japanese fish consumption, which equates to nearly 5 kilograms consumed per household. Studies of seafood demand in Japan indicate that Japanese consumers are well aware of the quality and species of salmon entering the market (Herrmann, Mittelhammer and Lin 1992). The major buyers of salmon are in the restaurant trade.

Japan imports farmed Atlantic and Pacific salmon and high quality wild caught Pacific salmon. Low quality Pacific salmon is also imported, but in much smaller quantities. High quality Pacific salmon consists of chinook (or king), coho, and sockeye salmon, while low quality Pacific salmon consists of chum and pink salmon. The type of salmon imported mainly depends on the form of the imports. Japanese imports of fresh salmon are mostly Atlantic salmon, while most of the frozen imports are Pacific salmon.
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While Japanese imports of whole fresh salmon have increased rapidly in recent years, frozen salmon still accounts for the bulk of the imports. In 1995, a total of 172,501 tonnes of salmon were imported by Japan. Of this total, 88 per cent were frozen imports (Japan Tariff Association 1996). The predominant suppliers of frozen salmon to the Japanese market are the United States, supplying 91,216 tonnes in 1995, and Chile, supplying 31,708 tonnes (FAO 1995).

Competing suppliers

Norway is by far the world's largest producer of farmed salmon (table 5). Over 80 per cent of its salmon production is exported, mainly to the European Union (Seafood International 1996). Chile also exports a majority of its production.

Norway is the largest supplier of fresh Atlantic salmon to Japan, consistently accounting for over 60 per cent of total fresh Japanese imports. In 1994-95, Norway accounted for 69 per cent of Japanese whole fresh salmon imports, Chile 12 per cent and Australia 9 per cent. Other competing suppliers of fresh salmon to the Japanese market are Canada, the United States, the United Kingdom and New Zealand. Australian salmon also competes with supplies of frozen salmon, predominantly from the United States, Canada and Chile.

| 5 | World production of farmed salmon – FAO data |
|---|---|---|---|---|---|---|---|---|---|
| Atlantic salmon | | | | | | | | | |
| Norway | 80 | 117 | 158 | 155 | 171 | 170 | 207 | 260 |
| Chile | 1 | 2 | 10 | 18 | 28 | 32 | 35 | 55 |
| Canada | 2 | 2 | 3 | 11 | 14 | 15 | 30 | 32 |
| Australia a | 1 | 2 | 4 | 3 | 3 | 3 | 3 | 3 |
| United Kingdom | 18 | 29 | 33 | 41 | 39 | 49 | 52 | 73 |
| Other | 32 | 45 | 46 | 50 | 46 | 50 | 51 | 57 |
| Subtotal | 134 | 197 | 254 | 278 | 304 | 310 | 378 | 480 |
| Pacific salmon | | | | | | | | | |
| Chile | 4 | 7 | 9 | 19 | 18 | 20 | 35 | 40 |
| Japan | 14 | 18 | 22 | 21 | 24 | 25 | 25 | 27 |
| Canada | 6 | 12 | 12 | 16 | 15 | 8 | 8 | 8 |
| New Zealand | 2 | 2 | 2 | 3 | 5 | 4 | 3 | 4 |
| Others | 3 | 2 | 1 | - | - | - | - | - |
| Subtotal | 29 | 41 | 46 | 59 | 62 | 57 | 71 | 79 |
| Total | 163 | 238 | 300 | 337 | 366 | 367 | 441 | 559 |

a Australian statistics are incorrect.

Seasonal trends in salmon trade

Seasonal factors have been an important influence on world salmon demand and supply. There is a seasonal component to demand for salmon imports to Japan, with the peaks being in the warmer months, from December to April (Japan Tariff Association 1996; figure C). The end of the calendar year has been found to be a period of particularly high salmon consumption, as this is the time when end of year salary bonuses are paid to employees and new year celebrations take place (Herrmann et al. 1992).

Seasonal factors have also been an important influence on salmon supply. For southern hemisphere producers, Australia, Chile and New Zealand, harvesting has tended to be in the warmer months of September to March. In contrast, Norway, Canada and the United States have traditionally harvested in the warmer northern months, April to November. Competing high quality wild caught Pacific salmon is also harvested between May and October.

The southern hemisphere harvest season has coincided with the high demand season in Japan, and the low supply season in the northern hemisphere. Together, these factors have influenced the price for Australian salmon.

However, the seasonal factors have gradually been changing, as several key exporters have been supplying fresh salmon over considerably longer seasons. These changing seasonal trends have implications for salmon prices.

Export prices on the Japanese market

Australia has tended to receive a price premium on the Japanese market, compared with the average price of exports from other countries. The size of
**SALMON IMPORTS**

the premium has fluctuated over time, although Australia has received some premium in virtually all months in which it has supplied salmon to the Japanese market (Japan Tariff Association 1996; figure D). The real prices shown in figure D are for fresh salmon only, so the premium does not reflect differences in fresh and frozen supplies and prices. The other interesting feature about the import prices is that they have been falling, largely as a result of the strong growth in the supply of imports (figure D).

Over the year to February 1996, Australia’s premium above the average fresh salmon import price on the Japanese market has been around 110 yen per kilogram, or 16 per cent of the average salmon export price on the Japanese market (where the average is for the six major suppliers excluding Australia — Norway, Chile, the United States, Canada, the United Kingdom and New Zealand). The premium represents about 14 per cent of Australia’s average price over the year to February 1996.

Some of the premium could be caused by seasonal factors, with Australia receiving a price premium by supplying during periods of high demand and relatively low overall supply. If seasonality was the dominant factor driving the premium, other southern hemisphere producers could also be expected to receive it. The fact that Australia receives a premium relative to the other major southern hemisphere producer, Chile (Japan Tariff Association 1996; figure E), suggests that factors other than seasonality are important.

Furthermore, as noted earlier, many farmed salmon producers are extending their seasons, so Australia’s relative advantage in supplying during the peak demand months is likely to be declining. For example, since 1990 Chile has been supplying Japan with fresh salmon over the full year (figure E). It is also

![Monthly fresh salmon prices and Australia’s price premium](image)
important to note that in recent times when Australia has supplied over the full year, it has continued to receive the premium in each month (figure E).

The determinants of the premium and the possible impacts of imports on it are analysed in the following chapter. ABARE has argued that the possible loss of the price premium is a key aspect of the impacts of imports, and noted that there are a number of possible elements of the premium, and not all of these factors would be at risk if imports were allowed into the market (ABARE 1996).
4. Price premium for Australian salmon exports to Japan

Determinants of the premium
As discussed earlier, part of the price premium on the Japanese market could be caused by seasonal factors. However, the importance of these factors is likely to be declining, as major suppliers are expanding their seasons to supply throughout the year. It is important to distinguish any seasonal influences on Australian export salmon prices from other influences, because the seasonal factors cannot be attributed to the disease-free status of the Australian industry. In contrast, the quality determinants of the price premium could be affected by the entry of imports if they result in the entry of disease.

Seasonality
The seasonal components can be separated from the price premium for Australian salmon in the Japanese market. Estimates of the contribution of seasonal factors to the price premium are shown in table 6. The analysis was performed using the X-11 procedure available in the SAS statistical software package. The analysis was undertaken on the price premium for Australian fresh salmon in the Japanese market over the average price for fresh salmon (Atlantic and Pacific) supplies from other countries to that market. The data were available on a monthly basis. However, the fact that some countries, including Australia, have not supplied in each month restricted the analysis to quarterly aggregates, reducing both the scope and precision of the estimates.

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<td>1996</td>
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a. excluding partial years (1991 and 1996)
The estimates suggest that seasonal factors do contribute to the price premium for Australian salmon in some quarters, although in each quarter the size of the seasonal impacts has been declining over time. This is consistent with the earlier observations about changing supply patterns among the major salmon suppliers to the Japanese market, and the expectation that the importance of seasonal factors is declining.

For example, in the first quarter, which is a season of peak demand, seasonal factors are estimated to have added an average of 52 yen per kilogram to the Australian price premium since 1991. For the first quarter of 1996, the seasonal trend accounted for 44 yen per kilogram, which was around 35 per cent of the Australian price premium.

Seasonal factors have a small impact on the annual average price premium, as they add to the premium in some quarters, but they erode part of it in others.

It should be noted that the estimates can only provide a broad indication of the nature and size of seasonal impacts on the Australian salmon price premium in the Japanese market. With changing patterns of world salmon supply, it is unlikely that seasonal influences are stable.

Quality

The quality of Australian salmon is likely to be the main factor explaining Australia's price premium. Australian salmon is marketed as being clean, green and disease free (Tasmanian Development and Resources 1996).

Australia is considered to be free of salmon diseases under the International Aquatic Animal Health Code. The code was developed by the Office International des Epizooties (OIE), which is an observer organisation to the Committee on Sanitary and Phytosanitary Measures, which in turn sits under the World Trade Organisation (AQIS 1996). The code does not contain a comprehensive list of all possible diseases, only those considered to be currently or potentially of significant socioeconomic or public health importance. Australia is free of the listed diseases.

Some salmon importing countries require certification of the disease free status of imports, others do not. Among Australia's major salmon markets, Taiwan requires certification, but Japan does not.

Other quality factors may not be related to the disease free status. For example, the good quality of the water in Tasmania could enhance the quality of the salmon and hence contribute to its price premium. It is also possible that
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superior marketing or packaging could contribute to the price premium, although it is unlikely that this could be sustained as a significant factor unless the underlying product was genuinely of superior quality to salmon from other countries. Part of the premium may also reflect Australia’s status as a small, niche producer. Australia is the only disease free supplier among the six major exporters to Japan. Consumers may be willing to pay more for a product that is not widely available in the market.

Possible price impacts of removing the import ban

Removal of the import ban could have a significant impact on Australia’s export price premium if it resulted in the loss of the disease free status. There are a number of possible pathways through which the entry of fresh or frozen salmon imports could result in the establishment of disease in Australian salmon populations. The risks involved are being assessed in the science based salmon Import Risk Analysis (AQIS 1996).

Those parts of the price premium not related to disease, such as seasonality, would not be lost if there was a disease outbreak. However, as discussed above, the seasonal impacts are likely to be small.

For the Japanese market, disease free certification is not required, as Japan already has many salmon diseases. However, an outbreak of disease would mean that Australian salmon could not be marketed as disease free. The need to treat any outbreak with chemicals and medicines would also damage the clean green status. There may also be some clear physical implications of the disease. The symptoms vary with the type of disease, with some resulting in visible quality problems such as spotting of flesh and deformities. Some of these quality problems may be detected before the fish is cut open and consumed, others may not.

In summary, if the entry of imports resulted in a disease outbreak, most of the price premium that Australia has been receiving on the Japanese market would potentially be under threat. In the worst case for producers, all of the price premium except that associated with seasonality (estimated to be small, and declining) could be lost. The price premium represented around 14 per cent of Australia’s average price in the Japanese market throughout 1995.
5. Imports and the domestic salmon market

Changes to the quarantine rules to allow imports could affect competition and prices in the Australian salmon market if the imports that enter the market, or even potentially enter, are close substitutes for the Australian product and prices in the Australian market have been kept above competitive levels. Australian salmon competes effectively with North American salmon in export markets, so Australian suppliers should also be cost competitive with imports in the Australian market, in the absence of disease. However, if prices have been kept above competitive levels in the domestic market, imports of similar products at competitive prices could put downward pressure on prices in the Australian market.

Imported products and prices

The imports that are being considered in the Commission's study are Pacific wild caught salmon. The substitutability with the Australian farmed Atlantic salmon will depend on the type of Pacific salmon that is imported. If it is high quality Pacific salmon, such as chinook or coho, then it is likely to be regarded by consumers as a competing product, as it currently is in the Japanese market. However, lower quality Pacific salmon, such as chum or pink, is unlikely to be competitive with Australian salmon. It has been reported that there is currently a glut in supply of this lower quality salmon in Alaska (The Economist, 7 October 1996).

The substitutability will also be influenced by whether the imports are frozen or fresh. Fresh imports are more likely to compete with high quality fresh Australian salmon. Fresh, high quality imports are likely to be particularly competitive in the months when fresh Australian production is relatively low. However, as noted earlier, the Australian season is gradually expanding and output is increasing, so this opportunity for imports may become less important.

As a guide to possible import prices, over the year to February 1996, the average prices for Canadian and United States wild caught Pacific salmon exports (fresh plus frozen) entering the Japanese market were $7.16 and $6.51 per kilogram respectively (Japan Tariff Association 1996). In comparison, the average 1995-96 free on board price for all Australian salmon destined for export markets was $10.00 per kilogram (table 3). If additional freight costs to Australia were around or slightly less than $3 per kilogram, then the North
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American imports could enter Australia at around the free on board price for Australian salmon. However, even at this price, the imports may not be competitive.

Australian salmon has been consistently selling at a price premium compared with the North American imports in the Japanese market. If Australian consumers similarly regard Australian salmon as being of superior quality and worthy of a price premium, then the North American salmon would have to enter Australia at below the local price, in order to be a strong competitor for domestically produced salmon.

Furthermore, if the quarantine ban is removed there may be some requirements which could increase the price at which imports could enter. For example, certification indicating disease status may be required by an importing country under the Office International des Epizooties (OIE) International Aquatic Animal Health Code, when the importing country has a better health status than the exporting country. In the draft salmon Import Risk Analysis, AQIS indicated that there was a range of possible requirements or procedures that could be imposed on salmon imports to reduce the risk of disease entry (AQIS 1996).

Australian salmon costs and prices

As noted earlier, Australian salmon competes with North American salmon in export markets, so it should be cost competitive in the Australian market. In the absence of entry of disease, the main way in which imports could affect the domestic market is by providing competition, if domestic salmon prices are not already set competitively.

There are some features of the Australian salmon industry which suggest that it may be possible for suppliers to discriminate between the export and domestic market, restricting supplies to the domestic market to keep prices high. For example, the industry has been dominated by three firms which supply predominantly fresh fish to both the export and domestic markets, and there has been limited scope for independent suppliers to increase output, as smolt supplies have been controlled by Saltas.

However, there is no substantive evidence that Australian producers have been restricting supplies to the domestic market to keep prices high. Supply to the domestic market has been increasing rapidly and average farmgate prices have been falling in recent years. The removal of a potential barrier to entry by independent suppliers, in the form of the smolt monopoly, should also enhance
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competitive pressures. Prices in the domestic market cannot be sustained above competitive levels if independent producers can increase supply.

Even if there were barriers to entry and Australian salmon producers could restrict supply to the domestic market, their scope to keep prices high would be limited by the extent to which salmon competes with other seafoods and premium food. Salmon competes with a range of high quality seafoods available in Australia. Pascoe, Geen and Smith (1987) estimated price elasticities of fish demand of around -2. As these are aggregate estimates which do not account for substitution between different types of fish, it is reasonable to expect (though not conclusively) that price elasticities of demand for individual fish species would be higher. On balance, it does not appear that there would be substantial opportunities for salmon suppliers to exploit market power in the domestic market.

Imports may have an impact on the domestic salmon market if they result in a disease outbreak and increase the costs of production. In an ABARE report prepared for AQIS, the costs of an outbreak for a typical salmon farm were estimated to be substantial (McKelvie, Reid and Haque 1994). For example, treatment programs would increase the costs of a representative farm by around 9 per cent. Additional costs would be incurred for monitoring of disease status. The viability of farms would depend on the success of the treatment programs.

Furthermore, if Australian consumers have similar preferences to consumers in key export markets, and are prepared to pay a premium for disease free salmon, then the establishment of disease in Australia may also reduce the price of salmon in the domestic market.

Related markets

While North American wild caught Pacific salmon imports may not be strong competitors for Australian farmed Atlantic salmon, the availability of a new seafood product may generate some benefits for seafood consumers. The benefit will arise because consumers have more choice, as a previously banned product becomes available. The imported product may be an alternative to a range of medium quality seafood products. However, as noted above, if the imports result in a disease outbreak, seafood consumers may also bear some costs, as a premium product — disease free Australian farmed Atlantic salmon — may no longer be available.

The Industry Commission has argued that domestic smoked salmon producers may benefit from the removal of the import ban. They may be able to replace smoked salmon imports and increase Australian exports of smoked salmon.
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The implicit assumption underpinning this view is that Australian smoked salmon producers have some competitive advantage in processing. They would need a strong cost advantage over processors from other countries to make it viable for them to import frozen salmon, process it and then compete with smoked salmon suppliers from other countries, both in the Australian market and export markets. There is no conclusive evidence to indicate that Australian smoked salmon producers do have any comparative advantage. It is therefore doubtful that smoked salmon producers would benefit from the removal of the import ban.
Since production started in 1985, the Australian salmon industry has grown rapidly. Australian salmon has established a strong export market, where it tends to receive a price premium compared with salmon from most other countries. Sales to the domestic market have grown at an even faster rate, as Australian demand for premium quality seafood has increased.

Australian salmon has consistently sold at a price premium compared with fresh salmon from other countries in the key export market, Japan. The premium is largely due to the quality of Australian salmon, which in turn is closely related to Australia's disease free status.

The fact that Australian salmon can, in the absence of disease, compete with North American salmon in export markets indicates that it should also be cost competitive in the Australian market. Imports may have some impact on domestic prices if they have been kept above competitive levels, and the imports are close substitutes and priced below the Australian price. There is no conclusive evidence that Australian salmon output has been restricted to keep prices up. Supply has been increasing and farmgate prices falling in recent years. Salmon also competes with a range of other seafoods in Australia, and estimates indicate that demand is very responsive to prices. Therefore, it is unlikely that salmon producers would have scope to exploit market power.

If there are institutional arrangements which may give rise to market power in the domestic salmon market, it would be better to address these arrangements directly rather than allowing imports as a means of encouraging competition, if there is a significant risk of a costly disease outbreak.

Removal of the import ban could have implications for the price premium that Australian exporters receive. If imports result in a salmon disease outbreak, or a potential outbreak, then the premium associated with Australia's disease free status and clean green image could be lost. This could represent up to 14 per cent of the recent prices for Australian salmon in the Japanese market.
Appendix A: Prices and output under price discrimination and perfect competition

The following simple model helps to illustrate some points about prices and outputs where an industry supplies a product to two separate markets, say an export market and a domestic market.

Assume that the industry is a small supplier to the export market. It does not influence the world price, and can supply any level of output at the prevailing world price, shown in figure F as $P = MR_e$. Demand in the domestic market is given by the downward sloping demand curve $D_d$, and the associated marginal revenue curve is given by $MR_d$.

Total output from the industry is set at the level where the marginal revenue from the export market equals marginal cost, $MC$. Producing more than $Q_e$ will reduce profits (as additional costs are more than additional revenue), while producing less would mean that opportunities to more than cover additional costs are forgone.

The allocation of output between the domestic and export markets depends on the nature of competition in the domestic market. If there is one dominant firm with monopoly power in the domestic market, it will set domestic output at the level where marginal revenues from the export and domestic markets are equal. That is, total output will be $Q_e$, supply to the domestic market will be $Q_{d1}$, and the remainder will be exported. The domestic price will be $P_{d}$, which is higher than the export price, $P$.

If the industry is instead characterised by strong competition between a number of producers, or even potential producers, then prices in the domestic market will be bid down to the point where they equal the price in the export market. Supply to the domestic market will not expand beyond this point, $Q_{d1}$, because it would not be profitable for anyone to supply to the domestic market if the export price was higher.

Compared with the price discriminating situation, the competitive situation involves more supply to the domestic market, at a lower price.

While it is difficult to draw firm conclusions about the degree of competition in the Australian salmon market, the observation that farmgate prices have been falling, and are now below average export prices, and supply to the domestic market has been increasing suggest that the market may be tending
Prices and outputs under competition and price discrimination

The more scope there is for independent suppliers to increase their supply of salmon to the domestic market, the more likely it is that prices will be bid down to the competitive level. A higher price in the domestic market cannot be sustained when independent suppliers can increase supply to that market and force the domestic price down to the point where it equals the export market price.

The simple model helps to illustrate the differences between prices and output in perfectly competitive and monopoly situations. In practice, many markets will be somewhere between the two theoretical extremes. In such cases, outputs and prices in the domestic market would be somewhere between the competitive and monopoly levels. The analysis is also based on the simplifying assumption that the firm or firms have perfect knowledge about the demand and marginal revenue curves they face. If they do not, then their pricing and output behaviour is likely to vary from the theoretical situations shown in figure F.

**Impacts of imports**

The simple model presented above provides a useful framework for assessing possible impacts of imports. It can be used to examine the impacts of:

- Competition from imports, which are available at, say, price $P_m$ (figure G);
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Possible impacts of imports

- A reduction in the export price, to $P_{x1}$, which could arise if the imports result in a disease outbreak;
- An increase in production costs, to $MC_1$, which could arise if entry of imports results in a disease outbreak.

Some possible cases are discussed below. It is important to note that the following are not intended to be accurate representations of actual markets for Australian salmon. The actual markets may differ from the model in several ways. For example, Australian producers may not be able to sell as much salmon as they like at the prevailing export price. Increasing supply may put some downward pressure on the export price, and the demand curve would therefore not be horizontal. The model is also based on the assumption that the same product is supplied to the two markets, under the same cost conditions, and output can readily be switched between the two markets. In practice this may not be the case. The model can be modified to represent alternative demand and supply cases. However, the aim here is not to consider all possible cases but rather to illustrate some possible cases, emphasising the differences between the competitive and price discriminating situations.

Competition from imports

Say imports could enter the market at price $P_{m}$ and they are considered by consumers to be perfect substitutes for the Australian salmon. If the industry was behaving as a price discriminating monopolist, with the domestic price at $P_{d}$, the competition from imports would force the domestic price down to $P_{m}$, and result in an increase in supply to the domestic market and a reduction in exports. Domestic producers would have lower profits, but would still supply to the domestic market.
If the industry was already pricing competitively, with domestic prices at $P$, then the threat of imports at $P_m$ would not have an impact on domestic supplies and prices (as $P_m$ is above $P$).

This simple case illustrates the point that the competitive impacts of imports depend on how the industry is currently behaving. If it is price discriminating, the imports will result in some benefits to domestic consumers, who can consume more at a lower price, and reduced profits for domestic producers. If the market was competitive before the imports, then there would be no significant competitive impact from the potential entry of imports at price $P_m$.

**Reduction in export prices**

As discussed in chapter 4, if the entry of imports results in loss of Australia’s disease free status, it is likely to reduce the price for Australian exports. The possible impacts are illustrated in figure G.

The reduction in the export price to $P_{x1}$ would result in a fall in total output to $Q_{x1}$ and a reduction in exports. The size of the reduction in exports will depend on what is happening in the domestic market. If the domestic industry is competitive, supply to it will increase to $Q_{d2}$, and exports will fall to $Q_{x1} - Q_{d2}$.

If there is price discrimination, total output will still be $Q_{d1}$, so there would be fewer exports, but no increase in supply to the domestic market. (The price at which marginal revenues in the two markets are equal is still above $P_m$, so $P_m$ still sets the upper limit on domestic prices.)

These simple scenarios illustrate the point that changes in the export price can affect total output and the allocation of it between the domestic and export markets. If the domestic market is competitive, it will also have an impact on that market, as supplies to it will be increased.

**Higher domestic production costs**

The situation is complicated further when the possibility of higher domestic production costs is taken into account.

An upward shift in marginal cost, to $MC_1$, will result in lower total output and fewer exports. If the increase in costs is large enough, it may no longer be profitable to supply the domestic or export markets.
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