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LIBERALISING FISHERIES MARKETS
Scope and Effects

Chapter 3

Analytical Framework

Abstract. *This chapter consists of three major sections that contributes to the development of a theoretical framework for understanding the linkages between market liberalisation and its effects on markets and resources. The first explores the possibilities for supply responses due to market liberalisation in the following specific areas i.e. aquaculture, high seas fisheries, fisheries operating in third countries under bilateral access agreements and under-exploited fisheries with development potential. Empirical evidence as to the possibility for a supply response is provided. The second section examines effects of liberalising trade in fish, fishing services and investment in fishing vessels. It offers the crucial insights that the direction and magnitude of trade, and resource impacts, from policy changes will be determined by the possibility of supply responses in the sector. The last section discusses the effect of various trade and industry support measures on the supply of fish under specific regimes i.e. (i) aquaculture, (ii) shared stocks and high seas fisheries, (iii) fisheries under bilateral agreements, (iv) under-exploited fisheries and (v) multi-species fisheries. The key outcome of this section is the finding that the effects of market liberalisation in capture fisheries is a product of the level of stock exploitation combined with the fisheries management system.*

A. Proposal for an Analytical Classification

1. Background

When deciding to launch the Market Liberalisation Study, the Committee agreed to advance on a step by step basis with a broad coverage of the issues. A number of stages of the Study were identified by the Committee for Fisheries; these were:

1. Description of major markets, products and trade flows
2. Inventory of tariff and non-tariff measures, assistance measures and restrictions on investments and services
3. Analytical classification
4. Identify linkages (qualitative)
5. Analyse impacts (qualitative)
6. Quantifying impacts
7. Develop composite indicators.

In October 2000 the Committee for Fisheries requested the Secretariat to advance towards a proposal for an analytical classification. The Secretariat interpreted that to mean a classification of policy measures in fisheries that influence either 1) trade, or 2) resource sustainability or 3) both. Whilst the influence on trade is of key concern to the Market Liberalisation Study, any measure which also influences the resource sustainability outcome would be important to identify so that a possible trade off between the two can be assessed. It is also important to identify "double dividend" situations where relaxation of a policy instrument concurrently leads to an improvement in both trade and resource sustainability.

In March 2001 the Committee discussed a paper entitled "Proposal for an Analytical Classification" that outlined a classification of policy instruments including a grid for policy analysis. It was noted in that paper that as the policy instruments considered in the Market Liberalisation Study include tariffs, non-tariff barriers, assistance measures and restrictions on investments and services liberalisation any of these instruments could have an effect on both trade and resource sustainability.

Furthermore, combined with the paper presented by Professor Hannesson the Committee noted that the direction and magnitude of trade and resource impacts from policy changes will be determined to a large extent by the existence of a supply response arising from the change.[1] A supply response is defined as the ability of a domestic fishing industry to expand or contract production due to a change in a policy instrument external to the fisheries management system in place[2] or market signal. Supply responses in capture fisheries are a function of the fisheries management system (*i.e.* the production control method), the level of fishing (stock level above or below the MSY level) and the possibility for the domestic fleet to get access to other fisheries resources. As for the latter

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this may happen as a switch of effort to other species within domestic jurisdiction (*e.g.* under-exploited fisheries with development potential), as a switch of effort to high seas (uncontrolled) fisheries or through "buying" access to third country resources.

When discussing the first draft of the Proposal for an Analytical Classification in March 2001, the Committee agreed that the possibility of a supply response was a critical dimension. In order to have a more comprehensive picture and understanding of the classification the Committee requested the Secretariat to further explore the possibilities for supply responses in the following specific areas:

1. aquaculture (which is closer to agriculture in production characteristics than to capture fisheries);
2. high seas fisheries (which are not subject to management regimes);[3]
3. fisheries operating in third countries under bilateral access agreements; and
4. under-exploited fisheries with development potential.

This section seeks to advance on these four areas in response to the Committee's request.

Common for these areas is that they may be associated with a supply response to a change in external policy instruments or market signals. In addition to these areas there may be issues associated with multi-species fisheries where the supply mix (of different species) may change due to a policy change. Finally, the introduction of new fishing or processing technologies may make previously under-utilised species and fisheries become economically viable. Whilst the latter situation is of a longer term nature, changes in supply mix from multi-species fisheries are an interesting feature for many OECD fisheries. More details are provided in the following.

The following will briefly discuss each of the four areas identified by the Committee for Fisheries. In addition the paper provides, when possible, some empirical evidence (or examples) of the possibility for supply responses. The primary objective of the paper is to provide some additional insight into situations that may lead to supply responses due to market liberalisation. The observations at the end of the paper suggests that the largest supply response is likely to come from aquaculture followed by under-exploited fisheries with development potential, and fisheries outside national EEZ *i.e.* fisheries under bilateral access arrangements and on the high seas.

2. Aquaculture

FAO predicts that aquaculture will be a major source of fish supplies in the future. This concurs with the OECD's Environmental Outlook model that indicates a global aquaculture production of 70 million tons by 2020 compared to a production of almost 40 million tons today (see Box 3.A.1). Such an increase is deemed necessary if the world's population is to acquire fish protein at the level of today and against the background of diminished catches from the wild. However there are several concerns associated with this development[4], in particular fish farming's impact on the 7environment in general and on marine eco-system in particular.

To address these concerns the further expansion of aquaculture/fish farming is constrained by a number of factors. In many OECD member countries these include a set of public policies and regulations that are aimed at primarily managing the impacts of aquaculture on the marine environment (use of the sea area, space availability, restrictions

Box 3.A.1 **The importance of aquaculture**

By the year 2030, aquaculture will dominate fish supplies and less than half of the fish consumed is likely to originate in capture fisheries. The role of capture fisheries in the economies of the present OECD countries will have been reduced further as developing countries increase their share of both catches and subsequent processing. Their lower costs of labour will make these economies competitive both in the labour-intensive processing industry and as a source of seafaring fishers.

In wealthy countries, an increasing share of the fish consumed will be imported and, as these countries will want to obtain fish as cheaply as possible, it is likely that most trade barriers will be removed in advanced economies.

Aquaculture will have expanded geographically, in terms of species cultured and technologies used. It is very unlikely that Asia will continue to dominate production to the extent that it did during the 1990s. Mariculture will account for a larger share of total production, particularly if offshore culture technology becomes viable.

Source: FAO, The state of world fisheries and aquaculture, 2000, accessible at *www.fao.org*

on loads of nutrients etc.). In addition to regulatory limitations, the availability of suitable aquaculture sites and the availability of inputs (in particular fishmeal and oil for feed compounds) at prices commensurate with the value of production may limit the economics of production.

Some countries have imposed a moratorium on the further expansion of marine aquaculture activities with a view to assess the marine environmental impacts of such practices (*e.g.* in 1996 and for five years, Denmark introduced a stop for further aquaculture developments based on total marine loads of nutrients from aquaculture activities). Other countries (*e.g.* Norway) have a system of production licences/concessions that prescribe the technical characteristics of the production unit, location etc. These licences are limited and only a certain number of new licences are created each year. Other factors limiting production in Norway is a feed quota. Introduced in 1996 each licence holder is obliged to not exceed a maximum level of feed used in the production of salmon. The feed quota was introduced under a EU-Norway agreement that would stabilise Norwegian salmon supplies to the EU market; feed quota has not been restrictive as only 501 000 tons (of a quota of 517 000 tons) were used in 1999[5]. Nevertheless, based on Norwegian export statistics, this measure did not negatively (by quantity) affect the export of salmon from Norway to the EU.

Within the OECD area many of the administrative restrictions on aquaculture are in place for environmental reasons. Hence while aquaculture has developed fast over the past two decades it is likely that further development will be closely managed due to the potential environmental consequences of farming fish. Outside the OECD area, however, aquaculture will develop further and in particular in the developing world, where farmed fish is found to be a cheap source of protein and to provide commercial/trade opportunities for export to many OECD countries.

At present aquaculture in developing countries, besides shrimp and a few other notable exceptions (*e.g.* seaweed, oysters and mussels), is mainly subsistence farming of species with only local consumption value. Main species include carps and tilapia. The production systems also tend to be fairly simple. For example the most important farmed species in Asia, *i.e.* carps, is mostly raised in rice paddies as a supplement to the rice crop.

Also the shrimp culture can be fairly modest with regard to technology using mangroves and tidal changes as the basic element of the production system.

A particular difference between subsistence and commercial farming is the extent to which producers rely on feed compounds. Intensive commercial farming of high value species with a ready market in OECD countries (salmon, on-growing of tuna, and to some extent shrimp culture) relies on the availability of feed compounds that include fish. It is likely that the increased production, at least initially, will be for high valued species with immediate consumer acceptance. This will mirror the developments witnessed for salmon, turbot, eel, sea bream and sea bass species that all rely on feed compounds based on wild caught fish.

The availability of fishmeal and oil could be an important constraint on further production expansion insofar as these compounds are based on fish from capture fisheries. Once the technology has developed which make it possible to exclude fishmeal/oil from feed compounds this will no longer constitute a limitation. While work has been on going for at least two decades prospects for a complete elimination of fishmeal and oil are dim. It should also be kept in mind that fishmeal and oil are used in feed compounds for pigs and poultry and that, with increasing food demand in general, there will be an increasing competition for inputs.[6]

With these characteristics in mind the key issue for the present analysis is the extent to which fish farming can produce additional supplies in response to a change in trade policy instruments. In this regard it is of particular interest to understand the production response following provision of government financial transfers to the sector.

The Committee for Fisheries has not attempted to collect information on government financial transfers to the fish-farming sector on a systematic basis, as has been the case for capture fisheries (harvesting sector). In the *Transition to Responsible Fisheries: Economic and Policy Implications* information was only collected for government financial transfers to the marine capture fisheries sector.

However, information from the *Review of Fisheries* suggests that "Government policies in the aquaculture sector of OECD countries are generally directed at funding research (to develop new species for cultivation, to fight diseases and to reduce the environmental impact of aquaculture), and to a lesser extent to fund development of new facilities"[7].

It would thus seem that supply responses from aquaculture as a consequence of changes in policy instruments are possible but that they are likely to be medium to long-term in nature. Developing new species and aquaculture production systems are usually long-term proposals and it can take considerable time before commercial levels of production are reached. Furthermore it is recalled that farmed species developed for consumption within the OECD countries tend to be, initially, of high value and hence of limited quantitative impact. Once a market has been established markets can have considerable development potential. In this regard the species that are of importance include shrimps, salmon, mussels and oysters.

Nevertheless, and mirrored in the projections by the FAO and the OECD[8], the long-term perspective is one of considerable supply increase, with or without a change in trade policy instruments. In fact one may suggest that the key drivers in the future development of aquaculture reside in technological advances, access to site and access to capital rather than other factors external to the productions system.

When discussing the possibility of supply responses from aquaculture the Committee could address the following key questions:

- What is the magnitude of government financial transfers to aquaculture? And to what extend can these transfers shift supplies in the short-run?
- Do government policies (particularly with regard to environmental protection) effectively limit and manage output/production?
- What role for farming in developing countries and to what extent will production decisions in those countries be influenced by trade policy changes in OECD countries?
- Can trade policy instruments (*e.g.* HS coding, labelling) be used to segregate farmed products from wild caught fish? And what would such segregation of farmed vs. wild caught species imply for supply changes?

3. High Seas Fisheries (which are not subject to management regimes)[9]

The adoption of the 1982 UNCLOS confirmed that States have the right and freedom to fish the high seas without any regulations. However soon after its adoption fisheries on straddling stocks and highly migratory species became a cause of concern because of the impact of such fishing on the coastal states through whose waters the fish species migrate to feed or spawn. Coastal states domestic fishing interests were in danger of being diminished and resources could be further endangered by improvements in fishing techniques and gear technology.

Concern over the high seas fisheries and fisheries on straddling stocks was sufficient for an international agreement to be negotiated. The outcome was the Agreement for the implementation of the UNCLOS of 10 December 1982 relating to the conservation and management of straddling fish stocks and highly migratory fish stocks, which was adopted in 1995.

The purpose of the 1995 Agreement is to limit fisheries on fish stocks outside national 200 mile EEZ management sovereignty. The Agreement legally binds countries that have ratified it to conserve and manage high seas fisheries resources (see Box 3.A.2 for further particulars). The 1995 Agreement will enter into force once 30 countries have ratified it. By 31 January 2001 the agreement had received 27 ratifications.

Box 3.A.2 **The 1995 Agreement**

- Establishes the basis for the sustainable management and conservation of the world's fisheries;
- Addresses the problem of inadequate data on fish stocks;
- Provides for the establishment of quotas;
- Calls for the setting up of regional fishing organisations where none exist;
- Tackles problems caused by the persistence of unauthorised fishing;
- Sets out procedures for ensuring compliance with its provisions, including the right to board and inspect vessels belonging to other States; and
- Prescribes options for the compulsory and binding peaceful settlement of disputes between States.

Source: Earth Summit +5, 23-27 June 1997, "Backgrounder" from www.un.org

Whilst the high seas agreement may not have immediate effects in terms of limiting the high seas harvest and fisheries activities in general, an important new legal framework with a potential for restricting the supplies from this "free for all" resource has been created. Henceforth, an appropriate implementation of the Agreement can limit catch possibilities and supplies from the high seas.

FAO has estimated the high seas fisheries to be around 4 per cent (1995)[10] of the total catches although this figure is based on catches taken by vessels in the high seas in areas other than those adjacent to the EEZ of the flag state concerned. This figure corresponds to 3.6 million tons. However catches are concentrated on very few species (see Box 3.A.3). Most species taken on the high seas are intercepted migratory fish (*e.g.* tuna and swordfish), oceanic species of squid and octopus, and species (*e.g.* Alaska pollock, toothfish and other groundfish) in certain areas without territorial ownership (*e.g.* Doughnut hole, Smuthullet) where no state can claim full sovereignty based on existing international law. In addition, the estimated 3.6 million tons includes catches taken by vessels in areas of regional fisheries management bodies.

In the meantime most observers of high seas fisheries seem to concur that the high seas resources are largely over-exploited and that future catches are likely to diminish. In turn this would suggest that albeit considered a "free for all" resource the state of the stocks combined with the medium terms effects of actions taken to encompass management regimes for the most important high seas resources makes any significant positive supply responses form this area unlikely. By contrast, if additional effort is employed this could reduce supplies in line with the depletion of stocks although it should be recalled that the economic rationale for exploiting high seas resources is diminishing with over-exploitation.

Box 3.A.3 **The importance of distant water catches**

"In the course of the 23-year period the share of distant water catches has declined from 16% of the total in 1972 to 4% in 1995. There are several factors explaining this development, the extension of EEZs being the major one. In addition the contribution to this catch made by East European countries and the former Soviet Union has virtually disappeared, while that of other countries has remained stable, with the exception of Japan, where the distant water catch has declined. Over the last decade the share of tuna in the high seas catch has doubled both in volume to about 40% and in landed value to more than 80%. The result is that non-tuna species caught by distant water fishing fleets now account for less than 3% of world landings and only about 1% of total landed value.

It should be noted that landings of tuna are probably underreported. This is the evident conclusion from a comparison of the number of vessels carrying Flags of Convenience (FOC) and the quantities that the corresponding flag states report as distant water catches. Also, non-flagged vessels are unlikely to report their catches. And given the apparent rapid increase in the vessels carrying FOCs, and the existence of non-flagged vessels, this problem will grow."

Source: FAO Technical Working Group on the Management of Fishing Capacity, La Jolla, United States of America, 15-18 April 1998.

While flags-of-convenience (FOC) vessels will continue their high seas activities they will be more closely monitored and diplomatic and/or trade action will be taken. The extent to which these vessels are from OECD countries (for example established in FOC countries through foreign direct investments) may be a cause for concern and it would be interesting to have an estimate of the number of vessels flying FOC and owned by OECD nationals/capital. As noted above in Box 3.A.3. high seas fisheries has been on the decline, *inter alia*, as the number of long distance vessels (in particular from Japan and former Soviet Union) have decreased.

Furthermore, some States have taken action to deter IUU fishing operations. FAO reports (FAO document COFI/2001/7) that steps include the denial of port access to vessels known to have been engaged in IUU fishing operations and the closure of markets through the prohibition of landings where fish has been taken outside agreed regional conservation and management arrangements.

When discussing the supply response possibilities from high sea fishing activities the Committee could address the following questions:

- What is the potential for the 1995 Agreement to effectively manage/stop high seas fishing activities?
- To what extent are high sea resources over-fished? Are there under-exploited resources?
- What role will the FAO "International Plan of Action to prevent, deter and eliminate illegal, unreported and unregulated fishing" have with regard to addressing the high seas fisheries?
- Do high seas fisheries have spill over effects on fisheries within national EEZs if markets for high seas/straddling species (*e.g.* tuna) are further liberalised?

4. Fisheries Operating in Third Countries under Bilateral Access Agreements

Several OECD countries have bilateral fisheries agreements with third countries. For the purpose of the present analysis it is purposeful to distinguish two basic types of agreements:

- Reciprocal agreements that seek to regulate each party's fisheries for shared or migratory (between the two parties fishing zones) resources (*i.e.* joint-stock management), and
- Bilateral fisheries agreement or access agreements in third country fishing zones in return for financial compensation.

These two types of agreements are characteristic of most present day fisheries agreements. Compared to earlier studies by the Committee for Fisheries[11] the typology and "*raison d'être*" of these arrangements have changed over time. The most important (quantity wise) examples of the reciprocal fisheries agreements are the EU – Norway agreement on the North Sea and the USSR- Norwegian arrangement for fisheries in the Barents Sea. Whilst this type of agreement may be the most important ones, quantity wise, most of them will offer a limited possibility for changing the supplies. These are normally settled once a year based on negotiations between the parties involved based on biological advice.

Of particular interest for this study is the possibility bilateral fisheries agreements offer for increased supplies. Examples of the bilateral fisheries agreements are the EU agreement with several African countries (*e.g.* Senegal, Ivory Coast, and Mauritania). While

these arrangements are important for certain of the OECD fleets (in particular Spain and Japan have important bilateral fisheries arrangements that are important for their coastal regions) the quantities involved are limited. The exception to this general observation is the tuna fisheries most of which takes place outside the OECD area but by OECD vessels.

The basic tenet for a supply response under bilateral fisheries agreements is the possibility of buying additional access and/or quotas under an existing agreement and the negotiation of new agreements. If that is possible, then a supply increase may be forthcoming. To what extend this is possible will be determined by the agreement itself, the existence of under-exploited resources and whether the coastal state has an interest in selling access and quotas rather that exploiting the resource with domestic effort. In this regard this type of arrangement may be seen as a fishing service (typically by an OECD vessel with few other deployment possibilities) to fish the part of the available resource that is in excess to domestic catch capacity. For the coastal state the advantages of such an arrangement is to use the resource base in the economically (long-term) most appropriate way. This will be a trade off between domestic considerations (the value added of having domestic fleets fish) and the size of the financial compensation provided by the access seeking fleet.

In principle, the equilibrium between domestic and foreign fleet will be determined by the marginal costs of fishing in the respective fleets and assuming that the vessels owners are paying the compensation. However the empirical evidence[12] suggests that many countries are contributing towards their fleets access (and the fees that the vessels owners pay) with financial compensations paid state to state. Such compensations distort the "price signals" for access payments/fees and can lead to excess capacity being (re) deployed. As such these arrangements may provide additional supplies of fish.

5. Under-exploited Fisheries with Development Potential

Perhaps the single most important area for analysis with regard to a possible future supply potential remains the effect of developing under-exploited fisheries and the introduction of appropriate management regimes in OECD countries. OECD reports *(OECD Environmental Outlook*) that the world capture fishery production, under present conditions, is expected to remain fairly stable to 2020 at present day levels of 90-100 million tons whereas any production increases is likely to come from aquaculture (see above).

In its work on "*Transition to Responsible Fisheries*" the Committee noted that "The current situation, however, may be reversible. Recent work by the FAO has estimated that marine fisheries production could potentially reach 125 million tons – a 40 million tonne increase on the 1990-94 average of 83 million tons. These increases in landings are estimated to be due to better management (+8 million tonnes) and from developing fisheries (+35 million tonnes). On a global level substantial increases in landings can be achieved through better management and development of fisheries." (pp. 189).

Also the FAO predicted in 1997 (see Box 3.A.4) that world landings from marine fisheries could increase, even substantially, if resources were used better and an effort to improve the management of fish stocks were introduced.

Hence the introduction of appropriate management measures and the development of under-exploited resources may lead to a supply response. A change in trade policy instrument could bring about changes in relative prices for fish and fish products and/or could change consumer preferences (*e.g.* labelling). Hence fishing on given fish species

Box 3.A.4 **The future of fisheries?**

"In conclusion, while it must be recognised that the statistical significance of most of the analysis described here is insufficient, the elements of information available indicate that an increase in fisheries production of at least 10 million tonnes is possible plus further increases in landings of an unknown magnitude obtained from fisheries development as well as from mariculture. FAO in 1995 indicated that an additional 20 million tonnes more of landings might be obtainable. The results of the present study provide a firmer basis for believing that such an increase can be realised if: (a) degraded resources are rehabilitated, (b) under-developed resources are exploited further, avoiding, however, their overfishing and avoiding the overfishing, of those resources which have already reached the highest level of sustainable exploitation they can with stand, and (c) discarding and wastage are reduced."

Source: FAO Fisheries Circular No. 920 FIRM/C920 "Review of the State of World Fishery Resources: Marine Resources", Rome, 1997

and/or stock could be moved to another fish species/stock induced by a change in trade policy instrument.

Short-term supply responses may also happen; many OECD fisheries are managed with quantitative limitations but catch quotas may not always be fully exhausted. For example, for species under quota management in the Danish fishery, in 2000, the average quota utilisation was 67 % *i.e.* of the 2 046 600 tons available only 1 371 222 tons were taken. A number of reasons may be put forward for this situation including biological, political and economic[13].

Table 3.A.1. **Quota exhaustion in Danish fisheries 1995-2000**
(%)

	1995	1996	1997	1998	1999	2000
Fish for reduction	127	101	117	64	55	63
Fish for human consumption	87	91	85	84	81	86
Total use	103	95	100	68	60	67

Assuming that quotas are set with due regard to biological advice and that fishers are showing rational economic behaviour the main reason for not exhausting quotas fully will be that it is not economically viable to do so. This is substantiated by more detailed catch statistics/quota utilisation by Danish fishers. These show (Table 3.A.1) that quota utilisation falls with distance (fishing quotas in waters further away from home are used less heavily) and by the value of the fish (quotas for higher valued fish are more fully utilised). Hence a change in price, induced for example through a change in market policy instrument may in such cases be offset by a supply response.

It would be useful with a more comprehensive picture and in this regard Member countries could report on quota use (annual average would suffice) in the Review of Fisheries. By the same token it may be useful to explore in more detail fisher behaviour in fisheries managed by other systems than TACs.

Most fisheries (at least the EU and Japan) are "multi-species" in that fishers are targeting a number of different species in their fishing activity. Also certain fishing methods (*e.g.* trawl fishery) cannot be targeted towards a single species and most fishers, if possible, will change fishing target with season. Insofar as supply responses are concerned the interesting feature about multi-species fisheries is that fishers can to a certain extent target particular species according to demand. Hence the price signals can be an important driver for fishers to target particular species.

Within limits (biology, season, quotas) a rational fisher may have some room for manoeuvre in terms of changing fish target from one species to another. Insofar as this is possible, and assuming there is a demand for the catch, changes in policy instruments may give rise to a changing variety of fish species. The decision to re-rig fishing vessels (if different gear is required) to target other species will very much depend on the perceived benefits by the fishers to do so compared to the known costs of moving to different technology/fishing grounds etc. Hence, there may be some room for supply responses and supply shifts within multi-species fisheries[14].

6. Summing Up and Some Final Observations

The main purpose of the work on the analytical classification is to improve the understanding of when, and under which circumstances, a change in trade policy instruments may give rise to trade and/or resource impacts. As highlighted in the version of the Analytical Classification which the Committee considered in March 2001, the Committee initially requested an analytical classification before moving into step 3 (identify qualitative linkages) and 4 (analyse qualitative impacts). However, in large part because of Professor Hannesson's work, it has been possible to advance on an analytical classification that concurrently identifies linkages and addresses impacts.

When discussing the first draft in March 2001 the Committee singled out four areas to be further investigated. These areas were aquaculture, high seas fisheries, fisheries under bilateral fisheries agreements and under exploited fisheries with development potential. Recognising that the supply response is a critical dimension of an analytical classification, these areas were singled out by the Committee in the belief that it was here that a potential for a supply responses exist and thus would be of interest for trade/resource impact analysis. In this regard it is recalled that the traditional OECD fisheries situation of largely well managed fisheries where the total take from the resource is capped/limited (*e.g.* to a TAC), market liberalisation was found to have no effect on supplies (Hannesson).

This chapter has endeavoured to throw some additional light on the four areas that the Committee singled out, and have in addition looked at the issues associated with multi-species fisheries. In addition the work has included some empirical evidence to allow the Committee to measure the extent to which potential supplies exist.

The most important observation is that each of the four areas that has been subject to further investigation clearly can give rise to supply responses as a result of a change in trade policy instrument. As such there is a link between the trade policy instrument and the outcome in terms of a change in supplies and hence an impact on both trade and on resources.

The principal observations of this paper for each of the areas are:

- *Aquaculture* is a sector apart and is reminiscent of agriculture production systems. Discussions on further market liberalisation for aquaculture products could therefore parallel those in agriculture products. One issue not taken into the above analysis has been the spill over effects between aquaculture and capture fisheries. While many OECD countries regulate aquaculture it is still an area that is considered to have a big growth potential. Nevertheless supply responses are considered to be of longer-term nature. Because of supply response potential market liberalisation can have an impact and particular attention should be given to the use of subsidies to the sector. However one practical issue is how traders can distinguish between wild and aquaculture products.
- The amount of fish involved in *high seas fisheries* is marginal. Most Member countries fishing fleets cannot operate under domestic flag in high seas area outside domestic control and will therefore have to re-flag to engage in such fishing operations. In addition to the FAO International Plan of Action to prevent, deter and eliminate IUU fishing it may be useful to discuss if trade measures (market access) and foreign direct investments rules can be used as a supplementary deterrent. Also, their number and the powers of regional fisheries management bodies (areas and species covered) are increasing. The extension of their natural spheres of interest ("creeping jurisdiction") may ultimately make it away with high seas fisheries operations.
- Fisheries under *bilateral access agreements* seems to be an area that may have an important supply change potential. Most bilateral fisheries arrangements are entered into between states often with the use of government financial transfers and the basis for these arrangements in terms of price signals is thus distorted as the beneficiary vessels are not charged the full costs. The extent to which such arrangement have supply impacts will largely depend on the receiving states resource situation (fishing below, at or above MSY) and ability to effectively control the take from the fisheries within its jurisdiction. An additional, but important issue for most developing countries, is their knowledge about the state of their resources; in this regard financial compensation is positive if used for science capacity building.
- *Under exploited fisheries with development potential* and fisheries in which quotas are not fully used are shown to have a potential large supply response impact. The discussion above and the example, although limited to one country shows that even in TAC managed fisheries there is room for slack. To some extent this is a refinement of the analysis by Professor Hannesson. Whereas most fisheries in the OECD area are characterised by a limit on output (*e.g.* TAC management) some fisheries could produce additional output if managed in a more responsible and sustainable manner. This has been the subject of the "*Transition to Responsible Fisheries*" but an important additional step could be to estimate the amount of extra fish that could be produced through improvements in management. Leading to an increase in supplies, improved management regimes could have an influence on trade and trade flows. Although outside the scope of the Market Liberalisation Study the Committee may wish to consider these issues in a later Programme of Work.

It is recalled that the main conclusion from the work by Professor Hannesson paper was that when fisheries are managed and output is limited by a TAC (or similar limitation on the quantities that can be harvested), which is characteristic for most domestic OECD fisheries, a change in policy instruments outside the fisheries management instrument

will not lead to supply changes. As suggested in this paper the analysis leads us to believe that, in some cases, while the overall level of supplies may not change the composition of the supplies (fish species and origin) could change.

However the empirical evidence provided give rise to some additional reflection. While the evidence is insufficient to provide an estimate of the importance of the size of the impact (a modelling exercise is needed for such a figure, see point 5 and 6 of the stages that the Committee decided for this Study), at least, it may be used to prioritise between the areas of concern. In this regard it seems that two areas need some more study *i.e.* fisheries under bilateral arrangements and fisheries with development potential. A special study on the case of bilateral fisheries arrangements and fisheries under regional fisheries management bodies is under development. That study should allow further details and discussion on the possibilities for supply responses in these areas. As for under-developed fisheries with development potential the Committee may wish to study this in more detail in a later Program of Work. Such work could also be a natural extension to the "*Transition to Responsible Fisheries*" insofar the additional study area would concentrate on how to implement, in practice, the need to move to more sustainable fisheries situation.

Notes

1. This assumes that the operators in the harvesting sector are price takers in the world market and cannot individually (or in concert) use any advantage conferred by the policy instrument (such as a financial transfer) to change prices. Rather, any additional advantage from a policy instrument will in all likelihood be translated into increased effort or changes in input prices faced by the harvesting industry.
2. For ease there are three types of supply curves that are interesting to consider:
   - increasing supply curve, as in the case of aquaculture
   - backward bending supply curve, as is the case in open access fisheries
   - vertical supply curve, as for example under a quantitative limited fishery (TAC)
3. That is, excluding fisheries managed by regional fisheries management organisations.
4. For a recent authoritative discussion of the issues associated with aquaculture see GESAMP Report No 70 "A Sea of Troubles", GESAMP, January 2001 which includes the following quote "….badly managed aquaculture has destroyed key habitats like mangrove forests and has allowed selectively bred fish to escape to open waters and interbreed with their wild relatives, with unknown consequences".
5. Source: United States Foreign Agricultural Service, GAIN Report #NO0005
6. For an authoritative discussion of the links between wild caught fish and aquaculture see "On the relationship between aquaculture and reduction fisheries" by Frank Asche and Sigbjorn Tveteraas, Norwegian School of Economic sand Business Administration. Paper presented to the Tenth Biennial Conference of the International Institute of Fisheries Economics and Trade, 10-15 July 2000 in Corvallis, Oregon.
7. *Review of Fisheries in OECD Countries Vol. 1: Policies and Summary Statistics*, OECD, 2000
8. OECD *Environmental Outlook* (OECD, 2001)
9. This excludes fisheries managed by regional fisheries management organisations.
10. See Report of the Technical Working Group on the Management of Fishing Capacity, La Jolla, April 1998, available at *www.fao.org*
11. The Committee for Fisheries analysed bilateral fisheries agreements in "*Fisheries Issues: Trade and Access to Resources*" (OECD, 1989). In that analysis six categories of bilateral agreements were suggested. In addition to the two suggested for the purpose of the present analysis the 1989 work included neighbouring state agreements, agreements providing access to resources in return for access to markets, transitional agreements and bilateral interception agreements.
12. See for example the *Review of Fisheries* and the *Transition to Responsible Fisheries*.

13. In "Beregningsgrundlag for indtjeningen i det danske fiskeri: Arbejdspapir til 'konjunkturrapport' for dansk fiskeri 2000" by Jesper Levring Andersen, Statens Jordbrugs- og Fiskeriøkonomiske Institut, Afdeling for Fiskeriøkonomi og -forvaltning, and available on *www.sjfi.dk* a number of these reasons are further explored.

14. In 2001 Danish fishermen are reported to have shifted to fish for haddock and saithe (to compensate for low cod quotas) and that this had major price impacts (–25 % for haddock/saithe and +14 % for cod).

B. Effects of Liberalising trade in Fish, Fishing Services and Investment in Fishing Vessels[1]

1. Introduction

Since the Second World War, a major liberalisation of international markets has taken place. This has encompassed both investment and trade in goods and services, although all economic sectors have not been affected in equal measure. Agriculture has been a major exception. While this sector has not been entirely unaffected by trade liberalisation, it has been much less thorough for this sector than for most other, and possibly all other, sectors.

Often, perhaps in most cases, the fisheries are lumped together with the agricultural sector. One reason is undoubtedly that in both cases we are dealing with the production of food, and arguments relating to food security issues therefore also extend to the fisheries. Another related reason is that the fisheries sector is usually much smaller than the agricultural sector and too small to justify being administered separately from agriculture. Hence, agricultural policies often extend to the fisheries sector by default. This affinity with agriculture is probably one reason why the liberalisation of trade has been less than complete in the fisheries sector.

Nevertheless, trade barriers are generally lower for fish trade than for trade in agricultural products. Tariffs are lower and import quotas more liberal. International trade in fish products is lively; fish is probably the most widely traded of all commodities, relatively speaking. This applies to trade in fish, both fresh fish and processed products. The picture is quite different when it comes to trade in fishing services, fishing rights and investment in fishing vessels. An outright ban on international trade in these areas is more typical than freedom to trade.

In this paper we consider the effects of reducing barriers to trade. "Barriers to trade" is a very comprehensive subject; trade can be hindered by many different means. Sometimes this is done deliberately while at other times trade may be impeded by unintended side effects of measures implemented for a quite different purpose. In an ongoing study being conducted by the OECD Committee on Fisheries the trade barriers addressed include:

- tariff measures;
- non-tariff measures such as quantitative restrictions, anti-dumping duties, and price controls;
- government financial transfers;
- sanitary requirements that differ across countries;
- access to ports;
- regulations of foreign investment;
- regulations of trade in fishing services.

In this section, we will consider all of these except sanitary requirements. We do not distinguish, however, between the first two, as any quantitative restriction can be shown to be equivalent to a tariff. Both may therefore, from the point of view of trade liberalisation, be treated as removals of barriers that open up or increase trade between two countries and raise the price of fish in the exporting country while lowering it in the importing country.

As it will turn out, the effects of relaxing trade barriers such as tariffs and quantitative restrictions depend crucially on what kind of management regime is applied in the countries affected. We therefore begin with identifying three stylised management regimes which we believe to be typical of regimes in OECD countries and elsewhere. Having done so, we move on to discuss the effects of lowering tariffs or relaxing quantitative restrictions on a fish exporting and a fish importing country and how these effects depend on the management regime applied. This discussion is also interesting from the point of view of resource sustainability, an issue which of late has been getting more and more attention. Not surprisingly, the effects on sustainability of removing these trade barriers depend critically on the management regime applied.

Fish is traded in many forms; fresh or processed in various ways. More often than not, trade barriers are applied differently to different products. Removing tariffs or quantitative restrictions on one particular product will not only affect trade in that product but also have repercussions for other products, because the supply of raw fish typically cannot be expanded to accommodate increased demand for a product for which trade barriers have been relaxed. When the total catch is controlled, an increased demand for a product the tariff of which has been lowered will have to be met at the expense of other products derived from the given total supply of raw fish.[2] Under open access the relaxation of tariffs or quantitative restrictions on one particular product will affect the supply of raw fish through an improved profitability of fishing. The immediate effect will be to increase the total supply of raw fish, but in the long run the supply may either increase or decrease, depending on how intensively the fish stock was exploited prior to relaxing the trade barriers.

How the effect of relaxing trade barriers on the profitability of fishing will be transmitted depends on the market for raw fish; in an auction market the relaxation of a trade barrier would raise the price of raw fish, as the demand for raw fish is derived from the demand for finished products. Under other market forms, such as a vertically integrated company structure, the effect would not be transmitted through market prices but would nevertheless be likely to be similar, because the relaxation of the trade barrier would make raw fish more valuable. The direction of the effect on the supply of raw fish would again depend on the management regime applied.

Next we consider subsidies. By subsidies we mean direct financial transfers by governments, recognising that trade barriers such as tariffs and quantitative restrictions result in indirect subsidies while not being direct financial transfers. Subsidies are not an explicit barrier to trade but they typically distort trade. Since the effects of subsidies also depend critically on the management regime applied it is in many ways appropriate to consider them together with trade barriers.

Finally, we consider the effects of liberalisation of investment in fishing vessels and trade in fishing services. These problems have not been much discussed in the literature

on fish trade. Also here the effects depend on the fisheries management regimes involved. The paper concludes with a section summarising its main results.

2. Management Regimes

The consequences of trade liberalisation depend critically on what kind of management regime is applied in the fishing industry in the country of study. Needless to say, fisheries management regimes can differ in many different ways. At this level of abstraction it appears fruitful to distinguish between three major types of regimes which may be termed **open access**, **catch control**, and **effective management**. These are characterised as follows.

Under **open access** there is no control of the fishery, neither of the quantity of fish caught nor fishing effort. Individual fishermen or fishing firms can enter or leave the industry as they desire without having to acquire a license (except as a pure formality) or pay an entry fee in any form. Entry and exit will be determined according to whether fishing is more or less rewarding than what people could do otherwise. It is well known, both from theory and experience, that this results in an economic overexploitation of the fish resources, in the sense that the value that the marginal fisherman or fishing firm contributes to the economy in the long term is less than if he or the firm were engaged in an alternative occupation. The overexploitation could easily be so serious that the long term yield from a fish stock would be less than it could be. The reason for the overexploitation under open access is that fish stocks are scarce resources but yet available free of charge for the individual fisherman or firm. As is well known, if there is no charge for a scarce resource it will be overused; efficient outcomes in market economies depend on all resources being available only at prices that correctly reflect their scarcities.

Open access is probably no longer very representative in OECD countries. Various regulations of catches and fishing activities have gradually become established, particularly after the 200 mile zone came into force in the 1970s. In other countries open access is still not uncommon, particularly in areas where the 200 mile zone has not yet been established or is disputed and where the internal administration is weak, in particular the monitoring, enforcement and surveillance of fisheries regulations. Partly for this reason, and partly for serving as a benchmark, it is useful to look at the implications of open access. But even if open access does not exist in a strict sense it must be kept in mind that fisheries regulations are always imperfect, and despite formal regulations the ultimate result may come fairly close to an open access situation if the regulations are weak or weakly enforced.

With **catch control** the total amount caught from a stock of fish is controlled, either directly through a limit on the total catch or indirectly through limitations on the activities of the fishing vessels. In this regime there is still open access, however, in the sense that anyone can participate in the fishery, provided he or she satisfies requirements pertaining to country of residence, etc. Under this regime the biological overexploitation of the fish stocks can be avoided by setting the total catch limit appropriately. Economically little or nothing is gained, however. The marginal fisherman or fishing firm still contribute much less to the economy than they would in an alternative occupation, not because they reduce the productivity of the fish stocks but because each takes fish that somebody else could catch. This leads to unnecessarily large fishing fleets and high costs of fishing and erodes what otherwise would emerge as rent in the fishing industry.

The real world regime that best corresponds to the catch control regime is the so-called "Olympic" fishery where fishing is stopped after the total allowed catch has been taken (*e.g.* the Alaska halibut fishery before the individual fish quotas were implemented). More boats and fishermen than are needed are attracted to this type of fishery, because the individual fisherman or fishing firm may still find participation in the fishery more rewarding than doing something else, even while making a negligible contribution to the net value generated in the fishery. Fisheries where the control over the fishing fleet is lax or ineffective while the total catch is firmly controlled would come close to this type of regime.

Under **effective management** the amount caught from each fish stock is set at an economically optimal level, and the costs to take it are minimised. One could think of a fishery conducted by a single company for its own profit, but there are few if any real world examples of that. A practical example would be a regime where there is a total limit on the fish catch set by a government agency and where the industry has incentives to minimise the cost for taking that catch and to maximise the value derived from it. While it may be a tall order to expect government agencies to set economically optimal targets for fish catches it is not unrealistic to think of them as safeguarding the long term productivity of fish stocks through setting (and enforcing) limits on the total catch. For this regime to be economically efficient it is necessary that the industry be given a framework within which it may achieve maximum value added from the total allowed catch. A management system based on individual transferable quotas will help in achieving this; it will give the holders of quotas incentives to maximise the value of a quota and to minimise the cost of taking it. Under a regime like that the fish stock acquires a price in the form of a market price of a quota, as any outsider will have to buy his way into the industry by buying or renting quota. Even to remain in the industry will carry an opportunity cost, *i.e.* the value of a quota that could otherwise be rented or sold. Transferable boat licenses (concessions) may work in a way similar to individual transferable quotas, with the scarcity value of the fish stocks being reflected in the value of a fishing license, or the value of a boat with a license in excess of its value merely as a fishing vessel.

Most fisheries in OECD countries probably fall between the types effective management and catch control.[3] Over time there has clearly been a movement in many countries from catch control towards effective management, as more and more restrictions have been put on entering particular fisheries, for example by having to buy one's way in through buying and scrapping somebody else's licensed boat. Nevertheless, most countries probably are closer to catch control than effective management, although a few have come fairly close to effective management. The attributes of the three typical management regimes are summarised in Table 3.B.1.

Various measures often referred to as "technical measures" land us on either side of the stylised catch control regime. Among such measures are regulations of fishing effort through days at sea or restrictions on the use of fishing gear. In some cases at least these measures are used for indirectly controlling the total catch, when direct control of the latter is difficult. In a case like that we would be somewhere between open access and catch control, and how close we would be to open access would depend on how effectively the catch would be limited. In other cases we have various technical measures limiting the size, design or the number of fishing vessels, besides direct control of the total catch. This is likely to result in some limitation on investment in fishing vessels, as presumably is also the purpose. In a case like that we would be somewhere between catch control and optimal

Table 3.B.1. **Attributes of three stylised management regimes**

	Open access	Catch control	Effective management
Catch level	Outcome of competition among firms ignoring fish resource constraints	Limit set by management authority	Limit set by management authority
No. of vessels	Same as above	Outcome of competition for a maximum share of a given catch	Limited by cost minimisation of industry firms or by management authority
Other capacity elements (gear, technology, etc.)	Same as above	Same as above	Limited by cost minimisation by fishing companies. Can be partially limited by management authority.

management, but how close we would be to optimal management would depend on how well designed these rules are and how effectively they are enforced. Needless to say, in the real world we are dealing with a large variety of management programs but it seems to us to be a virtue in discussing only a few stylised types of these, to bring their effects better into focus.

3. Fishery Dynamics under Open Access

Much of the following discussion is concerned with long term effects. Some of these effects may be counterintuitive, particularly under an open access regime. It is helpful, therefore, to give a short description of the evolution of an open access fishery over time.

Fish stocks are renewable resources. It is possible to utilise a fish stock indefinitely by catching only the surplus production of the stock. The surplus production is the growth of the biomass of the stock in excess of what is needed to replace the biomass that disappears through natural death. In a natural equilibrium without fishing there would not be any surplus production; the annual growth would just replace the losses due to natural death. Fishing from a stock in natural equilibrium means that more biomass is being removed from the stock than is replaced by the growth of the stock, and the stock will diminish. This depletion process will come to a halt, however, provided that a smaller stock is more productive than a stock in natural equilibrium. This can happen for a number of reasons; a smaller stock means less competition for food, so each individual fish will grow faster and it also means a relatively younger stock where the "typical" fish grows faster than the "typical" fish in a population with more old, slow growing fish. There may also be less predation on young fish by old fish, because there are less of the latter around. In any event, the fishery will end up in a new equilibrium where the amount caught corresponds to the surplus growth. In this new equilibrium the stock will be smaller than in the natural equilibrium, but it will be more productive, and it could sustain the fishery indefinitely as long as the amount caught does not exceed the surplus growth.

Things could, however, go wrong. It is possible that the fishing activity expands to such an extent that it exceeds the maximum surplus production of the fish stock. If that happens the stock is doomed to extinction. Some fish stocks have become extinct, at least in a commercial sense, and some have been virtually extinct for a while and then recovered. Without adequate fisheries management there is nothing that prevents extinction of a stock except the fortuitous circumstance that it will not be profitable to expand fishing to the point where it exceeds the surplus production. In most cases this seems to be true for fish, but for terrestrial animals the picture is more bleak, as

exemplified by animals such as the American buffalo, the kiwi bird, and the great auk, which were hunted to extinction or nearly so more than a century ago.

Now consider a fishery that has become stabilised in an equilibrium. Under open access the fishing activity is pushed to the limit where the value of the catch of the least profitable fisherman or fishing firm, net of all costs, is equal to what the fisherman or the firm could earn, again net of all costs, in the next best occupation. Note that this value could be positive while the net value that this marginal fisherman or firm contributes to the fishery as whole is negative in the long term. This can happen because each fisherman or fishing firm has an adverse effect on the fish stock, soon to be described which causes the catch value of all fishermen or fishing firms to decline. This decline has to be subtracted before we get the net contribution of the individual fisherman or fishing firm, but needless to say this effect does not show up in the individual fisherman's or the single firm's profit or loss account, so the fisherman or the firm has no incentive to take it into account.

Then suppose that some "disturbance" occurs in a fishery that has reached a long term equilibrium. Suppose that the price of fish rises or the costs of fishing fall. This will make the fishery more profitable. Existing fishermen and firms will expand their fishing effort, and more people or firms might find it worthwhile to establish themselves in the fishing industry. The catches of fish will increase and exceed the surplus production of the stock. The stock will start to diminish, and it will be spared from going extinct only if a new equilibrium is attained where the surplus production is again equal to the catch. It is possible that the now smaller stock is capable of producing a larger surplus growth. In that case we have a greater fishing effort providing more fish, as would correspond to what ordinarily happens in other industries as a result of improved profitability and expansion of effort. But it is also possible that the new equilibrium will mean a smaller surplus production and a lower catch, despite the fact that there are more boats around and more people employed in the fishing industry. This is what some people who are not very familiar with the fishing industry sometimes find counterintuitive, but it is in fact readily explained. What happens is that the fish become more difficult to catch when the stock gets smaller; the catch per boat typically falls as the fish stock is depleted. There are some cases where the fishing technology is such that this effect is not very strong. In such cases, the risk of stocks going extinct because of intensive fishing is particularly high.

So, in brief, the fishery dynamics under open access work like this. As a fishery becomes more profitable and fishing effort rises, the catch of fish increases. Gradually, however, the catch falls again as the fish stock is diminished and stabilises at a new level when the stock has reached a new equilibrium. The time this takes varies inversely with the growth rate of the stock; in temperate waters it would normally take several years. The new level at which the catch stabilises may well be lower than the level from which it started. In that case the long term effect of a rise in profitability and fishing effort is a fall in the long term catch.

The scenario which has just been described is most directly applicable for a fish stock the growth of which depends only on the size of the stock itself. The fish stocks of the real world are not like that. The growth of a fish stock is affected by effects which are only imperfectly understood and therefore often called "stochastic". The growth of a fish stock of any given size can be quite variable from one year to another, depending on the availability of food, whether there are many predators around, and whether there is good

recruitment of young fish to the stock. These effects often make it difficult to detect the long term effects of expanding fishing effort. If fishing effort expands in a period of advantageous environmental effects (good availability of food, few predators, good recruitment) it may for a long time look as if the increased effort has resulted in a greater catch of fish even if the long term effect is in fact negative. This environmental effect, and the fact that all we know about fish stocks is highly uncertain, is one reason why fisheries management issues are controversial.

4. Effects of Removing Barriers to Trade

A barrier to trade means that Country A sells less fish to Country B than it would otherwise do, or gets a lower price for its fish, or both. Import quotas would be an example of the first while tariffs would typically have both consequences; *i.e.* depress the price for the exporting country and probably reduce the quantity exported as well. Below we consider the effects of removing trade barriers for the fish importing and the fish exporting country and how these effects depend on the fisheries management regime in both countries.

The removal or lowering of trade barriers means that the price of fish must rise in the fish exporting country and fall in the fish importing country, so what we need to look at are the adjustments in each country to these price changes. Note that this happens even in the case where the trade barrier is a quota or some other quantitative restriction. Removing such restrictions means that less fish will be available for the consumers in the fish exporting country, which raises the domestic price in that country. The price abroad has to be higher than in the fish exporting country for any establishment of or increase in trade to occur, even if, after a new equilibrium has been reached, prices will be the same (adjusted for transportation and transactions costs) in both countries.

Prohibition of direct landing of fish from foreign vessels is one trade barrier which has attracted attention. This has two effects. First, it makes fish more expensive, as it increases the transportation and perhaps processing costs of fish, in case the prohibition is an effective barrier. Second, it may affect different products differently, as the fish may have to be turned into a different final product if landed elsewhere (the fish might be barred from the consumer market for fresh fish because of having to be hauled over a longer distance). The effects on removing trade barriers for different products will be considered later in the paper.

The effects of removing barriers to trade under the three regimes, open access, catch control, and effective management, are discussed formally in a specific bioeconomic model in a separate Appendix to this paper. Below we discuss these effects in a non-technical language. We look at the effects of removing barriers to trade on the country removing the barriers, labelled the "fish importing country", and a country whose exports have been made easier by the removal of trade barriers, labelled the "fish exporting country". We do this for alternative management regimes in each country, but it should be noted that the management regime need not be the same in both; we think of the two countries as exploiting their own fish resources, to which they can apply their own form of management as they see fit or no management at all.

The fish exporting country

Open access

A higher price of fish will make fishing more profitable and attract more labour and capital into the fishing industry. This will increase the overexploitation of the country's fish stocks. The catch of fish may increase or decrease in the long term, depending on whether the fish stocks were exploited beyond the maximum sustainable yield level prior to the relaxing of the trade barriers, but the exports of fish will increase. Over time, however, the gains from trade for the fish exporting country will be eroded and possibly outweighed by the loss due to overexploitation of its fish stocks. It is quite conceivable that the country will end up worse off than before the barriers to trade were relaxed; the bioeconomic specifications needed to get that type of result in a formal model are by no means unrealistic (Brander and Taylor [1997a, 1997b, 1998] and Hannesson [2000]). What happens is that the country ties up (and hence wastes) so much of its productive resources in the fishing industry that it ends up having less of both fish and other goods than before.

Catch control

In this case the higher price of fish will not lead to a further decimation of the fish stock, which by assumption is kept under adequate control. But the increased price will increase the profitability of the industry and attract more fishermen and fishing boats. Fishing seasons will become shorter; what happens is that a given catch is being taken at a higher cost (*i.e.* the combined costs of all fishermen and fleets). The gains from trade will again be eroded, not by depletion of fish stocks this time but by excessive use of manpower and capital in the fishing industry, which could be used more gainfully elsewhere. In other words, the increase in unit values of fish in the market will lead to higher unit costs and as a result the net effect on profits in the industry will be small or zero. The society as a whole, however, will lose for the same reasons as highlighted in the open access case.

Effective management

In this case the rise in the price of fish does not attract labour and capital unnecessarily into the fishing industry. A higher price of fish may lead to a higher allowed catch; the optimal catch is at the point where the long term marginal cost is equal to the price of fish, which would ordinarily imply a catch somewhat lower than the maximum sustainable yield, and a higher price of fish would make it worthwhile to push the catch somewhat closer to the maximum sustainable yield. But even if the total catch is set at some suboptimal level, the industry has incentives to minimise the cost of taking the allowed catch and would not increase its fishing effort except as necessary to take a larger total catch, in case the latter is raised. The profitability of the industry would be increased, and this would be reflected in a higher rent in the industry, *i.e.* a higher market price of quotas or fishing licenses. The fish exporting country would in this case almost certainly gain from relaxing barriers to trade.[4]

The fish importing country

Open access

The effect in this case mirrors the effect on the fish exporting country. A lower price of fish leads to less overexploitation of the fish stocks in the country. The country thus gets a double dividend; it gains from getting more fish at a lower price, and from less resources

being tied up in the fishing industry. Labour and manpower will be diverted from fishing to other uses, increasing the production of other goods and lessening the overexploitation of the fish stocks.[5]

Catch control

The effect here mirrors what happens in the fish exporting country. A lower price of fish has no effect on the total catch, which by assumption is kept under control, unless it falls so far as to make the previously profitable catch level unprofitable. But a lower price of fish makes the fishing industry less profitable and leads to disinvestment in boats and gear in the industry. Labour and capital will flow from the fishing industry to other industries and increase the production of other goods. Also here the country gets a double dividend; it gets more fish at a lower price and more of other goods through less waste in the fishing industry. The country's fish stocks will not be affected, however, as long as the catch control is effective.

Effective management

A lower price of fish will first and foremost reduce the rent in the fishing industry. The catch is by assumption optimally controlled by a government agency, and it is possible that a lower price of fish will also mean a lower optimal allowable catch. Fishing effort will not change except if the allowed catch is reduced but the lower price of fish will mean less profitability in fishing, which will be reflected in lower market prices of fish quotas or fishing licenses. There will be no double dividend in this case; the country will gain by importing more fish in exchange for other goods it produces. Some restructuring of the fishing industry will occur in case the total allowed catch decreases, just as happens ordinarily when trade barriers are lowered and international competition leads to the expansion of some industries and contraction of others.

Summary

Summing up, we have seen that the management regime can be critical for the effects of relaxing barriers to fish trade. This would ordinarily be expected to bring gain to both parties, as is the classical result in the theory of international trade, and perhaps particularly to those countries which have a comparative advantage in fish production. But if the management of the fishery is lax or non-existent the result is the opposite; a country with a comparative advantage in fishing will not gain much and may quite possibly lose from an increased trade in fish. With lax or non-existent fisheries management it is the fish importing country that stands to gain most from trade; not only will it get the classical gains from trade implicit in comparative advantage but the wastefulness of its own fishing industry will be ameliorated. The effects are summarised in Table 3.B.2.

Another conclusion we can draw is that there is less difference than one might think between open access and catch control with no restrictions on investment in fishing vessels and gear. In both cases the fish exporting country will gain little and perhaps lose while the fish importing country will gain all the more. The only difference is that the wastefulness which under open access manifests itself in depleted fish stocks and excessive use of capital and manpower only leads to excessive use of capital and manpower under catch control, the fish stocks are spared. Both regimes are equally detrimental, however, from the point of view of economic efficiency because both attract capital and labour at the expense of other industries where they would be better used. This

Table 3.B.2. **Effects of relaxing trade barriers**

Regime	Fish exporting country			Fish importing country		
	Open access	Catch control	Effective management	Open access	Catch control	Effective management
Short term effects	Increased effort, larger catches, more trade, gains from trade	Increased effort, no change in catch, higher profits, gains from trade	No change in effort unless higher allowed catch, gains from trade, higher market value of quotas and licenses	Lower effort, smaller catches, more trade, gains from trade	Lower effort, no change in catch, lower profits, gains from trade	No change in effort unless smaller allowed catch, gains from trade, lower market value of quotas and licenses
Long term effects	Fish stocks decline, catch may decline, possibly loss from trade	Increased investment in fishing boats, no change in catch, small gains from trade	Same as above	Fish stocks recover, catch may increase, "double dividend" from trade	Reduction of fishing fleets, no change in catch, "double dividend" from trade	Same as above

is important to keep in mind, because many fisheries management regimes do not amount to much more than catch control and have economic consequences that are very similar to open access even if they formally look very different from open access.[6]

Some further considerations

A word of caution is in place with respect to the way the catch control and the effective management regimes have been characterised. The total allowed catch has been assumed either not to be affected at all by a higher price of fish, or to be adjusted upwards as warranted by the higher prices. Reality is likely to be less clear cut. A higher price of fish may lead to an increased political pressure from the industry to increase the total allowed catch, which after all is decided in political *fora*. This is particularly likely to occur under the catch control regime where there is open access to the industry if not to the fish stocks. This makes the difference between the open access and the catch control regimes even less than has been argued above. By contrast, under effective management it is less likely that the industry will press for higher than optimal allowed catch as a result of a higher price of fish. Under effective management the industry participants have a stake in the health of the fish stocks in the sense that the market value of their quotas or fishing licenses depends on the health of the stocks. They are therefore likely to exert pressure on the management authority for an allowed catch that would maximise the value of their assets. That notwithstanding, each individual fisherman or firm has an incentive to cheat on their quotas, or to use their boats more intensively than the regulations may specify. Higher prices of fish, resulting for example from market liberalisation, may encourage such cheating by making it more rewarding. Cheating is particularly likely to increase under a catch control regime, partly because the industry has less of a stake in the health of the fish stocks and partly because increasing participation in the industry will make it more difficult to monitor the total catch and ensure compliance of individual vessels with the necessary regulations.

Above we have considered cases where the exporting and the importing country each fish its own stock and apply the same management regime. In reality there will be cases where the importing country and the exporting country apply different regimes, and there will be cases where they fish the same stock(s). In the latter case there could not be too

much difference between the management regimes practised by the countries sharing the same stock; it would in most cases not make sense for Country *A* to practice effective management if Country *B* with which it shares a stock practices open access, unless Country *B* has a small enough portion of the stock to inflict only a limited damage upon Country *A*.

One case that appears particularly interesting and relevant is where two or more nations fish a stock on the High Seas. It still remains to be seen whether the UN Agreement on Straddling Stocks and Highly Migratory Fish Stocks will fundamentally change the open access situation prevailing on the high seas; that is, whether it will be possible to establish a TAC management regime for high seas fisheries, let alone effective management. What would the effects of trade liberalisation be in a case like that? Suppose there are two countries, a fish exporting country and a fish importing country, exploiting a shared stock under open access. In equilibrium the marginal fishing cost of each would be equal to the price *as perceived by each country*. With trade barriers in place the marginal cost of the fish exporting country must be lower, since they get a lower price. If the trade barriers are removed the price will become higher for the fish exporting country, it will expand its fishing effort, and a new equilibrium will be established with greater overall effort, but some of the effort of the fish importing country would be replaced. The long run effects on the total catch are uncertain but are likely to be negative. The fish importing country would gain in a similar way as discussed earlier by wasting less of its resources in fishing and paying less for its fish, while the fish exporting country would lose, partly through wasting more resources in fishing and partly by getting less fish in its home market. In the Appendix a situation with two countries exploiting the same stock is considered. In the model used in the Appendix the effects of opening up for trade are dramatic; the more efficient country would entirely displace the other country but would nevertheless lose from opening up for trade as long as there is open access. In the real world the effects are likely to be less dramatic, but there is every reason to expect that they will be in the directions indicated.

Finally it bears mentioning that the effects of relaxing trade barriers could be quite different with respect to fish farming. The response in this industry is likely to be similar to what happens in agriculture; a price increase as a result of relaxing trade barriers is likely to elicit a positive supply response, and *vice versa*.

5. Trade in Fish Products

Fish is traded in various forms; fresh, both for the consumer market and for further processing, processed as intermediate products for further processing, and as finished products for final consumption. Tariffs or quantitative restrictions are applied to each individual product or group of products. Typically the tariffs and the quantitative restrictions vary with the degree of processing. Usually the tariffs rise with the degree of processing, in order to protect the processing industry in the country applying the tariff. The protective purpose of tariffs is most explicit in cases where fresh fish is subject to different tariff rates, depending on whether it is sold to the consumer market or to the processing industry in the importing country.

Tariff reductions and removal of quantitative restrictions may therefore affect different products differently, depending on how the liberalisation of trade is implemented. An across the board removal of trade barriers would normally have greatest effect for the products

subject to the highest tariff and to the tightest quantitative restrictions. The effect of this will, as for fish in general, depend on the fisheries management regime.

Effects in a fish exporting country

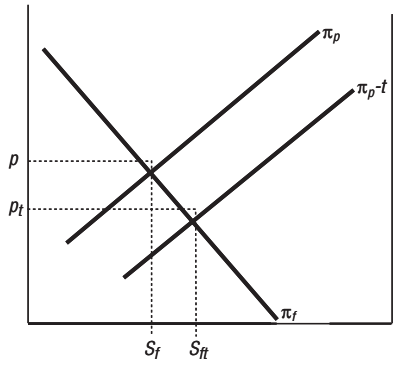
Again, we shall look at the effects for a fish exporting country and a fish importing country applying the differential tariff rates. Consider, first, the fish exporting country. Suppose the total quantity of fish is controlled and hence not affected by trade liberalisation. This could be the case both under the catch control regime and the effective management regime. At this point we make no difference between these regimes.

Suppose a given type of raw fish can be sold in two forms, fresh (for the consumer market) and processed. The marginal profit (market price less marginal cost of production) of each form will most likely be lower the larger is the quantity being sold. Even if the country is a price taker in international markets this could happen because of rising marginal cost of processing. The raw fish market is illustrated in Figure 3.B.1. The total quantity of raw fish available is represented by the width of the box in the figure and normalised to one. The share of the catch sold to the fresh fish consumer market is measured from the left while the share sold to the processing industry is measured from the right, with the curves π_f and π_p showing the marginal profitability of fish in the fresh fish consumer market and processed fish, respectively, expressed per unit of raw fish.

If the two types of products are produced in competitive industries buying raw fish in a competitive raw fish market the marginal profit lines will represent demand curves for raw fish in the two industries. Equilibrium in a competitive raw fish market will occur where the two demand curves cross; with a given quantity of raw fish the market will be cleared by a raw fish price common to both industries and denoted by p. The share S_f will go to the fresh fish market and the remainder to the market for processed fish.

Now suppose that there is a tariff on processed fish but no tariff on fresh fish. Let the tariff on processed fish be t, measured per unit of raw fish. The tariff reduces the marginal profit of processed fish for the fish exporting country, the marginal profit including the tariff being $\pi_p - t$. The new demand curve for raw fish for the processing industry is also shown in the figure. The new equilibrium implies a higher share of the raw fish going to the fresh fish market (S_{ft}) and a lower price of raw fish in the fish exporting country. If instead we start with a situation with a tariff the argument is reversed; removing the tariff on

Figure 3.B.1. **The raw fish market (exporting country)**



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processed fish would increase the amount produced of processed fish and decrease the amount of fish provided for the fresh fish consumer market. The removal of the tariff would also raise the price of raw fish.

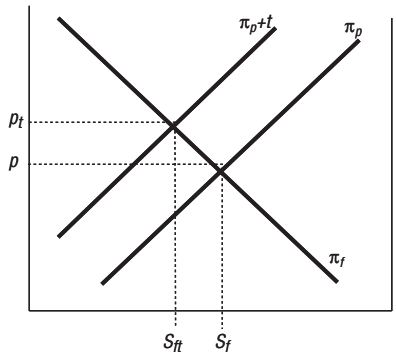
The division of a given quantity of raw fish between two use alternatives in a country exporting fish products. The width of the box shows the total amount of raw fish available and is normalised to one. The lines show the marginal profitability of raw fish used for the fresh fish market (π_f) and for further processing (π_p). Without tariffs the price of raw fish is p, and the share S_f is sold to the fresh market and the remainder for processing. A tariff of t per unit reduces the marginal profit of fish for processing to $\pi_p - t$ and increases the share of raw fish going to the fresh fish market to S_{ft} and lowers the price of raw fish to p_t.

If there is open access we can no longer assume that the quantity supplied of raw fish will not change. A higher price of raw fish would lead to an increase in fishing effort, which would increase the catch in the short run, but the long run effect could be negative, depending on whether or not the fish stocks are exploited beyond the maximum sustainable yield level. As far as shares of the total catch allocated to fresh *versus* processed fish are concerned, we would have the same effects as shown in Figure 3.B.1; the share of the catch being processed would increase as a result of removing trade barriers for processed fish but what happens with respect to the absolute amount would depend on how the catch would be affected. A higher share of a smaller catch might mean that less would be exported of processed products than before.

Effects in a fish importing country

For the fish importing country applying the tariff on imports of processed fish the conclusions are exactly the opposite, as far as its domestic fishing industry is concerned. A tariff on processed fish would raise the marginal profit of processed fish to $\pi_p + t$. The share of raw fish provided for the fresh fish consumer market would be lower with the tariff on processed fish and more would be produced of processed fish, as would presumably be intended by protecting the domestic processing industry with a tariff. Some of the protection would spill over to the catching industry, however, as the price of raw fish would be higher with the tariff. This case is illustrated in Figure 3.B.2.

Figure 3.B.2. **The raw fish market (exporting country)**



The division of a given quantity of domestically caught raw fish between two use alternatives in a country importing fish products. The width of the box shows the total amount of domestic supplies of raw fish and is normalised to one. The lines show the marginal profitability of raw fish used for the fresh fish market (π_f) and for further processing (π_p). Without tariffs on processed products the price of raw fish is p, and the share S_f is sold to the fresh market and the remainder for processing. A tariff of t per unit of processed products raises the marginal profit of fish for processing to $\pi_p + t$ and lowers the share of raw fish going to the fresh fish market to S_{ft} and increases the price of raw fish to p_t.

For a given supply of raw fish the effects of removing the trade barriers for processed fish on the domestic fishing industry in the fish importing country are exactly the opposite to what happens in the fish exporting country. The profitability of fish processing would fall, and the demand for raw fish for processing would be less; in Figure 3.B.2. the demand curve for raw fish for the processing industry would shift from $\pi_p + t$ to π_p. In the new market equilibrium the share of raw fish going to the fresh fish market would increase and the price of raw fish would fall. The country is likely, however, to get more of processed fish than before at a lower price, more than making up the loss of its own production with imports from other sources.

Under open access the effects are again uncertain in the long run. A lower price of raw fish would lead to less fishing effort and less catches in the short run. This would allow the country's fish stocks to recover, and they might recover to such an extent that domestic supplies of raw fish would increase in the long run. In that case the country would get a double dividend; it would get more processed fish at a lower price and increase its own supplies of raw fish due to the recovery of the stocks.

Summary

From this we see that removing trade barriers that affect different products differently may give rise to complicated repercussions in the markets. The production of products most affected by the trade barriers would expand in fish exporting countries and contract in fish importing countries. But due to the given total supply of fish the production of products not affected by trade barriers, or affected less than others, would contract in fish exporting countries and expand in fish importing countries. Under open access the effects are still more complicated and perhaps counterintuitive. The effects under the three stylised regimes discussed in this paper are summarised in Table 3.B.3.

6. Government Financial Transfers

Government financial transfers are not a trade barrier but they may distort trade. Such transfers can generate an artificial "comparative advantage" by lowering the production costs for a high cost producer, enabling him to undersell a producer who in reality has a lower cost of production. The way in which these transfers affect the production of and trade in fish depends in part on how they affect the costs of production and in part on the fisheries management regime. Ordinarily, these transfers reduce the cost of production and are in fact designed for that purpose; this is true, for example, of subsidies on fuel, bait or other inputs, tax relief for fishermen or investment in fishing vessels, and subsidies of the building of fishing vessels, either directly to the boat builders or indirectly through grants for buying fishing vessels or low interest on loans for such purposes. Other kinds of transfers, such as government financed buy-back programs for fishing vessels, need not reduce the cost of production, at least not directly. Indirectly, however, such programs

might reduce the cost of production by reducing the risk of bankruptcy and enticing fishermen and fishing firms to take greater risks when investing in fishing vessels. Payment of access fees to other countries' economic zones reduces the cost of fishing but the effect on fishing effort and fish production depends on the differential effect *vis-à-vis* the fishing fleet in the country in whose zone the right of access has been acquired.

In the following we will discuss the effect of government financial transfers on the total catch. The effect on trade depends on the effect on the total catch and whether it is the catch of a fish exporting or a fish importing country that is affected, as discussed above. Again, the effect on the total catch depends on the management regime. Under open access the long term effect on the total catch may be counterintuitive and contrary to the short term effect; government financial transfers to the industry may in fact lead to a smaller total catch in the long term. It may also be noted that these transfers do not necessarily lead to a lower price of fish. If that were to happen the total catch of fish would have to increase as a result of these transfers, which need not be the case.

Open access

Transfers which lower the cost of production ordinarily lead to expanded production and a lower price of the product. Under open access, cost-reducing transfers initially raise the profitability of the industry. This encourages more fishing effort and raises the fish catches in the short term. In the long term, however, the catches may in fact fall. The effect of government financial transfers on trade flows and prices is therefore uncertain under open access; if they lead to increased fish catches they would increase the exports of fish from the subsidising country, or reduce imports if the country is an importer of fish, and the world market price of fish would fall because of a higher production volume. This is what ordinarily happens as a result of subsidisation. But it could also happen that the catch falls in the long term. In that case the effects are in the opposite direction; the subsidising country would export less fish if it is an exporter of fish, or import more if it is an importer, and the world market price of fish would rise because less would be supplied.

Table 3.B.3. **Effects from relaxing barriers to trade on highly protected fish products**

Exporting country	Open access	Catch control	Optimal management
Supply of highly protected products	Share of total supply increases but total amount may decrease in the long run if the total catch falls.	Increases	Increases
Supply of less protected products	Share of total supply decreases but total amount may increase in the long run if total catch increases.	Decreases	Decreases
Price of raw fish	Rises	Rises	Rises
Total catch	Increases, but falls in the long term if the stock was exploited beyond maximum sustainable yield level.	Remains the same	May increase due to improved profitability
Importing country			
Domestic supply of highly protected products	Falls in the short run, as less of domestic supplies of raw fish are processed, but may increase in the long run if total catch increases.	Falls	Falls
Domestic supply of less protected products	Increases in the short run, as more of domestic supplies of raw fish are processed, but may fall in the long run if total catch falls.	Increases	Increases
Price of raw fish	Falls	Falls	Falls
Total catch	Falls, but increases in the long term if less fishing effort allows stocks to recover above maximum sustainable yield level, in which case there is a double dividend	Remains the same	May fall due to less profitability of fishing

Buy-back programs will probably work in the same direction as cost-reducing transfers under open access. To begin with fish stocks would recover as a result of removing fishing boats from the fishery. But if nothing is done about controlling investment in the industry the buy-back program would be self-defeating; new boats would be built in response to the improved profitability in the industry, and effort would expand until the fishery is again at a break even level. The net effect would probably be one of reducing the total cost of fishing; first, because the buy-back program would generate expectations of future bailouts and thus reduce risk, and secondly because the new boats would probably be technically more effective than the old ones. The long term effect on the catch would depend on whether the stock was exploited beyond the level of maximum sustainable yield; if so, then the catch would decline in the long term.

Under open access, the effect of buying access to another country's fishing zone will be to further diminish the fish stocks in the host country's zone. The long term effect on the total catch would depend on whether the stocks were exploited beyond maximum sustainable yield before the foreign fleet arrived. The foreign fleet will increase the fishing effort in the host country's economic zone, although the addition need not be one for one; the foreign fleet may displace some of the vessels of the host country, depending on its size and cost advantage *vis-à-vis* the host country's fleet.

Catch control

Under a catch control regime the catch would not be affected by cost-reducing transfers.[7] Such transfers would, however, improve the profitability of the fishing fleet and increase investment in the industry and thereby raise the cost of taking the given catch of fish. Government financial transfers would not in this case have any effect on international trade in fish; for that to happen it is necessary that the total catch volume be affected. The harmful effects of these transfers would be felt by the subsidising country itself through the increased cost of fishing, which means that less would be produced by other goods to satisfy the needs in the country. The effect of buy-back programs would be similar; in the absence of effective controls over investment in the industry they would simply encourage investment in boats and fishing gear, and for the reasons given above the total costs of fishing would probably be higher than before. A buy-back program will therefore only result in still higher costs for the country implementing it; a buy-back program will simply represent a net deadweight loss for the taxpayers who finance it, and furthermore increase the overall deadweight loss through raising the total costs of fishing beyond the level before the buy-back program.

The effect of paying access fees to the economic zones of countries which practice catch controls but do not control their own fishing fleet will be a displacement of some of the host country's fleet. The access of the foreign fleet means an increase in the total costs of fishing, through a still shorter fishing season or more severe restrictions on fishing effort for the host country's fleet. It may be noted that the catch control regime itself may become more difficult to practice, because the activities of foreign fleets usually are more difficult to control for the host country than those of the domestic fleet.

Effective management

Under effective management the industry participants have incentives to minimise the cost of taking the given catch. Cost-reducing transfers will, of course, increase the profitability of fishing, but as long as the total catch is given the fishermen or the fishing

firms have no incentive to increase their effort. The increased profitability would instead be reflected in a higher price of the "entry ticket" to the industry, *i.e.* higher market value of fish quotas or fishing licenses. The transfers would not in this scenario have any harmful effects on the allocation of resources, either in the subsidising country or the world at large, but merely represent a transfer of income from the taxpayers to the fishing industry. Under effective management, buy-back programs are essentially transfers of money to the industry in exchange for leaving. This will benefit both those who are bought out and those who remain in the industry. The latter will benefit either because they will get the catch quotas of those who left, or their operations will become less constrained if the total catch is controlled by other means. Buy-back programs seem particularly redundant in an industry which is effectively controlled, *e.g.* by transferable quotas, because the most efficient firms in the industry would have an incentive to buy out the less efficient ones as long as there are too many boats in the industry.

Transfers through the payment of access fees could enable foreign fishermen or fishing firms to buy their way into another country's fishing industry and outbid the host country's own fishermen. The effect on the total catch would be nil, however, as long as the total catch is effectively controlled. If access to the foreign country's zone is controlled by its own government through the selling or renting out of fishing rights in some form this would provide the host country with an additional revenue which its own fishermen are not able to match. At the same time this would represent a trade distortion in that the trade, in this case in fishing rights, would be affected by subsidies that might outweigh the host country's comparative advantage. The host country might not want to take advantage of the foreign country's generosity, as this might prove temporary and the host country might at a later date have to build up again its own fishing industry.

The effects of government financial transfers under different management regimes are summarised in Table 3.B.4.

Table 3.B.4. **Effects of government financial transfers to the fisheries**

	Open access	Catch control	Effective management
Total catch	Increases in the short run but decreases in the long run if the stock is exploited beyond maximum sustainable yield.	Unaffected	Unaffected
Price of fish	Falls in the short run but rises in the long run if the catch falls	Unaffected	Unaffected
Long term profitability of industry	Unaffected "at the margin" but profits for fishermen who are more effective or have lower opportunity cost will rise.	Same as for open access	Increases
Long term effects on trade	Uncertain, depend on what happens to total catch	Small, but there might be repercussions for goods other than fish, cf. below	None
Effects on the rest of the economy	More capital and manpower is attracted to the fisheries and less will be produced of other goods	Same as open access	None

Finally, with respect to fish farming, the effects of government financial transfers are likely to be similar to the effects in agriculture. Government financial transfers will increase the profitability of the industry, which will lead to expanding production, unless the transfers are made conditional on not increasing the productive capacity or to decommissioning production units.

7. Investment

Fishing fleets

The liberalisation of rules relating to direct investment has seldom reached the fishing industry. Most OECD countries restrict foreign investment in their fishing industries, and some even apply restrictions on domestic investment, allowing only *bona fide* fishermen to own fishing boats. Those who apply the latter rule have, however, found it necessary to make exemptions for the most capital intensive types of boats.

By foreign investment we shall mean investment in fishing vessels which are registered in the country in whose jurisdiction they operate. Such vessels would have to abide by the same rules and regulations as vessels owned by nationals, much as a factory on land owned by foreigners would be subject to the same rules and regulations as other factories, unless otherwise specified. Fishing by foreign registered vessels will be treated below as a separate issue under the heading of trade in fishing services.

Liberalising rules of foreign investment could be advantageous both for the foreign investor and the host country. There are various reasons why a foreigner might find it more profitable than domestic investors to invest in fishing vessels in any given country. The foreign investor might, for example, have access to a better technology. Even if it appears that fishing technology can be "bought off the shelf" and the requisite specific human skills hired on contract, it is undoubtedly true that some foreign investment in the fishing industry has been due to this effect.

It is probably more likely, however, that differences in profitability originate in marketing, management or other factors having to do with vertical integration. It could, for example, be attractive to integrate vertically all the operations in fishing, from catching the fish through processing and to marketing the finished product. Companies that process and market fish might find it attractive to invest in fishing vessels in foreign countries to diversify and secure control over their sources of supply, and they might also be able to operate fishing vessels more profitably due to their control over the entire value chain.

Like in the case of eliminating subsidies or removing barriers to trade, the effects of foreign investment depend critically on the management regime in the country where the investment takes place. If foreign investment in the fishing industry of a certain country is more profitable than domestic investment it will initially come as an addition to domestic investment and may over time replace some or all domestic investment. Under open access this will lead to a further depletion of fish stocks. The long term effects on prices and trade depend on what happens to catches in the long run. If catches increase, the trade in fish will expand if the foreign country is a fish exporter, and the price of fish will fall due to greater supply. If catches fall in the long term the opposite will happen.

Under catch control there would be no effect on trade or prices but the participation in the industry would increase, and some of the domestic fleet would probably be replaced by foreign owned fleet. The replacement of the domestically owned fleet by a foreign owned

fleet would be a bonus for the country; the excessive investment in the fishing industry implies that the overall return on investment in the fishing industry is lower than the return on other types of investment, and the host country would actually get a better overall return on its capital by being forced to withdraw some of it from the fishing industry. If all fishing vessels registered in the country are manned by domestic labour the waste of labour would increase; more labour would be drawn into the fishing industry where it has a lower return than in alternative occupations. Under this regime the country would gain from replacing some of its labour in the fishing industry by foreign labour, in the same way as it would gain by replacing some of its investment by foreign investment.

Note that even if the foreign investment adds no value at all to the industry in the host country it could still be profitable for the foreign investor. The net contribution of the foreign investment would be much less than the return on the foreign capital invested because this investment would raise the costs of fishing for all participants, but that effect would not be reflected in the profit and loss account of the foreign investor.

Similarly, under effective management the foreign investment would not have any effect on the trade flow or the price of fish. The foreign investor would have to buy his way into the fishing industry in the host country through buying a fish quota or a fishing license. This he can only do if he can operate more profitably and pay a higher price than domestic operators. If foreign investors are able to do this they will over time buy out domestic investors, and some and possibly all of the fish quotas or fishing licenses will end up being owned by foreigners. Some governments might see this as an additional reason for putting some rent recovery mechanism into place, such as a fee on or auctioning of fish quotas or fishing licenses, to make sure the fishing rent benefits the country in which jurisdiction the fish are located.

The effects of foreign investment in fishing fleets are summarised in Table 3.B.5.

Table 3.B.5. **Effect of foreign investment in fishing fleets**

	Open access	Catch control	Effective management
Total catch	Increases in the short run but decreases in the long run if the fish stock is biologically overexploited	No effect	No effect
Profitability of domestic fisheries	Declines, but the country will gain from moving capital out of fishing while losing from increasing the use of labour in fishing	Same as open access	Some operators will be bought out by foreigners
Price of fish	Depends on what happens to catch	No effect	No effect

The processing sector

Restrictions on investment in the processing sector are less common than in the catching sector but still exist in some countries. The effects of liberalising investment in fish processing would not be much different from investment in other industries. Unless the industry is vertically integrated such investment would not have any direct effect on the catches of fish. There could be indirect effects, however. If foreigners are willing to invest in fish processing to a greater extent than domestics this would mean that they could operate more profitably, or increase the profitability of domestic firms if they enter into partnerships with the latter. There are reasons, as already discussed, why this might

be the case; foreigners might have better market access, a better technology, or better management procedures. This could quite possibly result in a higher profitability of fishing operations through a higher price of raw fish, but to what extent a higher profitability in fish processing leads to a higher price of raw fish depends on how the raw fish market works, especially the degree of competition between different buyers of fish. A higher price of raw fish could affect the total catches of fish, depending on what kind of management regime is being applied, as already discussed.

8. Trade in Fishing Services

Trade in fishing services can mean many things. It will be used here for arrangements where fishing vessels from Country A catch Country B's fish. The extension of the fishing limits that occurred in the 1970s greatly expanded the scope for such trade, as an enormous portion of the high seas to which there used to be open access irrespective of the nationality of the fishing vessel or its crew came under the jurisdiction of coastal states. The actual trade in fishing services has however been very limited, since most coastal states have given preferences to their own fishing fleets and in many cases deliberately barred foreign vessels from fishing within their 200 mile zone.

Letting fishing vessels from Country A catch Country B's fish would typically involve fishing vessels from Country A entering the economic zone of Country B, but it need not be so. The countries around the Northeast Atlantic which share fish stocks that are controlled by limits on the total catch often exchange fish quotas with one another without necessarily allowing each other's fishing vessels inside their boundaries. It is also common practice around the Northeast Atlantic for Country A to allow Country B to take some of Country B's quota from a shared stock inside Country A's zone.

The gains from international trade in fish quotas or fishing services could be substantial. Most fish stocks fluctuate considerably over time for environmental reasons that are outside human control and even poorly understood. These fluctuations typically lead to fluctuations in catches, partly because allowed catches from stocks being controlled by catch limits are set with a reference to the actual condition of the stocks, and partly because it is physically difficult or impossible to maintain a steady catch level from a fluctuating stock. These fluctuations are seldom synchronised in time for different stocks; fish stocks may be abundant, for example, in the Northeast Atlantic while they are at a low level in the Northwest Atlantic. If, however, any given stock is to be fished exclusively by vessels from countries in whose jurisdiction the stock is located the capacity utilisation of the fishing fleet could be very uneven. Significant economic gains could be obtained by allowing international trade in fish quotas or fishing services. This question is considered more formally in Hannesson (1994).

Trade in fishing services for the purpose of levelling variations in the use of fishing capacity could take place in various forms. National governments could offer "excess quotas" in good years for hire in an international market. Alternatively, private firms holding quotas defined as shares of the total allowed catch of a certain stock could be free to hire fishing vessels from any country to take their quota. An arrangement like that would most likely lead to a more even utilisation of fishing capacity, with the largest and most wide ranging fishing vessels being available to be sent to a place where there is a particular need for their services at any given time. Lastly, multinational fishing companies would probably find it in their interest to acquire fishing rights (*e.g.* quota allocations) in

different stocks and even out their capacity utilisation by sending their vessels where they are most needed at each point in time. Some such activity is taking place already, but rules stipulating that fish quotas of a given country must be taken by that country's fishing fleet make such adjustment difficult.

More generally there are many reasons why it would be advantageous to hire a foreign vessel to do the fishing. Some countries have a comparative advantage in fishing. The reasons for that comparative advantage are as different as in any other industry. Sometimes they are associated with specific knowledge and technology that cannot be "bought off the shelf" but requires human skills which it takes a long time to acquire.[8] In other cases the cause for comparative advantage lies in low wages or less stringent regulatory regimes applied to fishing vessels.

Trade in fishing services, based on comparative advantage, could take many forms, depending on the management regime in the country at hand. Take, for example, a management regime based on individual transferable quotas. Such quotas could be allocated by auction where anyone, also foreigners, could be free to make bids. If foreign fishing fleets are more efficient than domestic, the quotas would end up in the hands of foreigners but the revenue for the quotas would be maximised. In a case like that it probably becomes important, from the point of view of the country controlling the quotas, not to sell them permanently but only for a limited time period, or to make them subject to attenuation, in order to secure a reasonably even stream of income and to avoid having the ownership of fish quotas permanently in foreign hands. A management system with attenuating quotas is described in Hannesson (1996).

More often, however, individual transferable quotas have been allocated initially on the basis of the track record of industry participants rather than by auction. The quota holders could then be free to use them as they find in their best interest. Where such systems have been put in place many quota holders have opted for renting out their quotas. With a liberalised trade in fishing services they could rent their quotas to foreigners who could fish at a lower cost than domestic fishermen. This would lead to an increased competition in the fishing industry and an increased pressure to cut costs. Permanent transferability of quotas could also be extended to foreigners. In that case the government in question would probably want to consider very carefully how it could ensure a reasonable share of the fishing rent on a permanent basis for its own population. This could be accomplished either by a quota fee or auctioning of quotas, either for a limited time period or with an "attenuation" rule.

These remarks on the possible comparative advantage of foreign fleets raise the question of what the foreign fleet really is. A foreign vessel is a vessel flying another country's flag, but re-flagging of vessels is not a complicated procedure. Liberalising the trade in fishing services is quite likely to lead to considerable re-flagging of fishing vessels, for reasons that are very similar to the ones that have led to the re-flagging of much of the merchant marine of many OECD countries. The rules pertaining to manning and registration of vessels are more liberal in some countries than others, making it cheaper to operate vessels under one flag than another.

There is some reason to believe that much of the fishing operations would be conducted with vessels under foreign flags and employing people from low wage countries if there were a general liberalisation in the trade in fishing services. We have in fact seen some of that happening. Some of the fishing conducted outside the 200 mile zone, where

national rules do not apply, has been done with vessels owned by OECD nationals but flying the flags of countries like Belize or Panama and manned by people from Poland, Lithuania and other low wage countries.

Let us turn, then, to how the effect of opening up for trade in fishing services depends on the fisheries management regime. Under open access a liberalisation of trade in fishing services would amount to lower fishing costs. This in turn would lead to increased fishing effort and a further reduction in fish stocks. The long term catches could either increase or decrease, depending on whether the stocks are biologically overexploited or not. Under catch control the lower costs of boats and crew would lead to increased investment in boats and gear in the fishery, and in the end the total costs of fishing would in fact rise, due to unnecessarily large fleets and shorter fishing seasons. Note the similarity of the effects under open access and catch control; in the latter case there is really open access to the fleet but the fish stocks are spared through catch controls, so that the detrimental effects of excessive fishing effort only come through excessive costs. In this case, the free trade in fishing services might in fact be an improvement upon the situation where the fishery is open only to nationals. To the extent domestic labour is out-competed by foreigners there will be less wasteful use of domestic labour in the fishing industry, with domestic labour being employed in operations that are more rewarding, seen from the point of view of the entire economy. As for the investment, to the extent the vessels are financed by domestics there will be waste, because the marginal return of this investment may well be negative, even if it is profitable from the point of view of the single boat owner.

Lastly there is the case of effective management. Under this regime, the possibility to hire boats from other countries will represent a lowering of fishing costs. It may be noted at this point that the hiring of fishing services is becoming more and more widespread in countries where exclusive, long term use rights have been introduced. In Iceland, for example, some holders of fish quotas routinely contract with boat owners who do not own quotas to do the fishing. The possibility of doing so at a lower cost seems likely to further encourage this practice. In any event, the lowering of fishing costs would increase the profits in the fishery, but since the total quantity is given and the holders of quotas or licenses have every incentive to minimise costs, the effect would be an increase in fishing rent, capitalised in a market value of quotas or licenses to the extent it is not siphoned off by fees or auctions.

The effects in the three management regimes are summarised in Table 3.B.6.

Table 3.B.6. **Effect of trade in fishing services**

	Open access	Catch control	Effective management
Total catch	Increases in the short run but decreases in the long run if the fish stock is biologically overexploited	No effect	No effect
Profitability of domestic fisheries	Declines, but the country will gain from moving labour and capital out of fishing, and from better use of fishing capacity	Same as open access	Owners of fish quotas will gain but domestic fishermen and boat owners will lose. Gains from better use of fishing capacity.
Price of fish	Depends on what happens to catch	No effect	No effect

9. Conclusion

The most important conclusion emerging from this discussion is the critical role of fisheries management for the effect of market liberalisation, whether it be of trade in fish products, investment, or trade in fishing services. To start with trade in fish products, a fish exporting country practising open access to its fisheries will gain little, and quite possibly lose, from trade liberalisation while fish importers may reap a double dividend by way of more fish at a lower price and a recovery of their own overexploited stocks. These effects are counterintuitive and almost certain to be overlooked by people unfamiliar with the intricacies of fishing under open access.

While open access in its pure form may be a thing of the past in many if not most OECD member countries, it still prevails in some developing countries. Furthermore, lax and insufficiently enforced regulations may not be much of an improvement over open access. Control of the fish catch while there is still open access to the industry will, if effective, protect fish stocks from depletion but do little or nothing to prevent the waste of manpower and capital in fishing. In those circumstances there will be small gains for fish exporting countries from trade liberalisation; it will only encourage further waste of resources in the fishing industry and reduce the production of other goods. Fish importers may, on the other hand, reap double dividends; in addition to getting cheaper and more fish the lower fish prices will cause some of the excessive capital and manpower to be transferred out of the fishing industry.

The fact that the catch of fish is limited either by regulation (catch control or effective management) or by nature implies that removal of trade barriers for some fish products will have repercussions over a wide spectrum of products. With a given supply of raw fish the production and trade of products that previously were protected can only be expanded at the expense of other, less protected products. Removal of trade barriers for highly protected products will therefore have repercussions for the trade volumes and prices of other, less highly protected products. This is further complicated under open access where the change in profitability due to the removal of trade barriers will have uncertain consequences for the long term supply of raw fish. Under open access, fish importing countries may again reap a double dividend from trade while fish exporters may lose.

The effects of government financial transfers on trade are somewhat counterintuitive and again dependent on the fisheries management regime applied. Government financial transfers ordinarily encourage production and depress the market price of traded products. When the total catch is effectively controlled this does not happen; the total supply is given and the effect on trade and prices is nil. Government financial transfers are then harmful first and foremost for the countries providing these transfers, through attracting more people and investment unnecessarily to the fishing industry. Capacity-reducing measures such as buy-back programs need not have this effect, however, except that they may make investments in the fishing industry less risky than they would otherwise be. Under effective management where the industry has incentives to minimise costs, government financial transfers will simply increase the profits in the industry.

Under open access government financial transfers will increase the degree of exploitation of the fish stocks, which may lead to decreasing catches in the long run. This will affect trade flows but possibly in an unexpected direction; if a fish importing country subsidises its domestic fisheries it may lead to a long term decline in its catches and hence to an increased and not decreased imports of fish. When governments pay access fees to

other countries' economic zones they will lower the costs of fishing and cause a further depletion of fish stocks in the host country or raise the cost of fishing through shorter fishing seasons in case the total catch is under control. Subsidising fishing in other countries' zones may amount to subsidising the renting or buying of fishing rights, in case there is an effective, rights based management system in place in the host country. This raises questions of rent taxation.

The effects of opening up for foreign investment in the fishing industry will also depend on the management regime. With open access this would encourage further depletion of fish stocks in case the opportunity cost of foreign capital is less than that of domestic capital. This would have repercussions for trade, depending on whether the long term catch is increased or decreased, and whether the host country is a fish exporter or a fish importer. The foreign capital might displace some of the domestic capital, which in fact would be beneficial for the host country, as the latter would waste less of its capital resources in the fishing industry. The wasteful use of labour would increase, however, if the foreign owned vessels are manned by the host country's labour. Under catch control the depletion of the fish stocks would be avoided. With effective management the foreign capital might buy out some of the domestic capital, which raises questions of resource rent taxation in order to secure sufficient benefits for the host country.

The effect of removing restrictions on trade in fishing services also depends on what kind of management regime is applied. With free trade in fishing services these would be provided by low cost suppliers of such services. Under open access this would lead to a further depletion of fish stocks and possibly lower catches in the long term while under catch control the fish stocks would be spared and only the fishing cost would be raised. There might in fact be some gain to the host countries under both regimes through pushing excessive labour and manpower out of the fishing industry and replacing it with hired services from abroad. Under open access there would be repercussions for trade of a similar nature as with foreign investment.

The effects of free trade in fishing services would be most beneficial when there is effective management. It would make it possible to deal better with the problems of fleet capacity utilisation caused by fluctuations in fish stocks, which are not synchronised between different jurisdictions. Trade in fishing services would also increase the profitability of fishing operations under effective management, which would accentuate questions of resource rent taxation. One phenomenon that would be likely to arise as a result of a liberalised trade in fishing services is re-flagging of fishing vessels to countries where labour costs are low or where there are less onerous regulations with respect to fishing vessels and their use.

Finally, a few words on where one could go from here. The theory of international trade and its application to renewable resources such as fish, upon which this paper has drawn, is well developed. Further insights are likely to come from applying this theory to specific cases rather than from a further refinement of the theory itself. These cases are likely to be both interesting and challenging, not least because of the differential tariff regimes often applied *vis-à-vis* different countries and for different products. Non-tariff barriers to trade, such as sanitary and quality standards, are a challenging and important subject.

A particularly interesting and fruitful case for application is fishing of shared stocks on the high seas. On this subject some further theoretical development is called for, particularly

with respect to pre-emptive strategies that nations engaged in fishing stocks on the high seas might employ to keep entrants out, and also on the trade regimes that might be supportive of whatever controls nations may agree to impose on fishing on the high seas.

The least explored areas with respect to effects of market liberalisation in fisheries are international investment and trade in fishing services. In this arena market liberalisation has made least progress. This may very well be the reason why there has been little research done on this, but it also appears to be a good reason for devoting further attention to these areas, to stay ahead of a development towards market liberalisation that may come.

Notes

1. Professor Rögnvaldur Hannesson of the Norwegian School of Economics and Business Administration, Bergen, Norway wrote this paper. The paper has already been published in the OECD Papers series, Volume 1, No. 1 (OECD, 2001).
2. It is possible that the higher price of fish products resulting from relaxing trade barriers will imply a greater optimal catch in the long term, in which case the supply of raw fish will be expanded, but even so the increased demand for products for which the trade barriers have been relaxed is likely to have to come at the expense of other products to some extent.
3. See "*Towards Sustainable Fisheries*" (OECD, 1997) in which a full description of the different types of OECD fisheries is given.
4. The only exception would be if there are many fish exporting countries affected by the relaxation of trade barriers, competing in an international market characterised by a low elasticity of demand. In that case it is possible to construct a scenario where the fish exporters lose from increased trade (see Hannesson, 2000).
5. It may be noted that a fish importing country could be one that has an inherently more effective fishing industry than other countries and would thus be expected to be a fish exporter because of its comparative advantage. What may reverse this is that the high technical efficiency of the country's fishing industry translates into a decimation of its fish stocks to such an extent that it actually has a higher cost of fishing than other countries with less productive fisheries. The reader is referred to the Appendix for a further explanation of this.
6. This was one of the reasons why the Committee for Fisheries decided in 1993 to embark on the *study* "*Towards Sustainable Fisheries*" that analyses the fisheries management systems in the OECD countries.
7. Note, however, that government financial transfers may encourage lobbying for larger allowed catches or make monitoring and compliance more difficult, as discussed above in connection with increasing prices of fish. These transfers may therefore be less innocuous under catch control than the discussion in the text suggests. This may also happen under effective management, but is less likely, as discussed above.
8. Tuna fishing in the Pacific comes to mind as an example; it has turned out to be difficult for the Pacific island states to develop national tuna fisheries despite being close to the fishing grounds for tuna.
9. Note that we have set $q_B = 0.16$ so Country B is technically more effective than Country A ($q_A = 1$).

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Appendix 3.B.1

This appendix uses a formal model to derive the effects of opening up for trade between two countries. Two goods are produced, fish (X) and other goods. There is one factor of production, which we call labour (L). There are constant returns for other goods, so we measure these simply in units of L. The following utility function is specified:

$$U = L^{\alpha} X^{1-\alpha} \tag{1}$$

Utility maximisation gives the following price (P) of X

$$P = \frac{1-\alpha}{\alpha}\frac{L}{X} \tag{2}$$

The fish is produced from a stock (S) growing according to a simplified form of the logistic equation:

$$\frac{dS}{dt} = S(1-S) - X \tag{3}$$

The production function for fish is

$$X = q(1-L)S \tag{4}$$

i.e. the total supply of labour is normalised to one. We study equilibrium situations where $dS/dt = 0$, so we get from (3) and (4).

$$S = 1 - q(1-L) \tag{5}$$

Inserting (5) into (4) gives

$$X = q(1-L)[1 - q(1-L)] \tag{6}$$

Open access

With open access, the value of fish production per unit of labour employed will be equal to the cost per unit of labour, which is one:

$$\frac{PX}{1-L} = 1 \tag{7}$$

Using (2) and (7) we get

(8) $L = \alpha$

Inserting (8) into (6) we get

(9) $X = q(1-\alpha)[1-q(1-\alpha)]$

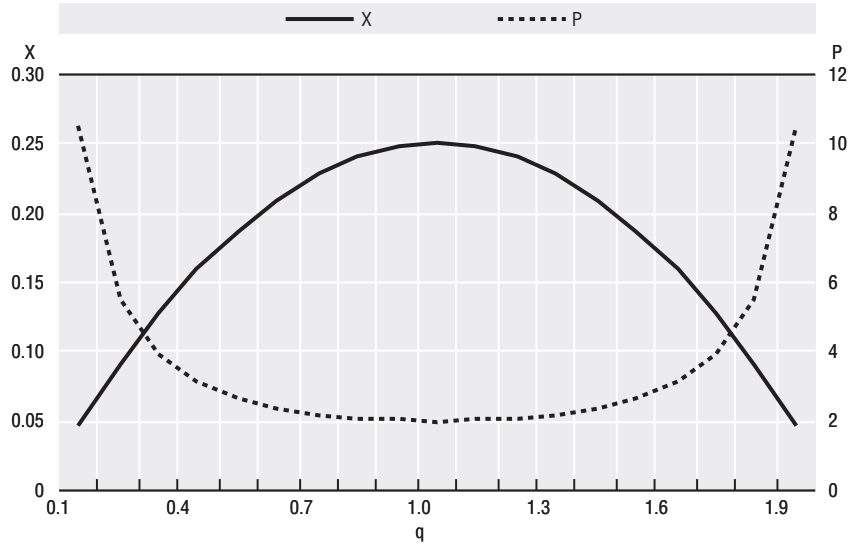
We now assume that the two countries, labelled *A* and *B*, are characterised only by different productivity of their fisheries, so that

(10) $q_A \neq q_B$

while all other parameters are the same.

Autarky

Figure 3.B.3. **Price and quantity of fish**



Without trade, prices and production will differ in the two countries. Figure 3.B.3. shows how the price and quantity of fish varies with the productivity coefficient, *q*, in the absence of trade (Equations (2), (8), and (9)). The utility parameter α is set equal to 0.5. Note that the quantity of fish is greatest when the productivity coefficient is equal to unity. As the productivity coefficient increases beyond that we get the pathological result that the production of fish diminishes. This happens because the greater productivity in the fishing industry encourages overexploitation, which diminishes the fish stock to such an extent that the long term yield diminishes. Note, finally, that the countries are assumed to be identical in terms of total labour supply.

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Trade

Now open up for trade. We assume that trade starts in a situation with equilibrium under autarky. The two countries will trade if the price of fish is different in the two countries, with fish being exported from the country where the price is lowest. For comparison, we fix the productivity coefficient of Country *A* at unity ($q_A = 1$). This does not qualitatively affect the conclusions, but with a different reference value of q_A Country *B* would export fish for certain values of q_B. With $q_A = 1$ Country *A* will always export fish if the productivity coefficient for Country *B* (q_B) differs from unity.

The equilibrium solution with trade can be calculated as follows. From Equations (6) and (7) we get the equilibrium use of labour in the fishing industries in the two countries. Note that since Country *B* imports fish it must export other goods, *i.e.* labour embedded in those goods. The equilibrium use of labour in the fisheries of the two countries will therefore be

$$(11)\quad 1 - L_A = \frac{Pq_A - 1}{Pq_A^2}$$

$$(12)\quad 1 - L_B - L^e = \frac{Pq_B - 1}{Pq_B^2}$$

where L_A and L_B are the amounts of labour used to produce other goods in Countries *A* and *B*, respectively, and L^e is the amount of other goods exported from Country *B*.

We can now use Equation (6) to calculate the production of *X* in both countries. The demand for fish (X^d) and other goods (L^d) in the two countries is given by Equation (2). Finally we have the conditions that the value of exports must be equal for both countries

$$(13)\quad PX^e = L^e$$

and that demand must be equal to supply

$$(14)\quad X_A^d = X_A - X^e\ , \qquad X_B^d = X_B + X^e$$

$$(15)\quad L_A^d = L_A + L^e\ , \qquad L_B^d = L_B - L^e$$

This gives us 11 equations to determine 11 variables, Equations (11) and (12) (or the two variants of (7)), two variants of each of (6) and (2), Equation (13), and two variants of each of (14) and (15). The variables are X_A, X_B, X^d_A, X^d_B, X^e, L_A, L_B, L^e, L^d_A, L^d_B, and *P*.

Solving these equations for different values of q_B ($q_A = 1$ by assumption) gives us, *inter alia*, equilibrium values for the production and price of fish in Country *B*. Figures 3.B.4. and 3.B.3 compare these with what obtains in the absence of trade. Trade will, of course, equalise the price in the two countries and lower the price of fish in Country *B*, as the country increases its supplies with imports from Country *A*. When $q_B < q_A = 1$ this is due to the fishing industry in Country *A* being inherently more efficient than in Country *B*. Country *A*'s fisheries offer fish at a lower price, and the production of fish in Country B declines (Figure 3.B.5). But when $q_B > q_A = 1$ it is Country *B*'s fisheries that are inherently more productive. The price of fish is nevertheless higher in Country *B*, because the higher technical efficiency entices it to overexploit its fish stock. Imports of fish from Country *A*, which has an inherently less productive fishing industry, lowers the price of fish in Country

B and reduces its fishing effort. This leads to a recovery of the fish stock in Country *B* and a higher yield of fish. The price of fish falls in Country *B*, partly because its own production of fish increases, and partly because it imports fish from Country *A*.

Figure 3.B.6. shows what happens to Country *A*'s consumption of fish. We see that it is less with trade than in autarky. This might not be a problem for Country *A* if it would consume more of other goods with trade than in autarky but this is not what happens; in this particular model Country *A*, the fish exporting country, consumes the same amount of

Figure 3.B.4. **Production of fish in Country B**

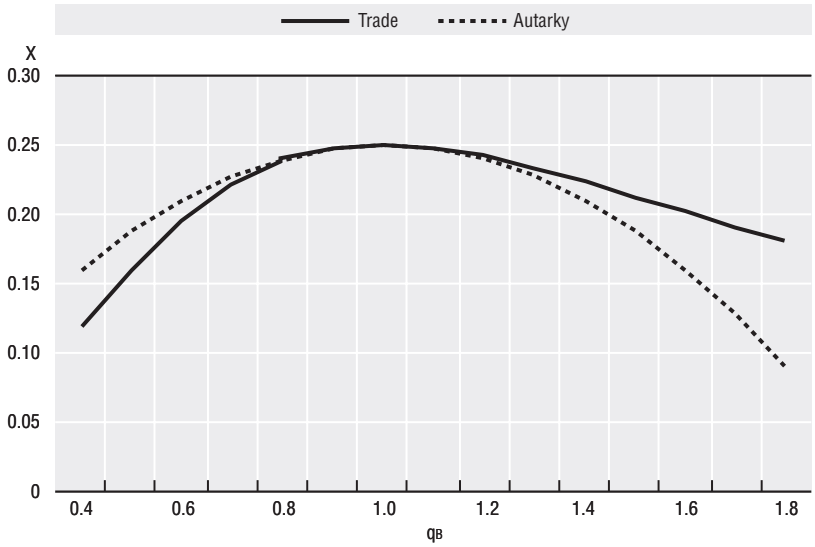

Figure 3.B.5. **Price of fish in Country B**

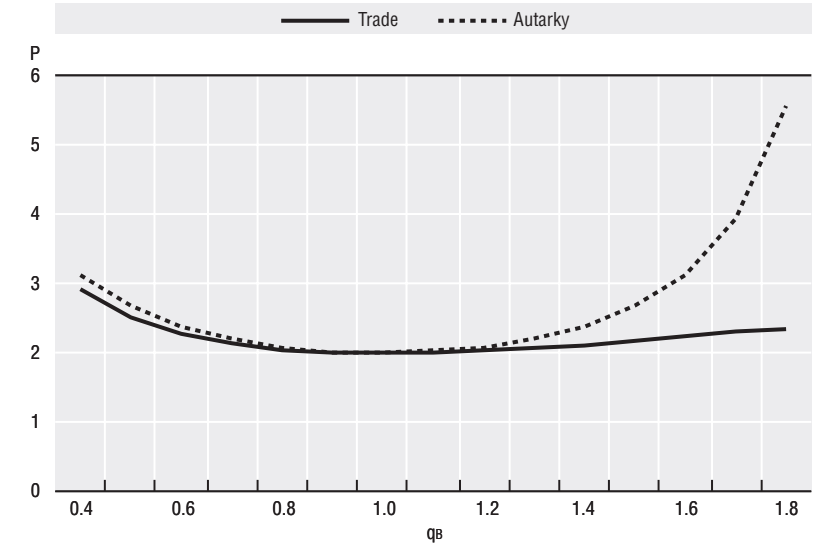

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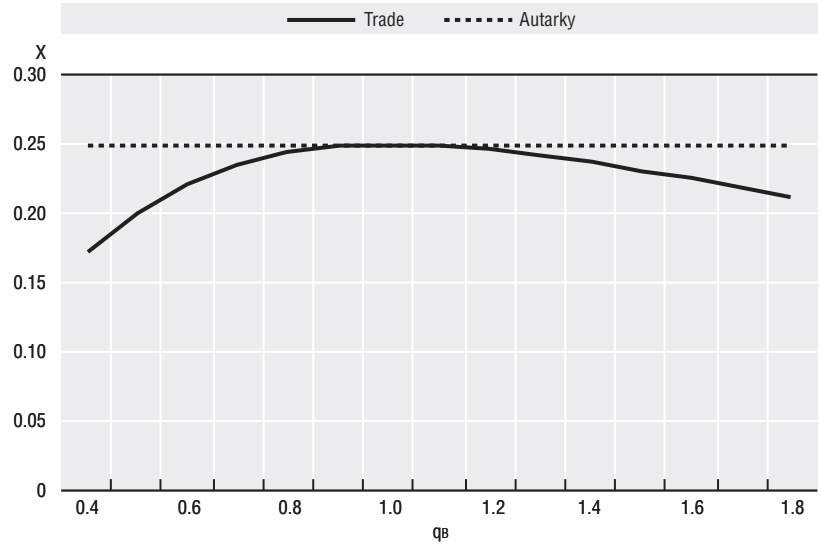
Figure 3.B.6. **Consumption of fish in Country A under open access**



other goods whether or not it trades with the other country. The effect of opening up for trade is that Country *A* wastes more of its labour in the fishing industry and ends up losing from trade while the other country gains all the more. This is an example of the impoverishing effect of trade under free access discussed by Brander and Taylor (1997*a* and *b*, 1998). If, however, the exporting country specialises totally in production of fish it will gain from trade, as also shown by Brander and Taylor. Such total specialisation could result from different preferences (*e.g.* a linear utility function where the two goods are perfect substitutes).

Catch control

With catch control the depletion of fish stocks can be avoided but if nothing is done about limiting entry to the industry it will still end up where total costs are equal to total revenues, and more factors of production will be used to catch the fish than needed. The demand for fish and other goods will still be governed by Equation (2) and the equilibrium in the fishing industry by Equation (7), but instead of Equation (6). The production of fish will be fixed at some given level

$$X = \overline{X} \tag{16}$$

Autarky

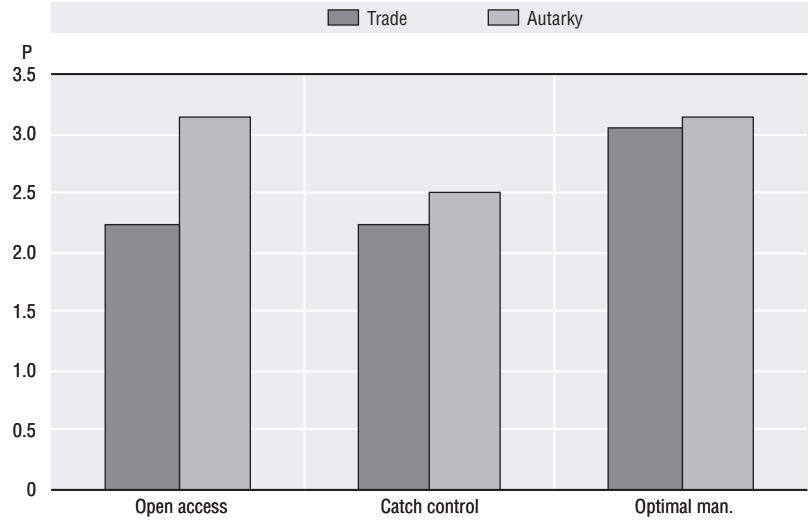
In the absence of trade, we can find the three variables *X*, *L* and *P* for each country from Equations (2), (7) and (16)). We continue to assume $q_A = 1$, which with open access in autarky gives maximum sustainable yield $X_{msy} = 0.25$, cf. Figure A1. Hence we set $\overline{X}_A = 0.25$. The meaningful level of $\overline{X}_B$ depends on the productivity parameter q_B. Here we shall use for comparison the value $q_B = 1.6$. This is in the range that would produce biological overexploitation under open access and result in an equilibrium catch $X = 0.16$ in the absence of trade. We assume that catch control succeeds in avoiding a decimation of

the stock that results in such a low catch and that the catch is set higher, or $\overline{X}_B = 0.2$. Note that $\overline{X}_B < \overline{X}_A$ is necessary in order to get any trade.

Trade

Equilibrium with trade can be determined in much the same way as above. We still have the same 11 variables, but instead of the two variants of Equation (6), we now have fixed quantities of *X* in both countries.

Figure 3.B.7. **Price of fish in Country B**



Figures 3.B.7. – 3.B.9. compare the results with and without trade, for Country *B*, under open access and catch control, as well as optimal management, which will be discussed below. The results of opening up for trade are similar with open access and catch control; the price of fish falls in Country *B*, which imports fish, and the amount of fish consumed in Country *B* increases. A noteworthy difference between open access and catch control is that the consumption of fish in Country *B* in the absence of trade is considerably higher with catch control than under open access and the price correspondingly lower. This is due to the fact that catch control manages to prevent the biological overfishing which occurs under open access. That there is waste under catch control will become clear when we consider optimal management, to which we now turn.

Optimal management

With optimal management, the use of factors of production is given by setting the value of the marginal product of labour equal in both sectors of the economy. This is equal to one by definition in the "other goods" sector. From Equation 6. we get

$$(17)\quad P\frac{\partial X}{\partial(1-L)} \equiv Pq[1-2q(1-L]=1$$

which gives us three equations ([2], [6] and [17]) to solve for the three variables *P, X* and *L* in each country under autarky. With trade we have the same 11 equations as before,

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except that (17), which comes in two varieties, one for each country, must now be used instead of Equations (11) and (12).

The solution under autarky in countries *A* and *B* compared with open access is interesting, and is shown in Table 3.B.7. for the same numerical values of the parameters as under catch control. Country *B* gets 50% more of fish and of other goods in the optimal solution than under open access, but the relative price of fish is the same as under open access, since the consumption of both fish and other goods has increased in the same proportion. Country *A* actually has slightly less fish in the optimal solution than in the open access solution but much more of other goods. The price of fish is therefore higher in the optimal solution, because fish has become scarcer relative to other goods; the gain lies exclusively in getting more of other goods which are relatively cheaper to produce. Under

Figure 3.B.8. **Quantity of fish consumed in Country B**

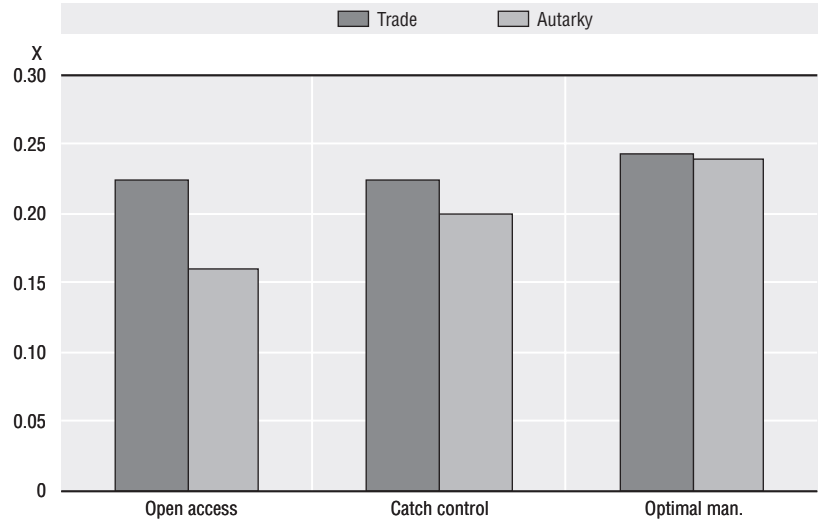

Figure 3.B.9. **Quantity of other goods consumed in Country B**

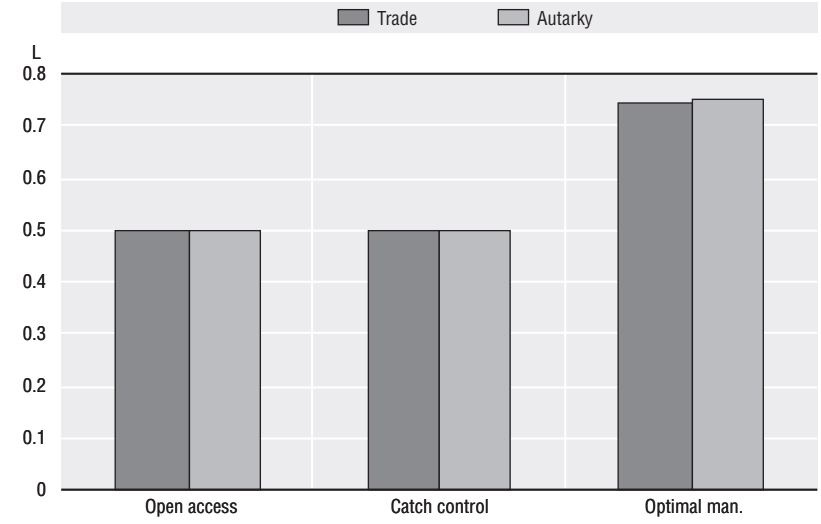

Table 3.B.7. **Comparison of open access and optimal management in Country A and Country B**

	Country A		Country B	
	Open access	Optimal man.	Open access	Optimal man.
Fish	0.25	0.22	0.16	0.24
Other goods	0.5	0.67	0.5	0.75
Price of fish	2	3.0	3.125	3.125

open access fish is relatively cheap because other goods are relatively scarce and not because fish is absolutely plentiful. In a real world situation, this price effect of optimal management would not be prominent, as less wasteful use of factors of production in fishing would affect many different goods and services, and the price of each would hardly change much, but the increase in the production of other goods and services could nevertheless be substantial.

We can now compare all three regimes. Figures 3.B.7. – 3.B.9. show the results under all three regimes for Country *B*. One thing to note is that with optimal management it is Country *B* that still imports fish, despite being more productive at fishing. This happens because Country *B* has a relatively large supply of other goods, because it does not need to use as much of its productive resources in its fishing industry[9], and is therefore more interested in buying fish from Country *A* and export some of its plentiful other goods. The gains from optimal management lie mainly in increased production of other goods, due to the elimination of the waste of factors of production in the fishing industry. We can also note that the open access and the catch control regimes are not very different in this respect; with catch control factors of production are still being used excessively in the fishing industry, which is why there is about the same quantity of other goods in both regimes, but depletion of the fish stock is prevented under catch control so there is more fish around.

Fishing from a shared stock – open access

It is possible to use the above framework to analyse the effects of opening up for trade when countries fish from a common stock. In order that there be any effects of trade the countries must differ somehow in economic terms. To keep within the above framework, it will be assumed that they differ with respect to fishing efficiency, so that Country *A* is more efficient than Country *B* ($q_A > q_B$). Under autarky they could fish simultaneously from a common stock, but their domestic prices would differ. With trade, the more efficient country would out-compete the other and be the only supplier of fish. Otherwise the solution of the model follows the same lines as above.

Figures 3.B.10 – 3.B.15. show the solution for some key variables with trade as a per cent of the autarky values. In figures 3.B.10. – 3.B.12. we have $q_A = 0.5$, and in Figures 3.B.13. – 3.B.15. we have $q_A = 0.7$. With the lower value there will be an increase in the total catch as a result of letting the more efficient country catch the fish whereas with the higher value this will result in overexploitation and a fall in the long term supply of fish. Otherwise the effects of opening up for trade are qualitatively similar. The price of fish falls in the less efficient country and rises in the country that will be the sole supplier of fish

after opening up for trade. Nevertheless, the utility level rises in the country that starts to import fish after trade has been allowed while in the other country the utility level falls. Hence the potential fish exporter will in fact lose from opening up for trade irrespective of what happens to the total catch; all trade does for this country is to entice it to waste its resources unnecessarily in the fishing industry.

Figure 3.B.10. **Price with trade** *versus* **autarky**

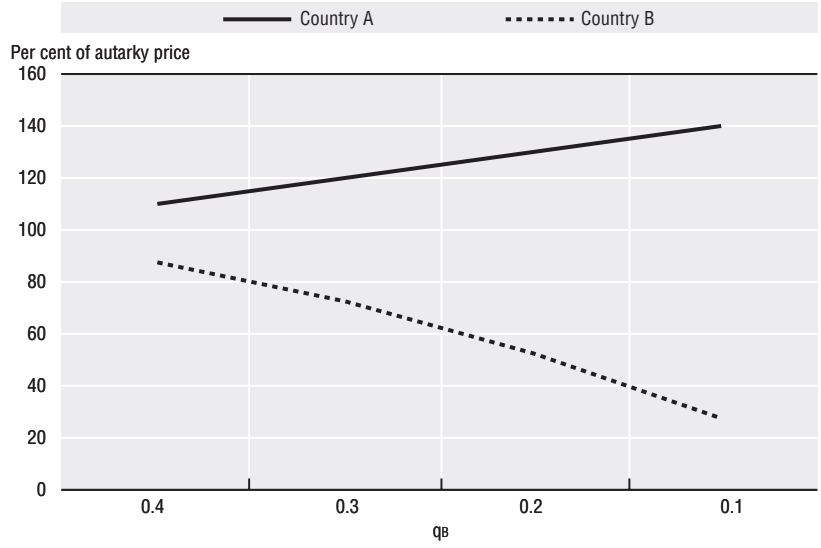

Figure 3.B.11. **Total catch with trade** *versus* **autarky**

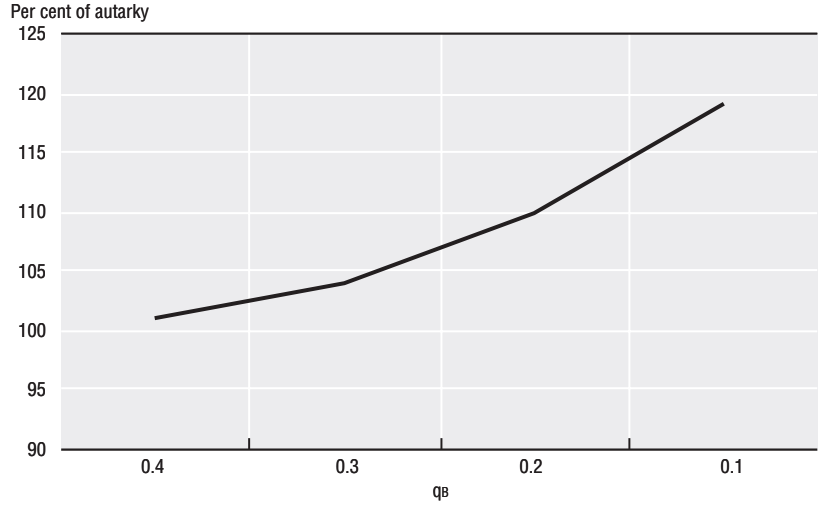

Figure 3.B.12. **Utility with trade** *versus* **autarky**

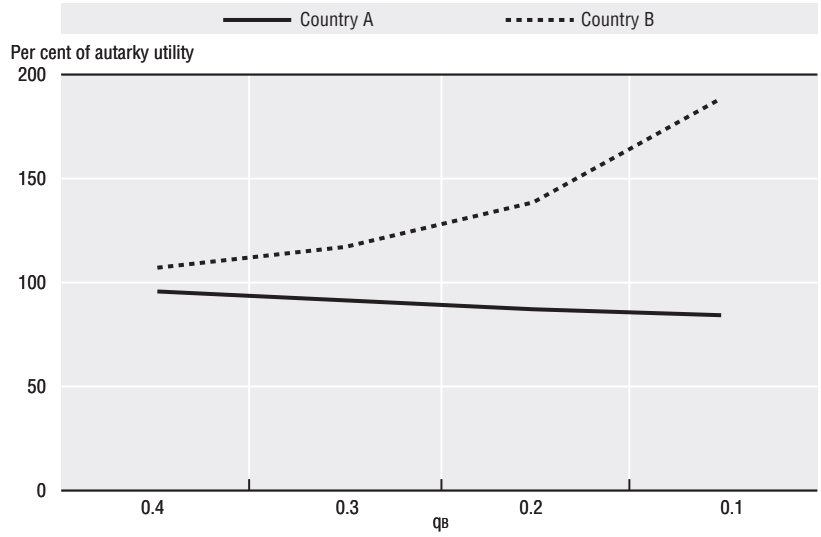

Figure 3.B.13. **Price with trade** *versus* **autarky**

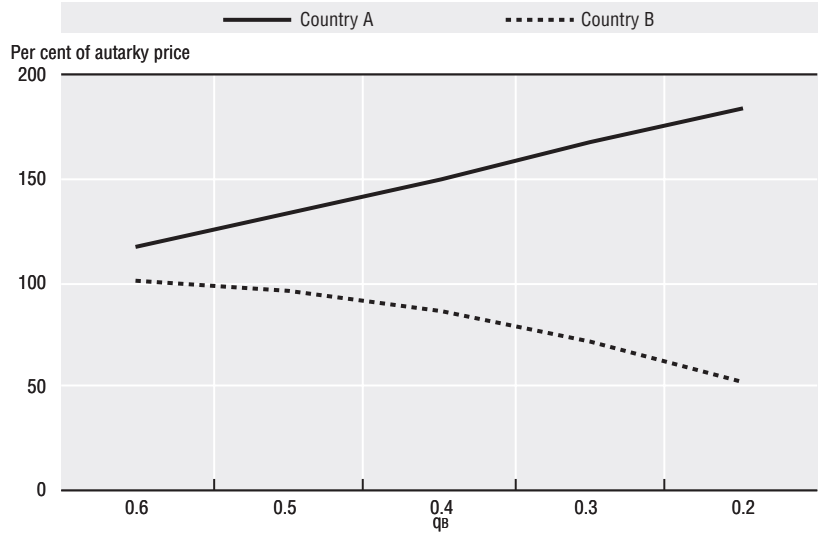

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Figure 3.B.14. **Total catch with trade autarky**

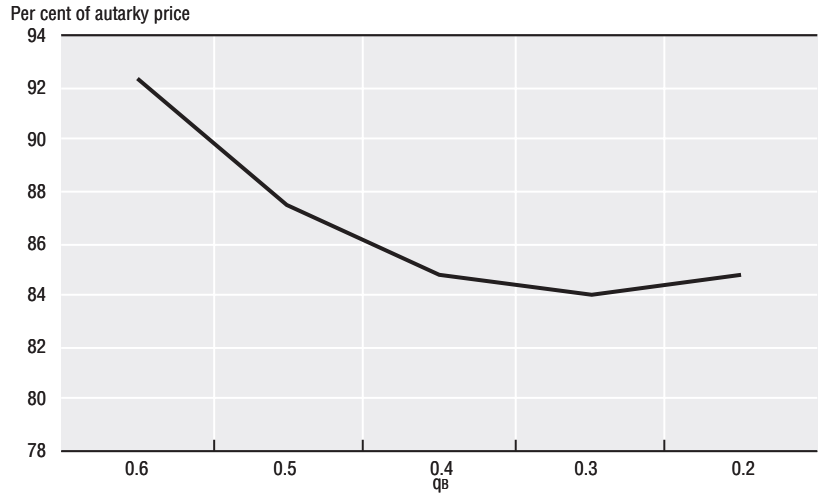
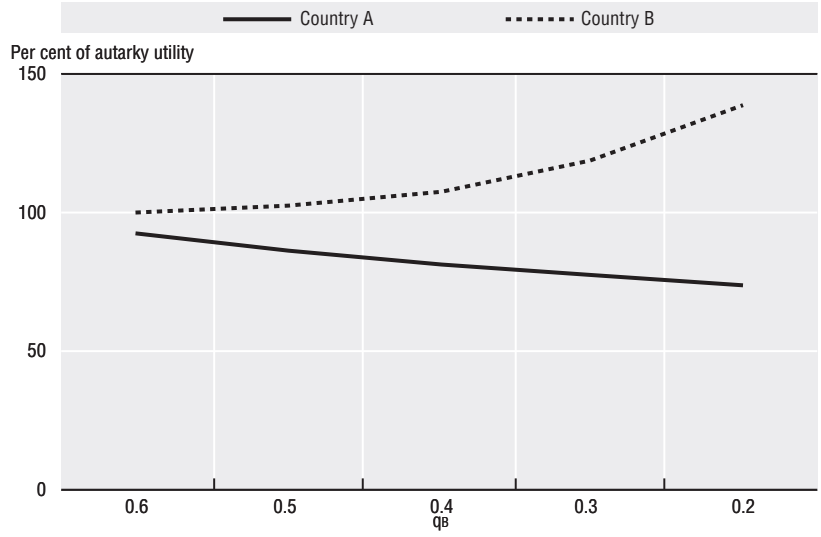


Figure 3.B.15. **Utility with trade** *versus* **autarky**



C. Effects of Trade Liberalisation on Supply in Selected Fisheries Management Regimes[1]

1. Introduction

The purpose of this paper is to discuss the effect of various trade and industry support measures on the supply of fish under the following specific fisheries management regimes: (i) aquaculture; (ii) high seas fisheries; (iii) fisheries under bilateral agreements, especially joint stock fisheries; (iv) under-exploited fisheries; and (v) multi-species fisheries.

There is a plethora of measures being used, or which could be used, for affecting trade and to support the fishing industry. The OECD Secretariat has provided the following list of measures:

- Relaxation in border measures
  - ❖ Reduction in tariffs
  - ❖ Suspensions/quotas
  - ❖ Preferential arrangements
- Non-tariff measures
  - ❖ Quantitative import restrictions
  - ❖ Price mechanisms
  - ❖ Export measures
- Government financial support
  - ❖ Market price support
  - ❖ Direct payments
  - ❖ Cost reducing transfers
  - ❖ General services
- Sanitary and hygiene regulations
  - ❖ Technical import requirements
  - ❖ Labels
  - ❖ Trade information schemes
- Access to ports
- Investments
- Services

The discussion of the effects of these measures on the supply of fish can be greatly simplified by noting that a change in price can be taken as a proxy for a change in all of these measures. A **reduction in tariffs** will lead to a higher price for producers in countries exporting to the country which reduces the tariffs, although possibly not by the same

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amount as the reduction in tariffs. For producers in the country lowering the tariff the price will go down. **Suspensions of tariffs**, **tariff-free quotas**, and **preferential arrangements** will have the same effect; they all amount to a higher price for producers in exporting countries, albeit for a restricted volume of exports. For producers in the country suspending tariffs, introducing tariff free quotas, and entering into preferential agreements the opposite will happen; their prices of the affected products will fall. Relaxation of **quota restrictions** lead to the same kind of supply response from exporters as a higher producer price; if quota restrictions are effective the exporters will want to sell a greater quantity but cannot do so because of the restrictions. For producers in the country applying the quota restrictions the opposite will happen; import quotas will allow them to sell at higher prices, so removing the quota restrictions will depress the price.

Price mechanisms are more difficult to deal with. Typically price mechanisms, as tools to discourage international trade, amount to a ban on selling below a certain minimum price.[2] Such measures can be said to be analogous to an import quota; an import quota would lead to a higher price in the country imposing the quota. A minimum price restricts the amount traded to what the consumers are willing to buy at a higher price than otherwise would prevail. Relaxing the minimum price would thus have the same effect on supply as relaxing an import quota and raising the producer price for exporters while for producers in the country applying the minimum price the opposite will happen. **Export measures** can be a variety of things, but if their purpose is to restrict trade their removal will have the same effect on supply as a rise in the producer price for exporters, while removal of measures that encourage exports (subsidies of exports, for example) will have the opposite effect.

Table 3.C.1. summarizes the effect of relaxing border measures (reducing tariffs, relaxing import quotas, etc.) on supply in exporting and importing countries and how it depends on the management regime applied in the fishery. This table draws in part on analysis in an earlier paper written for the Fisheries Committee, and in part anticipates later analysis in the present paper. As discussed in the previous paper, the effects depend critically on how the fish stocks are managed, with open access giving rise to apparently perverse supply effects (supply falls in the long term as the price of fish rises). The same thing can in fact happen in a fishery that is managed optimally, from an economic point of view, but for a very different reason. As the price rises it may in fact be economically optimal to push stocks below the level of maximum sustainable yield, because of the discount rate effect. For stocks with negligible fishing costs relative to the price of fish, or a unit cost of fish that is independent of the exploited stock, it can be shown that the optimum stock level is determined by equality between the marginal growth rate and the discount rate, which implies a standing stock below the maximum sustainable yield level. A rising price of fish may push a stock into the region where the optimal stock is below the maximum sustainable yield level. A case like this will be encountered below in the discussion of what may happen in high seas fisheries and in the discussion of supply response in under-exploited fisheries. The possibility that a rising price would lead to a fall in supply has been put in parentheses, because this is probably unlikely to happen in an optimally managed fishery.

Table 3.C.1. also shows what will happen in aquaculture. If the supply of feed is no constraint, aquaculture will respond in the same way as farming; a rising price will bring forward an increase in supply. If, however, feed is a constraint and an expansion of aquaculture leads to a rising price of feed and feed fish the response will depend on the

Table 3.C.1. **Effects on price and quantities of market liberalisation** *i.e.* **relaxation of border measures in importing country – two country situation**

	Exporter	Importer
I. Fishery managed by TAC set without reference to economic factors	↑p 0q	↓p 0q
II. Open access		
a) Stock above MSY level	↑p ↑q	↓p ↓q
b) Stock equal to MSY level	↑p ↓q	↓p ↓q
c) Stock less than MSY level	↑p ↓q	↓p ↑q
III. Optimal management (TAC set with reference to economic factors)	↑p ↑q (↑p ↓q)	↓p ↓q (↓p ↑q)
IV. Aquaculture		
a) Feed available without significant price rise	↑p ↑q	↓p ↓q
b) Managed fishery for captured feed fish	↑p ↑q (or 0q)	↓p ↓q (or 0q)
c) Open access fishery for captured feed fish	Same as in II above	Same as in II above

management regime in fisheries for feed fish, for very much the same reason as the supply in capture fisheries for consumption fish depends on the management regime for these stocks. If feed fisheries are badly managed or not at all, an increased price of cultivated fish may lead to a reduction in the supply of feed and hence to a reduction in the supply of farmed fish.

Government financial support normally has the same effect on supply as a higher price. **Market price support** obviously has this effect. **Direct payments** are likely to have the same effect; they certainly will if they are directly linked to the quantity produced, but it is possible to envisage direct payments as a lump sum transfer unrelated to production. Such payments may nevertheless have the same long run effect on supply as a price increase, because they are likely to encourage the entry of new firms into the industry if they are perceived as recurring events or something which entrants to the industry would be entitled to. **Cost reducing transfers** have the same effect as a price increase, as they increase the net price the producer receives for his product. Public provision of **general services** to the industry has an effect similar to a cost reduction; some activities that the industry would otherwise have to provide at its own expense are provided at the taxpayers' expense. **Sanitary and hygiene regulations**, technical import requirements such as **labels** and **information schemes**, and restricted **access to port and services** all translate into higher cost with effects similar to a lower price for producers in exporting countries.

Finally, it may be noted that some of the above measures have a trade diversion effect as well as a supply effect. Tariff reductions, quota relaxations and the like in Country *X* will make that country a more attractive destination of exports than Country *Y* which does not change its trade regime. Hence, exports from Country *Z* will to some extent be diverted from Country *Y* to Country *X*. This diversion effect could be greater than the net supply effect. Third import countries could thus experience less supply and higher prices of fish as a result of a particular import country or a group of countries relaxing their trade regimes. Another possibility of such secondary effects, which may be important, is the possible impact of an expansion of aquaculture (in response to a relaxation in the trade regime for fish) on the price of fish meal, the trade in fish meal and agricultural products now produced with fish meal, and the trade in substitutes for fish meal (soya meal).

2. Supply Response in Aquaculture

Aquaculture is in many ways more similar to agriculture than to capture fisheries. Cultivated fish are raised either in pens in coastal waters or in ponds or tanks onshore. The fish farmer grows juvenile fish to an optimal size and buys feed and other inputs for this purpose. The production process is controlled, but just like in agriculture it can be adversely affected by natural phenomena such as diseases, algae blooms, etc.

As long as more feed can be bought on the market, eventually at a higher price, and as long as there are sufficient farm sites available, eventually at a higher cost, the supply of farmed fish will increase as long as it is sufficiently profitable. There are undoubtedly many potential sites available for new fish farms, but it may be noted that the fish farming industry seems to be coming up against tighter and tighter constraints with respect to location of fish farms. These constraints arise from environmental concerns and competing uses of the coastal zone for leisure purposes. In some countries (Scotland, the United States) it has become quite difficult to obtain permissions for new fish farms. This notwithstanding, it does not appear likely that unavailability of sites will choke any positive response in production to continued profitability for good many years to come.

The expansion in fish farming can take the form of increasing the production of already farmed species or the introduction of new species. The latter depends on technological progress or a rise in price that will make it profitable to raise a particular species of fish on a fish farm. The farming of cod is an example of the latter; it appears to be technically feasible but the price of cod is hardly high enough as yet to justify farming of this fish on a major scale. Farming of each particular species will of course be responsive to changes in the price of that particular species. Major cross effects are not to be expected (i.e., a fall in the price of species *X* will increase the supply of farmed fish of species *Y*, because *Y* will have become relatively more expensive), because there are only a few species that are farmed on any major scale. Furthermore, the water temperature in each particular location restricts what kind of fish can be raised there; salmon cannot be raised in the Mediterranean, and sea bream and sea bass cannot be raised along the Norwegian coast.

As to the availability of fish feed, it is possible that this will cause some unexpected and counterintuitive supply responses in fish farming. Feed for farmed fish is mainly derived from captured fish, and it is through this link with the capture fisheries that we might get supply responses in fish farming similar to what we otherwise get in open access capture fisheries. As discussed in the previous paper written for the Fisheries Committee, the supply response in capture fisheries depends critically on the type of management applied in each particular fishery. In what follows we present possible supply responses under alternative management scenarios produced by a numerical model further explained in Appendix 1.

Before discussing the results produced by the model in Appendix 1, a word of warning is in place. The results are essentially due to the mechanism that increased demand for fish feed will lead to a rising price of fish used to produce fish feed. Such development, if it ever happens, could be a long way off, however. There is still a wide scope for increasing the supply of fish meal for the production of fish feed. Only 20% or less (17% in 1996) of all fish meal produced in the world is used for fish feed, and the development in fish meal prices is closely related to the development of substitute meal (soya meal) in poultry production.[3] An increased demand for fish feed is likely, therefore, to divert fish meal from

poultry production to the fish feed industry before its price starts to rise, gets "detached" from the soya meal price, and starts to further encourage the exploitation of feed fish.

The model in Appendix 1 has two types of fish, fish that is consumed directly and fish used for feed. The fish that is consumed directly can either be captured wild or farmed. The wild fish feeds on the feed fish, but the feed fish is also captured for conversion into feed for the farmed fish. With the stage being set in this way, the possible parallels to capture fisheries are clear. A rising price of consumption fish will ultimately cause overexploitation in open access capture fisheries. The same will ultimately happen, however, in aquaculture, because the rising price of farmed fish will cause the price of feed to rise and ultimately cause overexploitation of feed fish if there is an open access regime in such fisheries. This will also have repercussions for the capture fisheries through less feed fish being available for the captured consumption fish.

Note that even if the model has the trappings of a closed ecosystem it should not be understood literally in this way. The purpose of the model is to show in a simple and transparent manner what may happen as a result of a rising demand for farmed fish. Empirical work would have to look at separate ecosystems, the links between them, and the aggregate outcome from all of them. In what follows we discuss the supply response to a rising price in consumption fish (capture fish and farmed fish) under alternative management regimes for capture fisheries, as produced by the model.

With **open access** in capture fisheries, the sustainable catches of consumption fish will rise with the price up to a certain point and then fall, as a further price rise encourages overexploitation (Figure 3.C.1. in Appendix 1). But the picture is not radically different, as far as the total production is concerned, with consumption fish being produced on fish farms in addition to the capture fishery. With open access to feed fish stocks the production of farmed fish would rise up to a maximum and then fall, just as the production of capture fish. The reason is that a rising price of consumption fish increases the demand for fish feed and thereby the price of captured feed fish. This, in turn, will encourage overexploitation of feed fish and ultimately lead to a decline in catches of feed fish. Because farmed fish depends critically on feed from captured fish, this will lead to a declining supply of farmed fish. An expansion of farmed fish may have a substantial effect on the production of consumption fish, through diminishing the supply of feed fish for captured consumption fish (see Figure 3.C.2. in Appendix 1).

Needless to say, the above conclusions depend critically on the assumption that feed can only be derived from captured fish. If it turns out be possible to produce fish feed from other sources (agricultural products, for example) the production of farmed fish would not come up against these constraints. Furthermore, the price level at which the supply of farmed fish bends over backwards (a higher price results in less production) depends on the constraints set by the surplus production of feed fish stocks. How soon the fish farming industry runs into these constraints depends on whether the catches of feed fish can be further increased, or whether fish meal now used for raising chickens and other animals can be diverted to the production of fish farming. Fish meal for feed production is typically derived from pelagic species like anchovy, capelin and herring, and there are indications that the stocks of these species are and have for some time been fully exploited.

Optimal management of the entire system (fish farming and capture fisheries) leads to quite different results (see Figure 3.C.3. in Appendix 1). Here the supply of fish increases uniformly with the price but at a declining rate towards an upper limit determined by the

productivity of nature. The supply of farmed fish rises uniformly as the price of fish rises, but at a declining rate and also approaches an upper limit. The limited productivity of nature also puts constraints on fish farming as long as the latter depends on the input of captured fish.

An important point to note is that fish farming comes on the scene at a lower price of consumption fish under open access than with optimal management. Under open access the capture fishery for feed fish starts when the price the fish farmers are willing to pay for feed is high enough to make the capture fishery for feed fish profitable. The reason why it is not optimal to start up fish farming as soon as the willingness to pay for feed fish exceeds the cost of catching that fish is that feed fish has a shadow value as feed for wild fish. Only if fish farming can pay the full cost of captured fish including this shadow value would it be optimal to start up fish farming. Note that this shadow value depends on how strongly the feed fish affects the growth of consumption fish. If the feed fish did not affect the growth of any consumption fish its shadow value would be zero and fish farming would optimally be started as soon as the willingness to pay for feed fish exceeds the cost of capturing it.

The shadow value of feed fish raises a further important question about whether optimal use of feed fish would be likely to emerge in uncontrolled markets. The answer is, most likely not. For this to happen there would have to be some authority imposing a tax on the captured feed fish reflecting its shadow value as input for wild, captured fish. This might perhaps happen if it is the same country that captures the feed fish and the consumption fish, but it is not likely to happen if these two types of fish are caught by different countries or not subject to a unified management.

This argument can be taken as an argument for imposing trade restrictions to take account of the shadow value of feed fish not otherwise accounted for. This could be done through tariffs on feed fish or meal and fish feed derived from it. Tariffs on farmed fish would not be a satisfactory substitute for such tariffs, because feed fish has a shadow value irrespective of whether it is ultimately used to feed chickens or farmed fish or whatever. It must also be noted that the data requirements and analysis to establish an empirically convincing case for tariffs or other trade restrictions for this reason are daunting. The tariffs that would have to be applied would vary, depending on where the feed fish is coming from, as there are many different sources of feed fish each with its own shadow value as feed for fish in the wild. In some ecosystems the value of feed fish may not be significant because of a large surplus production of feed fish and little exploitation of species that feed on them. The Peruvian anchoveta might be an example of this. In other cases the shadow value of feed fish could be high. The importance of capelin as feed for cod appears fairly well established so the shadow value of capelin is likely to be high. Contemporary practices in fisheries management may in fact take a rudimentary account of this. The capelin fishery in the Barents Sea has in recent years mostly been closed because of estimated high predation by cod. Table 3.C.2. summarises the outcome.

A possible and perhaps likely management scenario is **separate management** of the stocks of feed fish and consumption fish. This is almost bound to happen if the two stocks are managed by separate entities (countries or organisations). The total supply of consumption fish would be somewhat lower under such local optimization than with global optimization (see Figure 3.C.5. in Appendix 1), except at low to moderate prices where the local optimization in fact leads to too large fish production. Open access in all

Table 3.C.2. **Effect of a rise in the price of cultivated fish on aquaculture output and the output of capture fisheries if feed is a constraint**

Management regime in capture fisheries	Effect on output in aquaculture	Effect on output in capture fisheries for consumption fish
I: Open access	Output rises for sufficiently low prices but as the price of feed fish increases the stocks will ultimately be exploited beyond MSY, supply of feed falls and aquaculture output falls.	Lower stocks of feed fish lead to less growth of consumption fish. Higher price of consumption fish leads to less supply as stocks are pushed beyond MSY.
II: Capture fisheries for feed fish and consumption fish managed separately	Output rises and flattens out as supply of feed cannot be further augmented	Output of consumption fish falls as the price exceeds a certain level.
III: All capture fisheries managed as a whole	As in II, but aquaculture is initiated at a higher price than under II.	As in II, but output of capture fisheries continues to rise with price longer than in II.

fisheries would, needless to say, lead to much less supply of fish once the price exceeds some critical level. The quantitative difference between these three regimes would in the real world depend on the actual relations in the various ecosystems of the world.

3. Supply Responses in Shared Stocks and High Seas Fisheries

Shared stocks are fish stocks that migrate between the exclusive economic zones of two or more states. Cooperation between the states involved is therefore necessary in order to manage such stocks effectively. Stocks that are partly or wholly outside the 200-mile limit can also be regarded as shared stocks, with the important difference that the number of countries involved is not clearly limited and cooperation therefore less likely.

In this section we shall look at how a higher price might affect the supply from shared fish stocks. If the countries sharing a stock cooperate in realising an optimal utilisation of the stock, a rise in the price of fish is likely to increase the supply from the stock, provided the countries continue to cooperate after the price has risen. This effect need not be great, however, particularly if the price is already high, because nature sets limits to how much can be caught from any fish stock. It is in fact also possible that a rise in the price of fish will reduce the long term supply from an effectively managed stock (see Figure 3.C.8. in Appendix 2 and the discussion thereof). The reason for this is the following. When the cost per unit of fish caught is sufficiently low it is optimal to push the stock below the level which maximises sustainable yield, because of the discount rate effect. This, needless to say, implies that the supply will be less than the sustainable maximum. With a zero cost per unit of fish caught (or, more precisely, when the cost per unit of fish caught is independent of the stock level) the optimum stock level is at the point where the marginal surplus growth rate is equal to the discount rate. The effect of a rising price is to reduce the cost per unit of fish caught relative to the price of fish, and a sufficiently high price of fish would make the cost per unit of fish caught negligible.

Unfortunately, there is some reason to believe that a rise in the price of fish may erode the incentives to cooperate on managing fish stocks. This comes about in the following way. Suppose N countries are cooperating in realizing an optimal utilization. There will always be some short term gains for anyone who decides not to continue the cooperation; until others discover that he has stopped cooperating the deviating agent will be able to obtain a greater profit than otherwise by driving down the fish stock below the level consistent with cooperation. But as soon as the other partners discover this they will retaliate by also stopping their cooperation. This will in fact be the best they can do if the

deviating agent persists in not cooperating. Some period of non-cooperation will in any case be necessary to ensure that agents will not be tempted to stop cooperating and then get off lightly by promising to return to the fold. A higher price of fish may increase the short term gains from non-cooperation more than its long term cost and hence lead to a switch from a regime of cooperation to one of non-cooperation.

There are many ways in which a strategic game between a number of agents sharing a fish stock can be sensibly formulated. In Appendix 2 one particular model is considered. The logic of the model is as follows. *N* agents share a stock and regard the exploitation of the stock as a repeated game. They therefore use a long (infinite) time horizon in calculating the benefits of alternative strategies. The payoff from the cooperative strategy is the net present value of an infinite series of optimal catches. Each agent compares this to an alternative strategy of "defection" where he depletes the stock to a break-even level and cashes in an extra profit from this. This extra profit will, however, be a short term gain; as soon as the other agents find out about the defection they will retaliate by participating in the depletion of the stock to the break even level. The long term aggregate profit will fall and in the end everyone will be worse off than otherwise, but still the agent who started the defection process may gain from this, as his short term gains may outweigh his long term loss.

The effects of a change in the price of fish on supply from shared stocks, including high seas fisheries, are difficult to predict, and their direction is not related to whether or not stocks are overexploited. There could very possibly be a "perverse" supply response, as under free access, i.e., a higher price leads to less supply of fish in the long term. The reason why it is difficult to predict the effects on supply of a change in the price of fish is that the incentives for agents sharing a stock to cooperate may be either strengthened or weakened by a rising price, depending on the particular situation and how it is perceived by the agents. If a higher price of fish leads to a breakdown in cooperation so that the stock becomes overexploited, the supply of fish will fall in the long term.

Several cases are discussed in Appendix 2. In the first case, agents cooperate if the individual gain from breaking away from cooperation is less than the loss from doing so. Even if the gain is a short term one and the loss is permanent, the former could outweigh the latter, because of time discounting. A higher price of fish could increase the short term gain more than the long term loss and lead to a breakdown in cooperation, in which case long term supply will fall (See Figure 3.C.6. in Appendix 2 and the accompanying discussion).

Another case is where the incentives to cooperate depend on differences in fishing costs among agents. Specifically, what can happen is that low cost agents can exclude high cost agents from the fishery by making sure that the stock at the beginning of a fishing season is always too small for the high cost agents to fish profitably. Strategies of this kind are perhaps particularly relevant for high seas fisheries where newcomers are likely to have higher costs than the incumbents. In Appendix 2 a specific, two agent example is discussed. For a low enough price of fish, the real cost (cost per unit of effort divided by the price of fish) difference between a low cost agent and a high cost agent is sufficient to make it profitable for the low cost agent to keep the high cost agent out of the fishery by fishing down the stock. As the price rises the real cost differential is eroded, and the low cost agent has to fish down the stock further and further, implying that long term supply falls with a rising price, just as in the open access case. But as the price rises beyond a certain point the

real cost differential becomes so small that it is no longer profitable for the low cost agent to keep the high cost agent out of the fishery, and so cooperation takes over and the long term supply of fish rises. The upshot of this is that as the price of fish rises from some low level the long term supply will increase at first, then fall, and then rise again as the price becomes sufficiently high (for details, see Figure 3.C.7. in Appendix 2 and the accompanying discussion).

The final example in Appendix 2 concerns a stock that straddles out of the economic zone. The fact that the stock is partly accessible for a possibly indeterminate number of agents significantly erodes the incentives for the coastal state to leave a large stock behind at the end of each fishing season, as the benefits will to some extent accrue to other agents. The agents fishing outside 200 miles are assumed to deplete the stock each period to its break-even level, because they are assumed to be many and competing with one another. The incentive for one particular agent to leave behind a stock above the break even level would be weak, as this would primarily benefit other agents.

Since most of the stock is accessible within 200 miles, it makes sense for the coastal state managing the stock not to deplete the stock all the way down to the break-even level; the coastal state, or a consortium of cooperating coastal states, would get the lion's share of any benefit from leaving behind a stock above the break-even level. The incentive to do so will, however, be considerably weaker than if the coastal state was the sole owner of the stock. In the example discussed in Appendix 2 (see Figure 3.C.8. and the accompanying discussion) the total catch from a straddling stock is only 60 – 70% of what it would be if all of it were inside the economic zone and the coastal state managed it optimally. In the example, only 10% of the stock is assumed to be accessible outside the economic zone, so straddling erodes the long term supply of fish much more than the degree of straddling might lead one to believe.

To sum up, the above discussion shows that the effects of a rise in the price of fish on the long term supply of fish from shared stocks, including stocks on the high seas, are complicated and sometimes counterintuitive. A rising price affects the incentives those who share a stock have to cooperate *versus* not to cooperate. In some circumstances a rise in the price of fish could strengthen the incentives not to cooperate *vis-à-vis* the incentives to cooperate and reduce the long term supply of fish. In other cases a rise in the price of fish might weaken the incentive for low cost agents to exclude their high cost competitors sufficiently for the former to go for a cooperative solution, which would increase the long term supply of fish. It is not possible to draw a general conclusion about the effect of a rising price on the supply from shared stocks; what will happen will depend on the particulars of each case.

In terms of market liberalization, what this means is that the effects of market liberalization on the long term supply of fish from shared stocks and stocks on the high seas are difficult to predict, as these effects will be case-specific.

4. Stocks under Bilateral Access Agreements

There are two major types of bilateral access agreements. The first is about exploitation of shared stocks that migrate between two adjacent economic zones. The coastal states involved may find it in their mutual interest to allow each other access to each other's zones for fishing such stocks, for example because of changes in the seasonal availability of fish. The case of shared stocks has already been discussed. The effects of

changes in the price of fish on access agreements will be related to how they affect cooperation on a shared stock in each particular case; if it breaks down the access agreement would probably be discontinued.

The other case is where one coastal state allows another, perhaps a distant water state, access to its economic zone, because it does not find it worthwhile to exploit its own fish resources, not fully at any rate. Such access agreements could be due to differences in the cost of fishing, or because the distant water fishing nation subsidizes its distant water fishing. A rise in the price of fish would erode these cost differentials, as discussed above for two countries sharing a stock. As a consequence, the coastal state allowing access to its waters may conclude that it gains less from allowing others access to its waters than it would gain by taking the fish itself. A rise in the price of fish could therefore bring such access agreements to an end. Ending such agreements need not have much of an effect on the total supply in the long term. In the short term there might be a fall in the total supply if the host country does not have enough fleet capacity to utilize its resources optimally, but as such capacity is built up the optimal rate of utilization would be similar to the one under the bilateral access agreement, the cost differential between the two countries having been largely eroded. Whether or not the host country would manage to achieve an optimal rate of utilization under the two arrangements is another question, and if that is not the case it is difficult to give any clear answer to the question how the abandonment of bilateral access agreements would affect supply.

5. Supply Response in Under-exploited Fisheries

An under-exploited fishery is one where the stock is above the level which would yield maximum surplus growth, alias maximum sustainable yield. The effect of a higher price on the yield from such stocks is clear; it would lead to intensified exploitation, reduce the stock level and increase surplus growth and sustainable yield. Under open access, the stock would become overexploited as the price rises beyond a certain level, and the long term supply of fish would fall.

Curiously, perhaps, the same thing would happen even if the stock were optimally managed in economic terms. This is due to the earlier mentioned discount rate effect. What is involved here is the following. Economically optimal exploitation means maximization of the present value of future rents from the stock. Taking less than the maximum sustainable rent involves a permanent loss. But there is more involved. A more intensive exploitation will always increase rents in the short term, even if they fall in the long term. Maximizing present value involves balancing the short term gain in rents 7and the long term loss in rents. Even if the loss of long term rents is permanent and thus infinite it will have a finite value because of the discount factor; losses that occur far into the future are negligible in present value terms, so that the infinite time series of losses has in fact a final value, just as the geometric time series we learned about in our high school algebra. Hence it could be justifiable in economic terms to push a stock below the maximum sustainable yield level, even if it involves a permanent loss in rents. For stocks where the cost per unit of fish caught depends on the size of the stock, which is probably the normal case, this would only occur at a sufficiently high price. This is why the long term supply from an optimally managed stock might fall as the price rises beyond a certain level, but that level is much higher than the price level beyond which long term supply falls with a rising price under open access. This effect in fact occurs in Appendix 2 (see Figure 3.C.8. and the discussion related to it).

Table 3.C.3. **Effects in long term supply in a multi-species fishery where a fleet exploits both species *A* and *B***

	Long term supply of A	Long term supply of B
Open access		
Vessels haMve sufficient freedom to switch effort from Species *B* to *A*	↑ if stock of *A* above MSY level ↓ if stock of *A* below MSY level.	↓ if stock of *B* above MSY level ↑ if stock of *B* below MSY level.
Both species fished indiscriminately	Same as above	Same as for *A*
Optimal management		
Vessels have sufficient freedom to switch effort from Species *B* to *A*	↑ (↓ if discount rate effect important) ↑ if stock of *A* above MSY level	↓ (– if discount rate effect important) ↓ if stock of *B* above MSY level
Both species fished indiscriminately	↓ if stock of A below MSY level.	↑ if stock of *B* below MSY level.

This kind of counterintuitive supply response is very different from the one occurring under open access. Normally it means much greater standing stocks (even if the optimal stock is below the maximum sustainable yield level), and it occurs at a much higher price than the "perverse" supply response under open access. It is, however, possible that the concurrence of a low stock growth rate relative to the discount rate and insensitivity of the cost per unit of fish caught to the size of the exploited stock will imply a very small optimal stock or even one that is fished to extinction.

6. Supply Response in Multi-species Fisheries

Multi-species fisheries are of two types: (i) two or more fish species are fished simultaneously and possibly indiscriminately; and (ii) two or more fish stocks which are ecologically related are fished separately. The stocks involved in the first type of fishery need not be related ecologically, but most often they would be at a similar level in the food web and therefore competing for food.

Consider, first, fisheries of the first type. We confine the discussion to the two-species case, as it would quickly get complicated and the outcomes more uncertain if three or more species are involved. What will happen to long term supply as a result of a price increase will depend on whether the stocks are managed or not. We consider two cases, open access and economically optimal management. In the third case of management by TACs set on the basis of biological criteria only (MSY for example) nothing would happen, given that the TAC-management is effective. This case was considered in great detail in the previous paper written for the Fisheries Committee.

Let us look, first, at the **open access** case. If the price of species *A* goes up it would be worthwhile to divert more effort to that species rather than species *B*, the price of which has not risen. Species *A* might become overexploited, or more overexploited than before, while Species *B* would become less exploited. The result for long term supply would depend on whether the stocks had been driven down below the MSY-level and is shown in Table 3.C.3. If both types of fish are taken indiscriminately the rise in the price of species *A* will lead to an intensified exploitation of species *B* as well. Again, what happens to the long term supply depends on whether or not the stocks are overexploited and is shown in Table 3.C.3.

With **optimal management**, effort would be diverted from Species *B* to Species *A*. This would normally lead to an increase in the supply from *A* and a decrease in supply from *B*. The exception would be the discount rate effect which we have already discussed. In Table 3.C.3 the discount rate case is put in parentheses.

Table 3.C.3 shows effect of a price increase for Species *A*

If both species are fished indiscriminately, the optimization of the fishery would involve some careful tradeoff between the yields of the two species. It is possible that it would be optimal to overexploit species *B*, or *A* for that matter, even if the discount rate effect is negligible, depending on which of the two is most valuable and productive. Qualitatively the results are similar to what obtains under open access but quantitatively they are different, being the result of a careful tradeoff between the yields of the two species. A case in point is shrimp fisheries where other types of fish, including juveniles of valuable species that have not yet reached a commercially valuable size, are taken in conjunction with high priced shrimp. A higher price of shrimp would lead to more exploitation of such unwanted fish, with adverse effects on other commercial fisheries.

Then consider fisheries of type (ii), ecologically dependent species. The effect of a rising price of species *A* on an ecologically related species *B* depends on the kind of relationship between the species. If *A* and *B* compete for the same food, or *A* feeds on *B*, an intensified exploitation of *A* will increase the surplus production and sustainable yield of species *B*; there will be more food available for *B* or the predation pressure on *B* will become less. If, on the other hand, *A* is a feed fish for *B*, or they are in a symbiotic relationship, the opposite will happen; an intensified exploitation of *A* will reduce the surplus production and sustainable yield of *B*. The effect on the supply is the same as the effect on surplus production, the direction of which would not depend on whether the fishery was being managed or not. Under open access, however, an increase in surplus production could to some extent, but probably not fully, be eroded through an expansion of effort due to a temporary rise in profits.

So, the effects of market liberalization in multi-species fisheries can be somewhat complicated and counterintuitive. Market liberalization for one particular type of product, or species could have repercussions for the supply from other species, either because both are fished by the same fleet and possibly indiscriminately, or because of inter-species dependence. The inter-species dependence was in fact at the core of the problem we looked at above for aquaculture.

7. Conclusion

In this section we have discussed the effects of a rising price on the supply of fish in selected fisheries regimes. The effect of a price rise is shorthand for effects of various trade and market liberalization measures that amount to a rising profitability of fishing in an exporting country; tariff reductions, relaxation of quota constraints, easier trading of goods across borders, and economic support of the fishing industry.

The first case considered was aquaculture. Aquaculture has many similarities with agriculture and the effect of a rising price on output is likely to be similar. Aquaculture depends, however, on feed derived from other fish, and the supply of feed may become a constraint to such an extent that a rising price of farmed fish would lower the supply of farmed fish. This would happen as a result of open access in fisheries for feed fish, but even if these fisheries were managed there could be negative repercussions for other capture fisheries, so that the total supply of consumption fish would not increase by nearly as much as the supply of farmed fish.

For shared stocks and stocks on the high seas the effect of a price rise could be complicated and counterintuitive. A higher price of fish could erode the incentives for

countries to cooperate on stock management and reduce the long term supply of fish. The opposite could also happen if there is a cost differential between countries; an increasing price would erode the real cost differential to the extent that a low cost country has more to gain by cooperating and sharing a stock than by keeping high cost competitors out by overexploiting the stock.

In cases where distant water fleets fish in the economic zone of a coastal state under a bilateral agreement, a rising price of fish could make it profitable for the coastal state to overtake the fishery, because the price increase erodes its cost differential vis-á-vis the distant water fleet. The effect of this takeover of the coastal state on the long term supply would probably not be great and could go either way.

Finally, multi-species fisheries were briefly considered. A rise in the price of a targeted species would increase bycatch and thus have an adverse effect on the stock of bycatch species. When the bycatch consists of juveniles of little commercial value the effect on fisheries for such species will be negative. For ecologically interdependent fisheries the effect of a price rise for one species on the supply of related species would depend on the nature of the ecological relations.

Notes

1. Professor Rögnvaldur Hannesson of the Norwegian School of Economics and Business Administration, Bergen, Norway wrote this section. Opinions and ideas pertaining to this paper are those of the author and are not necessarily shared by the Committee for Fisheries.
2. An example is the current agreement between Norway and the European Union on exports of salmon.
3. On this, see F. Asche and S. Tveterås: "*On the Relationship between Aquaculture and Reduction Fisheries*". Paper presented at the Tenth Biennial Conference of the International Institute of Fisheries Economics and Trade, Corvallis, Oregon, July 10 – 14, 2000.

Appendix 3.C.1. The interaction of aquaculture and capture fisheries

To study the interaction of aquaculture and capture fisheries we shall use a two-species model originally formulated by Larkin*

$$\text{(1a)} \quad \frac{dS_1}{dt} = a_1 S_1 - b_1 S_1^2 + d_1 S_1 S_2 - Y_1 \equiv G_1(S_1, S_2) - Y_1$$

$$\text{(1b)} \quad \frac{dS_2}{dt} = a_2 S_2 - b_2 S_2^2 + d_2 S_1 S_2 - Y_2 \equiv G_2(S_1, S_2) - Y_2$$

where S_i is the stock of species i, Y_i is the instantaneous catch of species i, a, b and d are parameters, and $G_i(S_i,S_j)$ is the surplus growth function of species i. The sign of d_i determines what kind of interaction there is between the two species; if both are positive we have symbiosis, with both negative we have competition, while if they are of opposite sign one species feeds on the other. In the present context we let Species Two represent the consumption fish while Species One represents the feed fish, so that $d_1 < 0$ and $d_2 > 0$.

Letting the model represent a self-contained system, it is clear that Species Two could not exist without Species One, implying that $a_2 = 0$. The values we have assumed for the parameters in (1), to be used in examples below, are summarized in Table 3.C.4. These values have been set to produce a natural equilibrium with a much greater biomass at the lower level in the food chain, as is the case in nature. These values also produce a stable natural equilibrium.

Table 3.C.4. **Assumed values of the parameters in Equation 1., the natural equilibrium (S*) produced, and maximum biomass at each ecological level**

	a_i	b_i	d_i	S_i^*	S_i^{max}
Species 1	1	0.01	–0.05	50	100
Species 2	0	0.05	0.01	10	10

As to aquaculture, we assume that it produces the same kind of fish that can be obtained by catching Species Two, so that they have a common price, P_2. To produce the farmed fish one needs exactly the same kind of feed as the wild fish eats in its natural element, that is, fish caught from Species One. This gives rise to a derived demand for Species One. If the unit cost, exclusive of feed, of farming fish is r, and the efficiency by

* Larkin, P. (1966): Exploitation in a Type of Predator-Prey Relationship. *Journal of the Fisheries Research Board of Canada,* Vol. 23, pp. 349 – 356. See also Hannesson, R. (1983): Optimal Harvesting of Ecologically Interdependent Fish Species. *Journal of Environmental Economics and Management*, Vol. 10, pp. 329 – 345.

which fish farming converts feed fish into consumption fish is k, then the implied price of fish of Species One (P_1) is

$$(2) \quad P_1 = (P_2 - r)k$$

This is the profit, net of all costs other than feed, per unit of feed required, but if there is sufficient competition between fish farms in obtaining feed fish, this would be the market price of the latter.

Obviously, the conversion coefficient in fish farming and how it compares with conversion in the wild is important. One might expect it to be lower, because feed fish has to be treated before being fed to farmed fish. Typically it is turned into pellets, but that is not always necessary. On the other hand, the conversion coefficient in fish farming may be expected to be roughly constant, because of controlled feeding and feed processing, while in the wild the ecological efficiency, *i.e.* the conversion of the total biomass of feed fish into fish flesh at a higher trophic level, will depend on the relative biomass at both levels, according to Equation (1). Here we shall define two concepts of efficiency. One will be termed "surplus growth efficiency" and relates to how much of the food intake of Species One translates into surplus growth, i.e., fishable surplus, of Species Two, labeled E_1:

$$(3) \quad E_1 = -\frac{a_2 S_2 - b_2 S_2^2 + d_2 S_1 S_2}{d_1 S_1 S_2} = \frac{b_2 S_2 - a_2}{d_1 S_1} - \frac{d_2}{d_1}$$

From this we see that the surplus growth efficiency is highest when S_2 approaches zero (note that $a_2 = 0$ and $d_1 < 0$). A minimum amount of food will then be spent on maintaining the biomass of Species Two. As the biomass of Species Two increases, more and more food intake must be spent on maintaining the biomass itself, until in natural equilibrium all the food intake is spent on that. With the values assumed above of d_1 and d_2 the maximum surplus growth efficiency is 0.2.

The other efficiency concept, which we shall call transfer efficiency, denoted by E_2, relates to how much of the biomass of Species One is transferred to surplus production of Species Two. This is simply

$$(4) \quad E_2 = \frac{a_2 S_2 - b_2 S_2^2 + d_2 S_1 S_2}{S_1}$$

Like the surplus production of Species Two, the transfer efficiency will have a maximum for a certain level of the stock of Species Two. For the parameter values assumed, this efficiency reaches a maximum of 0.034.

Now turn to k, the conversion efficiency in the aquaculture sector. It seems reasonable to assume that it will be lower than the maximum surplus production efficiency in the wild, if for no other reason then because some loss will be involved in converting catches of Species One to feed for farmed fish. Below we shall use a value of $k = 0.1$, which is one half of the maximum surplus growth efficiency.

The food conversion efficiency in aquaculture can also be related to the transfer efficiency. The surplus production of Species One, expressed as share of the biomass of Species One, is $a_1 - b_1 S_1 + d_1 S_2$. We see that this reaches a maximum of $a_1 = 0.2$ when both S_1 and S_2 approach zero (note that $d_1 < 0$). When turned into surplus growth by means of aquaculture we must multiply by k, and with $k = 0.1$ we get $E_2 = 0.02$, which is less than the maximum transfer efficiency in the wild. Hence the assumption of $k = 0.1$ does not appear

unreasonable, for comparison with capture fisheries in the above model. In particular, it does not seem to give any undue advantage to aquaculture.

Long term equilibria with capture fisheries and aquaculture

Let us now look at long term equilibria, with and without aquaculture. Three kinds of regimes will be discussed, open access, globally optimal management, and locally optimal management. Open access and optimal management are extremes between which reality is likely to lie. Open access is becoming less and less common, as more and more fisheries are made subject to various forms of regulation. On the other hand, such regulations are not always fully effective, and often so ineffective as to come close to open access and no control over the total catch. Full optimization of a system of two fish species is, as discussed in the main text, unlikely. It is more likely that the capture of each species will be optimized without taking into account the ecological relationships in the sea. We refer to this latter regime as local optimization.

Open access

To analyze open access, we shall use the time-honoured Schaefer production function

$$(5) \quad Y_i = q_i E_i S_i$$

With a given unit cost (c) of effort the cost per unit of fish caught will be $c/q_i S_i$. With equilibrium being where the price of fish is equal to the unit cost of fish, we get the equilibrium stock

$$(6) \quad S_i = \frac{c}{q_i P_i}$$

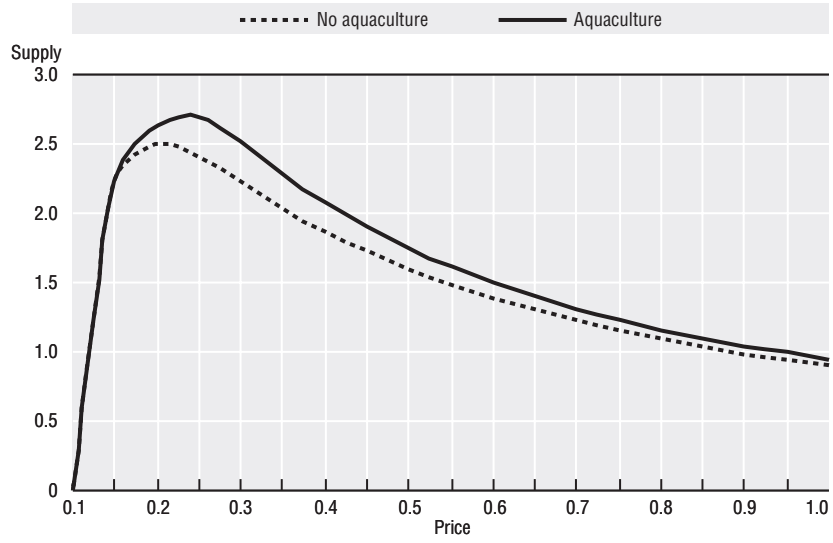
This can now be inserted into Equation (1) to find the equilibrium catch of fish as a function of the price of Species Two. Note that, with aquaculture, Equation (2) gives the price of Species One as a function of the price of Species Two.

Figure 3.C.1. shows the equilibrium supply of fish, with and without aquaculture, as a function of the price of Species Two (assumed to be perfectly substitutable by farmed fish). In order that catching Species Two be profitable, we need $c/q_2P_2 < 10$, because the natural equilibrium value of S_2 is 10. Setting $c/q_2 = 1$ makes catching of Species Two profitable for $P_2 > 0.1$.

Setting r, the cost per unit of farmed fish excluding feed costs, equal to 0.05, there is a margin to cover feed costs already at $P_2 = 0.1$. But this margin must cover the unit cost of providing feed fish; i.e., $P_1 > c/q_1S_1$. With $c/q_1 = 1$ as for Species Two and using Equation (2) this translates into $P_2 > 1/kS_1 + r$. In pristine equilibrium the right hand side is 0.25 so fishing feed fish for farming of Species Two requires a higher price than that which makes fishing of Species Two profitable (0.1). As P_2 rises the inequality will sooner or later appear, partly because P_1 rises as well and partly because a higher P_2 reduces the equilibrium stock of Species Two and raises that of Species One, so that the value on the right hand side of the inequality sign falls. In this particular case aquaculture becomes profitable as P_2 rises beyond 0.17.

As Figure 3.C.1. shows, the total supply of fish is not very different with and without aquaculture. Within a certain price range the total supply with aquaculture is about 10%

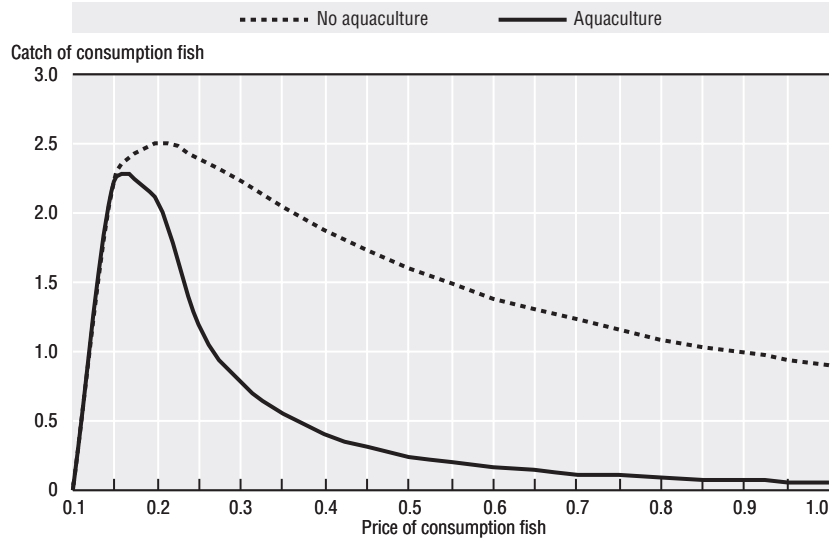
Figure 3.C.1. **Consumption fish in open access**



higher than with capture fisheries only, but the difference becomes less and less as the price of fish increases. Under open access we get the same kind of overexploitation as a result of a high enough price of fish whether or not there is farmed fish in addition to captured fish. With fish farming the rising price of feed fish ultimately leads to an overexploitation of feed fish and a diminishing supply.

There is one major difference, however, between the situation with capture fisheries only and capture fisheries together with aquaculture. This is illustrated in Figure 3.C.2., which shows the catch from capture fisheries with and without aquaculture. From this we

Figure 3.C.2. **Capture fisheries in open access**



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see that aquaculture has a quite dramatic effect on capture fisheries; the catches of Species Two fall very quickly as the price of fish rises beyond the level which makes the catch of feed fish profitable, and they are reduced to a fraction of what otherwise would be the case. The reason is, of course, less availability of feed fish in the wild, which seriously reduces the surplus production of Species Two in the wild. This can just about be compensated through utilization of feed fish through aquaculture. But this is not a general result; by changing the ecological coefficients d_1 and d_2 the result could be the opposite, namely that the total supply of consumption fish at a high enough price of consumption fish will be less with than without aquaculture.

Optimal management

With optimal management the total profit from aquaculture and capture fisheries is maximized:

$$(7) \quad \underset{S_i}{Max} \quad \sum (P_i - c / q_i S_i) Y_i \quad i = 1, 2; i \neq j.$$

Looking only at equilibrium solutions without time discounting, $Y_i = G_i(S_i,S_j)$ (cf. Equation [1]), we get the following first order conditions for an interior solution:

$$(8) \quad P_i \frac{\partial G_i}{\partial S_i} + P_j \frac{\partial G_j}{\partial S_i} - \frac{cb_i}{q_i} = 0$$

$i, j = 1, 2; i \quad j.$

Solving these equations we get the optimal stock levels

$$(9) \quad S_i^o = \frac{2P_j b_j (P_i a_i + b_i c / q_i - d_j c / q_j) + (P_i d_i + P_j d_j)[P_j a_j + b_j c / q_j - d_i c / q_i]}{4P_i P_j b_i b_j - (P_i d_i + P_j d_j)^2}$$

$i, j = 1, 2; i \neq j.$

If the solution is not an interior one we either have $S_1 = 0$, i.e., extinction of Species Two, or no exploitation of Species One. In the latter case the optimization problem becomes one of optimizing without Species Two or optimizing the catch of Species Two only, with the stock of Species One being determined through Equation (1a) with $dS_1/dt = 0$ and $Y_1 = 0$.

Figure 3.C.3. shows the total catch in the optimal solution, with and without aquaculture. The total catch increases with the price of consumption fish and approaches an upper limit, instead of falling when the price rises beyond a certain point as under open access. The presence of aquaculture could raise the catch further; as the price of consumption fish increases the total production with aquaculture is asymptotically about 15% higher than with capture fisheries only, in this particular example. One thing worthy of note is that aquaculture does not arrive on the scene until the implied price of feed fish has risen beyond the level at which it becomes profitable to exploit it. In the open access solution it becomes profitable to exploit feed fish as the price of consumption fish rises beyond 0.17, but it is not optimal to do so until it has risen above 0.43. The explanation is that feed fish has a shadow price as an input into the production of consumption fish in the wild, so under optimal exploitation the market price of feed fish as an input into the production of farmed fish must cover not just the cost of fishing but also the shadow value of feed fish as an input for the production of consumption fish in the wild. A price of feed fish emerging in a competitive market would not reflect this shadow value of feed fish.

Figure 3.C.3. **Consumption fish with optimal management**

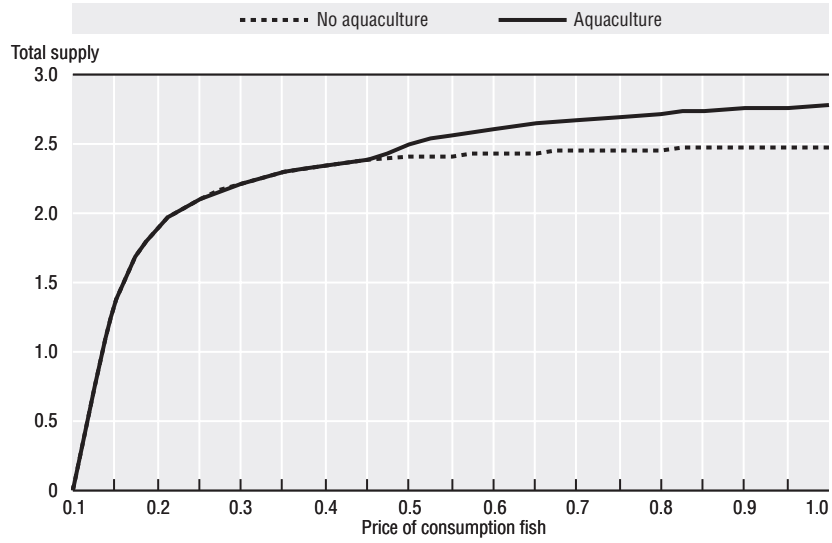
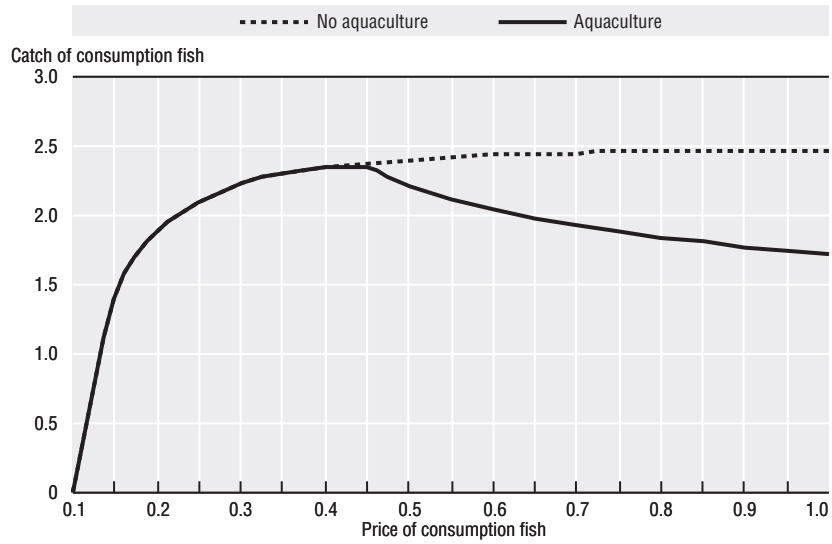


Figure 3.C.4. **Capture fisheries with optimal management**



As the price of consumption fish rises beyond the said critical level and the optimum stock of consumption fish becomes smaller, some of the feed fish could be better utilized for farmed fish. Figure 3.C.4. shows that aquaculture in the optimal solution comes at the expense of capture fisheries. The figure shows the catches of captured fish with and without aquaculture. As the price of consumption fish increases the catch of wild, consumption fish falls asymptotically to one half of what it would be in the absence of aquaculture.

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Unsurprisingly, it turns out the mix of capture fisheries and aquaculture has an ecological interpretation. This is easiest to see if we ignore the cost of fishing ($c = 0$). From the first order condition (Equation [8]) and using Equation (2) we get

$$(10) \quad -k(P_2 - r)\frac{\partial G_1}{\partial S_1} = P_2 \frac{\partial G_2}{\partial S_1}$$

The left hand side of (10) tells us how much it is worth to reduce the biomass of feed fish by one unit and transfer it into consumption fish through fish farming, valued at the price of consumption fish net of farming costs excluding feed. The derivative of the growth function for feed fish tells us how much the fishable surplus of feed fish increases as a result of decreasing the stock of feed fish at the margin, the conversion coefficient tells us how much of this we can turn into consumption fish by way of fish farming, and the price term turns this into money. The right hand side shows the value of the surplus growth of consumption fish we lose in the capture fisheries by decreasing the amount of feed fish in the sea at the margin. At the optimum, the value that we gain in fish farming by fishing one more unit of feed fish must be equal to the value we lose of captured, consumption fish by doing so.

It is instructive to consider what happens when the price of consumption fish approaches infinity. From Equations (2) and (10) we have

$$(10a) \quad \lim_{P_2 \to \infty} S_1^o = \frac{2ka_1b_2 + a_2d_2 + ka_2d_1}{4kb_1b_2 - k^2d_1^2 - 2kd_1d_2 - d_2^2}$$

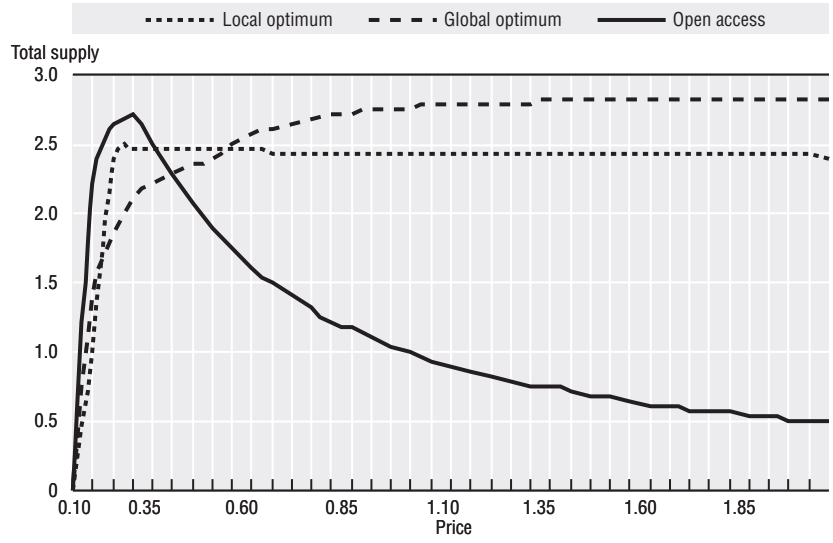
$$(10b) \quad \lim_{P_2 \to \infty} S_2^o = \frac{2ka_2b_1 + ka_1d_2 + k^2a_1d_1}{4kb_1b_2 - k^2d_1^2 - 2kd_1d_2 - d_2^2}$$

With the parameters used, we get 57.14 for S_1 and 2.86 for S_2, respectively. We may note that the optimal value of S_2 as P_2 increases towards infinity is well below what we would get if we were optimizing with respect to S_2 only. In that case, without time discounting, the optimal value of S_2 would approach the value producing the maximum sustainable yield, which is 5, one half of the natural equilibrium level. The reason is that the additional reduction in the stock of consumption fish (the one from 5 to 2.86) increases the surplus growth of feed fish and makes it possible to increase the total production of consumption fish by transforming some of the feed fish by way of fish farming and not entirely through the capture fishery. The capture fishery does not disappear altogether, however, even when the price of consumption fish approaches infinity. Put differently, it is not optimal to replace the capture fishery entirely by fish farming, even if this would maximize the amount of feed fish obtainable for input into fish farming.

Local optimisation

As discussed in the main text, it is none too likely that we will see a global optimization of the yield from the marine ecosystem. It is of interest, therefore, to inquire into what would happen if the yield of feed fish and consumption fish were optimized separately, without paying any attention to the ecological interrelationships.

Figure 3.C.5. **Consumption fish**



Maximizing the yield of each species in isolation gives the following first order condition for an interior solution (*i.e.,* with both species exploited):

$$(11)\quad S_i = \frac{\left[a_j d_i + 2b_j\left(a_i + cb_i / p_i q_i\right)\right]P_j + cb_j d_i / q_j}{P_j\left(4b_i b_j - d_i d_j\right)} \qquad i, j = 1, 2;\ i \neq j.$$

where P_1 is given by Equation (2).

Figure 3.C.5. shows the total supply of consumption fish under the three regimes, global optimization, local optimization (ignoring the ecological interrelationships), and open access, as a function of the price of consumption fish. Open access is by far the worst regime; the total supply of fish falls quickly as the price of consumption fish rises beyond a certain point, due to excessive exploitation of both consumption fish and feed fish. But local maximization is appreciably inferior to global maximization, resulting in a less supply of consumption fish than global maximization as the price of consumption fish rises beyond a certain level. For a relatively low price of consumption fish the total supply is in fact higher both under open access and local maximization than under global maximization, because more is being supplied than is warranted by costs. With local maximization, aquaculture and the catch of feed fish start much too early; a better option would be to use the feed fish in the sea to improve the yield in the capture fisheries. From the slight kink in the curve for the global optimization we can see at which point aquaculture enters the scene, which clearly is at a higher price than under local optimization.

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Appendix 3.C.2. Models of shared stocks and high seas fisheries*

The model to be used is in discrete time. Fishing reduces the stock from some initial value to a level which is left behind. The growth of the stock and the stock level in the beginning of the next period depends on the stock level that is left behind. With S_t denoting the stock left behind after fishing in period *t*, the stock at the beginning of the next period will then be a function $G(S_t)$. For numerical calculations we use the logistic function:

$$G(S) = S[1 + a(1 - S)]$$

In this formulation the stock is expressed as a fraction of the carrying capacity of the environment.

Suppose the price of fish, *p*, is given and independent of the quantity fished. Suppose further that the unit cost of fishing is inversely related to the stock, i.e., equal to *c*/*S*, where *c* is a cost parameter equal to the break-even level of the stock. The rent from fishing over one period will be

$$\int_{S_t}^{G(S_{t-1})} \left(p - \frac{c}{x} \right) dx = p[G(S_{t-1}) - S_t] - c[\ln G(S_{t-1}) - \ln S_t]$$

The present value (*V*) of rents from the fishery is

$$V = \sum_{t=0}^{\infty} \delta^t \{p[G(S_{t-1}) - S_t] - c[\ln G(S_{t-1}) - \ln S_t]\}$$

where $\delta = 1/(1+r)$ and *r* is the discount rate. Maximization of *V* with respect to *S* (the optimum stock left behind after fishing) gives the first order condition

$$-(p - c/S^o) + \delta[p - c/G(S^o)]G'(S^o) = 0$$

where S^o is the optimum stock to be left behind, identical for all periods as long as *p*, *c* and *r* do not change. Apostrophe (') denotes first derivative.

Agents with identical costs

Assuming *N* identical agents who share a stock, the net present value for each agent from cooperating with other agents in maximizing the present value of rents will be

$$V^o = \frac{\pi^o}{N} \frac{1}{1 - \delta}$$

* These models are adapted from Hannesson, R. (1997): Fishing as a Supergame. *Journal of Environmental Economics and Management*, Vol 32, pp. 309 – 322.

where π^o is the annual profit that can be obtained from the stock in the cooperative solution. This must be shared between all *N* agents.

Suppose one particular agent contemplates deviating from the cooperative solution. He will be able to realize some short term gain before he has been found out by the other agents. But the other agents are not likely to continue cooperating if one agent defects, particularly not if there are just a few agents, so eventually the deviating agent will obtain a lesser profit than if he cooperates. His temporary gain from cooperation could nevertheless outweigh his long term losses. Here we will deal with this in the following way. An agent who deviates will be able to drive the stock down from the optimal level S^o to the break-even level $S^* = c/p$. When he has been found out, assumed to occur at the end of the period when he deviates, the other agents stop cooperating and follow the same depletion policy for ever after, so that the total profit realized will be $\pi^*(S^*)$. The payoff to the deviating agent will therefore be

$$V^d = \frac{\pi^o}{N} + \pi^d + \frac{\pi^*}{N}\frac{\delta}{1-\delta}$$

where π^d is the temporary excess profit obtained by deviating from the optimal solution, i.e.,

$$\pi^d = p(S^o - S^*) - c\left[\ln S^o - \ln S^*\right]$$

If deviation is not profitable, $V^o > V^d$. For any given *p*, *c* and *r* we can calculate the maximum number of agents, *N*, sustained in a cooperative solution. In the case presented in the text we have used $a = 0.2$, $r = 0.05$, $c = 0.3$ and varied *p*.

Figure 3.C.6. shows how a rising price of fish could weaken the incentive to cooperate and strengthen the incentive to defect from a cooperative solution in this particular setting. The curve in the figure shows the maximum number of identical agents compatible with any given cost relative to price (*c/p*). Above the curve there will be too many agents for cooperation to be possible. Hence, a rising price (movement leftwards in the diagram) may make cooperation among a given number of agents unsustainable, through increasing the short term profits of deviation relatively more than the sustained profits in the cooperative solution. A switch from a cooperative to a non-cooperative solution would lead to lower long term catches. Hence, if a price increase leads to cooperation breaking down, the supply response will be "perverse" as in the open access situation; in fact we would go from effective management to an open access situation.

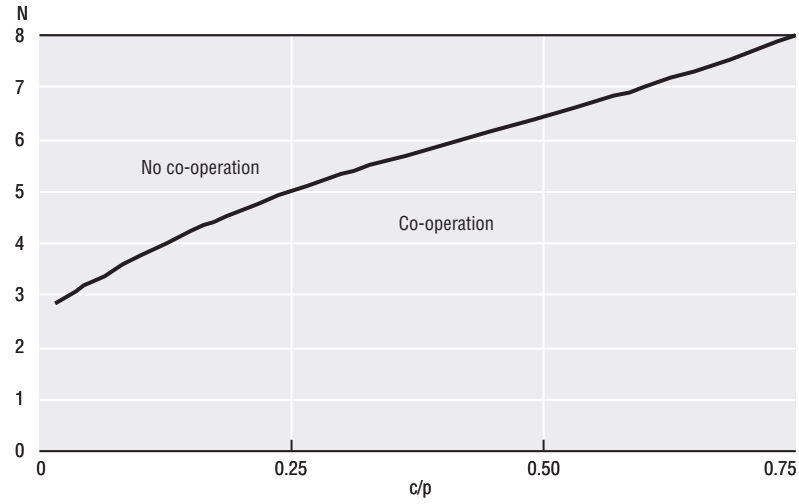
Differences in costs

If different agents have different fishing costs it could be in the interest of the low cost agent(s) to exclude the high cost agents from the fishery by keeping the stock below the level at which it is profitable for the high cost agents to fish the stock. This entails

$$G(S^{**}) < c_h / p$$

where S^{**} is the stock level that the low cost agent leaves behind at the end of every fishing period, and c_h is the cost parameter of the high cost agent.

Figure 3.C.6. **Level of cooperation as a function of the price**



The stock level left behind by the low cost agent can assume three different values:

(i) $S^* = S^o$ if $S^o < S^{**}$ or $\pi^o/N > \pi^*$

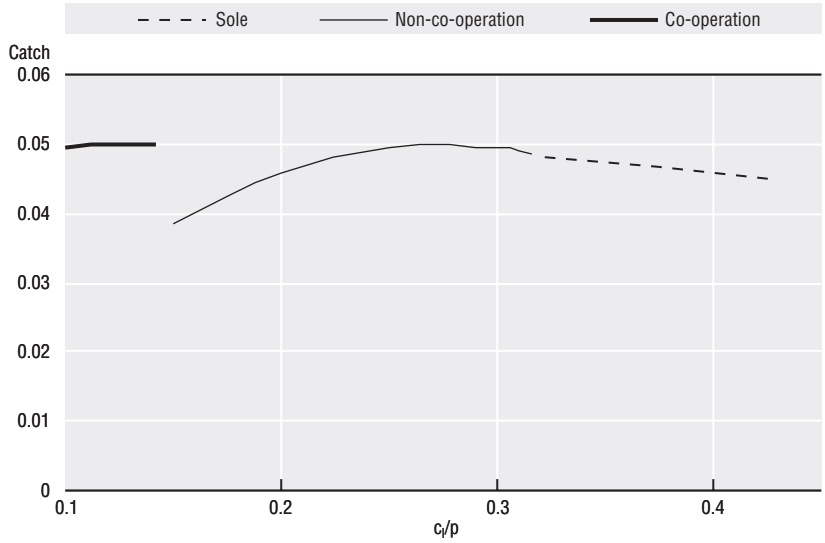
(ii) $S^* = \max[S^{**}, c_l/p]$ otherwise

This in fact identifies four different fishing strategies. If $S^o < S^{**}$ and $\pi(S^o) > \pi(S^{**})$ the low cost agent can have the stock for himself; the returning stock under the optimal policy (for the cost of the low cost agent) is less than what would be needed to make fishing profitable for the high cost agent. The other case covered under (i) is where the profit the low cost agent obtains if he excludes the high cost agent is less than his share in the profit from cooperation. It is possible to analyze this case with the "defection" strategy discussed above, but this would not add greatly to the qualitative conclusions to be presented. The other two strategies are identified in Case (ii) above. In the cases presented here we have set $c_l = 0.3$, $c_h = 0.6$ and $N = 2$ while a is as before. The case $S^{**} < c_l/p$ under (ii) does not arise here, so only three strategies emerge as c_l/p is varied.

In contrast with what we did above we here compare the annual profits the low cost agents can obtain under different strategies. It would be possible to consider threat strategies in infinite horizon games, as discussed above, but this would not add greatly to the qualitative conclusions we are about to present.

In a cooperative solution, both agents would catch an equal amount. Figure 7 shows the total catch obtained at different cost levels for the low cost agent relative to price (c_l/p). The discontinuities of the curve shown in the figure indicate a shift from one strategy to another. Furthest to the right in the figure the price of fish is low (high c/p ratio). Here there is a large gap between the stock levels at which the low cost and the high cost agent can fish profitably, so large that if the low cost agent leaves behind at the end of each fishing season a stock which maximizes his annual profit, the returning stock would be below the level at which the high cost agent can fish profitably. In other words, the cost differences are so great that the low cost agent is in effect a sole owner of the stock. As the price rises and we move leftwards along the curve labeled "sole", we see that the total catch of fish rises.

Figure 3.C.7. **Catch from a shared stock**



A rising price of fish would reduce the real cost differences between the high cost and the low cost agent (as p increases both c_l/p and c_h/p approach zero). When the price has risen to a certain point the cost differential (deflated by the price) between the two agents has been eroded to the extent that the low cost agent has to deplete the stock to a level below that which would maximize his annual profit, in order to exclude the high cost agent from the fishery. It would still be in the interest of the low cost agent, however, to exclude the high cost agent. The curve labeled "non-cooperation" shows what happens to the total catch as the price increases (as we move leftwards in the figure); beyond a certain price level the total catch starts to fall. The reason is that the stock which the low cost agent must leave behind to keep the high cost agent out of the fishery becomes smaller as the price of fish increases.

Finally a point is reached where the price of fish is so high that the cost differences between the two agents are no longer very important (the curve labelled "cooperation"). The low cost agent's share in the profit if he goes for the optimal solution (at his cost level) and admits the high cost agent to the fishery would then be higher than if he would persist in excluding the high cost agent. Hence we get the result that as the price increases beyond a certain level the total catch of fish increases in a discontinuous fashion as the low cost agent changes strategy.

Straddling stocks

By a straddling stock we mean a stock most of which is inside the 200-mile zone, with a small part accessible outside the zone. We will assume that the stock inside the zone is effectively controlled by one coastal state or cooperatively by a group of coastal state while the part outside the zone is fished down in each period to a break-even level. We will further assume that during the fishing period a part k of the stock stays inside the zone and is depleted to a level which the coastal state(s) find optimal. The part 1- k that is outside the zone will be assumed to be depleted to the break even level c/p, because that part of the stock is accessible by an indefinite number of players, none of whom as any incentive to

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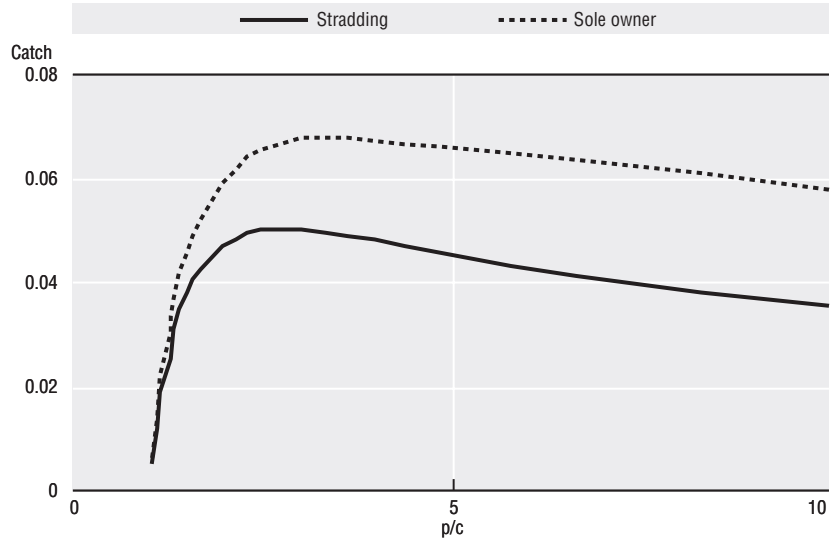
Figure 3.C.8. **Maximizing present value**



save any of the stock. The same cost parameter will be assumed for both the coastal state and the high seas players. After the fishing is over, the regeneration of the stock is assumed to depend on the entire stock, both outside and inside the 200-mile zone, with the regenerated stock distributing itself in the same proportion outside and inside the zone. The definition of "straddling" means that $k < 0.5$; here we shall use $k = 0.1$.

The present value of the fishery of the coastal state(s) is

$$V = \sum_{t=0}^{\infty} \delta^t k \{ p [G(kS_{t-1} + (1-k)S^*) - S_t] - c [\ln G(kS_{t-1} + (1-k)S^*) - \ln S_t] \}$$

where S is the stock level the coastal state leaves behind and $S^* = c/p$ is the break even stock level which the high seas agents leave behind. The aggregate stock is $kS + (1\text{-}k)S^*$. The stock is measured in terms of density (tonnes per square km, for example, as this is what determines the break-even level. This is why the present value expression must be multiplied by k.

The first order condition for maximum is

$$-(p - c/S^o)[1 - r] + kG'(kS^o + (1-k)S^*)[p - c/G(kS^o + (1-k)S^*) = 0]$$

where S^o is the stock level which it is optimal to leave behind. In the case discussed in the text we have used $c = 0.3$ while a and r are as above. The sole owner case is the one with $k = 1$.

Figure 3.C.8. shows the total catch at different prices relative to the cost parameter (p/c), for the straddling stock case and for the sole owner case. The figure shows that the total catch rises with the price up to a certain point and then falls. The fall in the total catch as the price rises beyond a certain level is due to the previously mentioned effect that as the cost per unit of fish caught becomes negligible, it becomes optimal to push the stock down below the maximum sustainable yield level.

The figure also shows that accessibility of stocks outside 200 miles can greatly affect the total catches taken from a stock. In the example shown in the figure the total catches from a straddling stock are only 60-70% of the catches under sole ownership when the price relative to the cost parameter is "high". Note that only 10% of the stock was assumed to be outside the 200-mile zone. It would thus not take much straddling to significantly weaken the incentives to manage the stock optimally.

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Preface

This Study is the fruit of comprehensive discussions of various issues related to fisheries market liberalisation within the Committee for Fisheries as part of its Programme of Work 2000-2002. In finalising this work the Committee also adopted a Statement (see Foreword), Executive Summary and Synthesis Report highlighting the key points emanating from the Study. At its 90th Session in October 2002, the Committee for Fisheries decided to make this work and its supporting material available to the public.

Acknowledgments. *This report has been prepared with the active participation and help from Member countries of the OECD. Particular assistance was provided by the Danish, Norwegian and Korean authorities through various secondments. These included Mr. Max Nielsen (on secondment from the Danish Research Institute of Food Economics) who was responsible for the development of the tariff analysis, Ms. Trine Trollvik (seconded from the Norwegian Seafood Export Council) who was instrumental in building the tariff data base and Mr. Ki-Jeong Jeon (on secondment from the Korean fisheries authorities) who is the author of the chapter on Markets and Resource Trends.*

The OECD's Fisheries Division provided overall guidance and co-ordination in the development of this study.

Annex 1

Tariff and trade statistics for fish products

Source

The source of the information on the applied most favoured nation (MFN) duties contained in Table 6.10 below is the WTO Integrated Data Base (IDB). For the pre- and post-Uruguay Round duties in Table 6.10, the source is the IDB Uruguay Round Multilateral Trade Negotiation (MTN)Files (UR-MTN files).

Product coverage

The product coverage is the following:

HS-0301: Live fish.

HS-0302: Fish, fresh or chilled, excluding fish fillets and other fish meat of heading No. 03.04.

HS-0303: Fish, frozen, excluding fish fillets and other fish meat of heading No. 03.04.

HS-0304: Fish fillets and other fish meat (whether or not minced), fresh, chilled or frozen.

HS-0305: Fish, dried, salted or in brine; smoked fish, whether or not cooked before or during the smoking process; flours, meals and pellets of fish, fit for human consumption.

HS-0306: Crustaceans, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; crustaceans, in shell, cooked by steaming or by boiling in water, whether or not chilled, frozen, dried, salted or in brine; flours, meals and pellets of crustaceans, fit for human consumption.

HS-0307: Molluscs, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; aquatic invertebrates other than crustaceans and molluscs, live, fresh, chilled, frozen, dried, salted or in brine; flours, meals and pellets of aquatic invertebrates other than crustaceans fit for human consumption.

HS-0509: Natural sponges of animal origin.

HS-1504: Fats and oils and their fractions, of fish or marine mammals, whether or not refined but not chemically modified.

HS-1603: Extracts and juices of meat, fish or crustaceans, molluscs or other aquatic invertebrates.

HS-1604: Prepared or preserved fish; caviar and caviar substitutes prepared from fish eggs.

HS-1605: Crustaceans, molluscs and other aquatic invertebrates, prepared or preserved.

HS-2301*: Flours, meals and pellets, of meat or meat offal, of fish or of crustaceans, molluscs or other aquatic invertebrates, unfit for human consumption; greaves.

* HS2301 includes only fish item 23.01.20 (Flours, meals and pellets, of fish or of crustaceans, molluscs or other aquatic invertebrates)

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Country coverage

The countries for which information was extracted are the following: Argentina, Australia, Canada, Chile, China, the European Communities, Iceland, India, Japan, Korea Rep., Mexico, New Zealand, Norway, Poland, Singapore, Taiwan , Thailand, Turkey and the United States.

Description and Contents of the Tables

Table 6.10 (MFN Customs Duties and Import Volumes for Fish Products in Selected Countries, 1998-2001) shows tariff and trade information related to recent years available for applied MFN duties. The year of the tariff is given for each country. The structure and contents of Table 6.7 are explained in the table below:

Table 6.7 **Structure of MFN Customs duties and import volumes for fish products in selected countries (1998-2001)**

Field	Description
Country	Reporting country
Year	Calendar or fiscal year
HS Heading	4-digit Harmonized System (HS96) heading
Description	4-digit HS96 description
Number of Tariff Lines	Number of national tariff lines within HS heading
Number of Unbound Items	Number of unbound items within HS heading
Ad valorem Duty Rate – Min	Applied minimum *ad valorem* duty rate
Ad valorem Duty Rate – Max	Applied maximum *ad valorem* duty rate
Ad valorem Duty Rate – Avg	Applied average *ad valorem* duty rate
Number of non *ad valorem* Items	Number of items with non-*ad valorem* duties within HS heading for which no *ad valorem* equivalent is available
Quantities (Tonnes)	Import quantities expressed in tonnes
Quantities (other than Tonnes)	Import quantities expressed in other quantity units than in tonnes

Table 6.8 **Structure of Pre- and Post-Uruguay Round customs duties for fish products in selected countries**

Field	Description
Country	Reporting country;
Year	Calendar or fiscal year;
HS Heading	4-digit Harmonized System (HS96) heading
Description	4-digit HS96 description
Number of Tariff Lines	Number of national tariff lines within HS heading;
Pre-Uruguay Round Duty – Number of Unbound Items	Number of unbound items within HS heading for Pre-Uruguay Round duties
Pre-Uruguay Round Duty – Min	Pre-Uruguay Round minimum *ad valorem* duty rate[1]
Pre-Uruguay Round Duty – Max	Pre-Uruguay Round maximum *ad valorem* duty rate
Pre-Uruguay Round Duty – Avg	Pre-Uruguay Round average *ad valorem* duty rate
Post-Uruguay Round Duty – Number of Unbound Items	Number of unbound items within HS heading for Post-Uruguay Round duties
Post-Uruguay Round Duty – Min	Post-Uruguay Round minimum *ad valorem* duty rate
Post-Uruguay Round Duty – Max	Post-Uruguay Round maximum *ad valorem* duty rate
Post-Uruguay Round Duty – Avg	Post-Uruguay Round average *ad valorem* duty rate
"Post-Uruguay Round Duty" – "Number of Items Generated".	Number of pre-Uruguay Round tariff lines for which no offer was available

1. The expression "*ad valorem* duty rate" also includes *ad valorem* equivalents that were provided for non- *ad valorem* duties.

Table 6.9 **List of years available for applied duties and trade statistics**

Country	Applied Duty	Trade	Country	Applied Duty	Trade
Argentina	1998	1998	Korea, Rep.	2000	
Argentina	1999	1999	Mexico	1998	1998
Argentina	2000		Mexico	1999	1999
Argentina	2001		Mexico	2000	
Australia	1998	1998	New Zealand	1997	1997
Australia	1999	1999	New Zealand	1998	
Australia	2000		New Zealand	1999	
Australia	2001		Norway	1998	1998
Canada	1998	1998	Norway	1999	1999
Canada	1999	1999	Norway	2000	
Canada	2000	2000	Norway	2001	
Chile	1998	1998	Poland	2000	1999
Chile	1999	1999	Singapore	1998	1998
Chile	2000		Singapore	1999	1999
China	1996	1997	Singapore	2000	2000
China	1996	1997	Singapore	2001	
EC	1998	1998	Taiwan	1998	1998
EC	1999	1999	Taiwan	1999	1999
EC	2000		Taiwan	2000	
EC	2001		Taiwan	2001	
Iceland	1998	1998	Thailand	1999	1999
India	1996/97	1996/97	Turkey	1997	1997
India	1997/98		Turkey	1998	1998
Japan	1998	1998	Turkey	1999	1999
Japan	1999	1999	United States	1998	1998
Japan	2000		United States	1999	1999
Korea, Rep.	1998	1998	United States	2000	
Korea, Rep.	1999	1999			

Table 6.11 ("Pre- and Post-Uruguay Round Customs Duties for Fish products in Selected Countries") contains information related to the Uruguay Round Negotiations. Post-Uruguay Round MFN duty rates, which represent the concessions offered, correspond to the final stage of implementation of the concessions. When no offer was available, the pre-Uruguay Round MFN duty rates have been used. The number of these tariff lines appears in the last column of the table under "Post-Uruguay Round Duty". "Number of Items Generated". Pre-Uruguay Round MFN duty rates correspond to the bound duties existing at the beginning of the negotiations and, for unbound duties, to the duties normally applied in September 1986. Data for Argentina are not presented as these were not reported in the HS nomenclature but in CCCN (Customs Co-operation Council Nomenclature). The structure and contents of Table 6.11 are explained in the Table 6.8.

Table 6.10. **MFN customs duties and import volumes for fish products in selected countries (1998-2001)**

Country	Year	HS Heading	Description	Number of		*Ad valorem* Duty Rates			Number of	Quantities	
				Tariff Lines	Unbound Items	Min	Max	Avg	Non *ad valorem* Items[2]	Tonnes	Other than Tonnes
ARGENTINA	1998	0 301	Live fish.	9		0	13	7.2	0	12	
		0 302	Fish, fresh or chilled, excluding fish fillets and other fish meat of heading No. 03.04.	22		13	13	13.0	0	924	
		0 303	Fish, frozen, excluding fish fillets and other fish meat of heading No. 03.04.	26		13	13	13.0	0	3 634	
		0 304	Fish fillets and other fish meat (whether or not minced), fresh, chilled or frozen.	4		13	13	13.0	0	698	
		0 305	Fish, dried, salted or in brine; smoked fish, whether or not cooked before or during the smoking process; flours, meals and pellets of fish, fit for human consumption.	14		0	13	9.3	0	585	
		0 306	Crustaceans, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; crustaceans, in shell, cooked by steaming or by boiling in water, whether or not chilled, frozen, dried, salted or in brine; flours, meals and pellets of crustaceans, fit for human consumption.	10		13	13	13.0	0	201	
		0 307	Molluscs, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; aquatic invertebrates other than crustaceans and molluscs, live, fresh, chilled, frozen, dried, salted or in brine; flours, meals and pellets of aquatic invertebrates other than crustaceans fit for human consumption.	15		13	13	13.0	0	1 936	
		0 509	Natural sponges of animal origin.	1		7	7	7.0	0	0	
		1 504	Fats and oils and their fractions, of fish or marine mammals, whether or not refined, but not chemically modified.	5		7	13	10.6	0	8	
		1 603	Extracts and juices of meat, fish or crustaceans, molluscs or other aquatic invertebrates.	1		19	19	19.0	0	4	
		1 604	Prepared or preserved fish; caviar and caviar substitutes prepared from fish eggs.	15		19	19	19.0	0	21 384	
		1 605	Crustaceans, molluscs and other aquatic invertebrates, prepared or preserved.	5		19	19	19.0	0	1 921	
		2 301[1]	Flours, meals and pellets, of meat or meat offal, of fish or of crustaceans, molluscs or other aquatic invertebrates, unfit for human consumption; greaves.	2		9	9	9.0	0	189	
ARGENTINA	1999	0 301	Live fish.	9		0	13	7.2	0	11	
		0 302	Fish, fresh or chilled, excluding fish fillets and other fish meat of heading No. 03.04.	22		3	13	12.5	0	914	
		0 303	Fish, frozen, excluding fish fillets and other fish meat of heading No. 03.04.	26		3	13	12.6	0	2 866	
		0 304	Fish fillets and other fish meat (whether or not minced), fresh, chilled or frozen.	4		13	13	13.0	0	651	
		0 305	Fish, dried, salted or in brine; smoked fish, whether or not cooked before or during the smoking process; flours, meals and pellets of fish, fit for human consumption.	14		0	13	9.3	0	485	
		0 306	Crustaceans, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; crustaceans, in shell, cooked by steaming or by boiling in water, whether or not chilled, frozen, dried, salted or in brine; flours, meals and pellets of crustaceans, fit for human consumption.	10		13	13	13.0	0	245	
		0 307	Molluscs, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; aquatic invertebrates other than crustaceans and molluscs, live, fresh, chilled, frozen, dried, salted or in brine; flours, meals and pellets of aquatic invertebrates other than crustaceans fit for human consumption.	15		13	13	13.0	0	1 937	
		0 509	Natural sponges of animal origin.	1		7	7	7.0	0	0	
		1 504	Fats and oils and their fractions, of fish or marine mammals, whether or not refined, but not chemically modified.	5		7	13	10.6	0	12	
		1 603	Extracts and juices of meat, fish or crustaceans, molluscs or other aquatic invertebrates.	1		19	19	19.0	0	2	

Table 6.10. **MFN customs duties and import volumes for fish products in selected countries (1998-2001)** *(cont.)*

Country	Year	HS Heading	Description	Number of		*Ad valorem* Duty Rates			Number of	Quantities	
				Tariff Lines	Unbound Items	Min	Max	Avg	Non *ad valorem* Items[2]	Tonnes	Other than Tonnes
		1 604	Prepared or preserved fish; caviar and caviar substitutes prepared from fish eggs.	15		19	19	19.0	0	25 568	
		1 605	Crustaceans, molluscs and other aquatic invertebrates, prepared or preserved.	5		19	19	19.0	0	2 314	
		2301*	Flours, meals and pellets, of meat or meat offal, of fish or of crustaceans, molluscs or other aquatic invertebrates, unfit for human consumption; greaves.	2		9	9	9.0	0	171	
ARGENTINA	2000	0 301	Live fish.	9		0	13	7.2	0		
		0 302	Fish, fresh or chilled, excluding fish fillets and other fish meat of heading No. 03.04.	22		3	13	12.5	0		
		0 303	Fish, frozen, excluding fish fillets and other fish meat of heading No. 03.04.	26		3	13	12.6	0		
		0 304	Fish fillets and other fish meat (whether or not minced), fresh, chilled or frozen.	4		13	13	13.0	0		
		0 305	Fish, dried, salted or in brine; smoked fish, whether or not cooked before or during the smoking process; flours, meals and pellets of fish, fit for human consumption.	14		0	13	9.3	0		
		0 306	Crustaceans, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; crustaceans, in shell, cooked by steaming or by boiling in water, whether or not chilled, frozen, dried, salted or in brine; flours, meals and pellets of crustaceans, fit for human consumption.	10		13	13	13.0	0		
		0 307	Molluscs, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; aquatic invertebrates other than crustaceans and molluscs, live, fresh, chilled, frozen, dried, salted or in brine; flours, meals and pellets of aquatic invertebrates other than crustaceans fit for human consumption.	15		13	13	13.0	0		
		0 509	Natural sponges of animal origin.	1		7	7	7.0	0		
		1 504	Fats and oils and their fractions, of fish or marine mammals, whether or not refined, but not chemically modified.	5		7	13	10.6	0		
		1 603	Extracts and juices of meat, fish or crustaceans, molluscs or other aquatic invertebrates.	1		19	19	19.0	0		
		1 604	Prepared or preserved fish; caviar and caviar substitutes prepared from fish eggs.	15		19	19	19.0	0		
		1 605	Crustaceans, molluscs and other aquatic invertebrates, prepared or preserved.	5		19	19	19.0	0		
		2301[1]	Flours, meals and pellets, of meat or meat offal, of fish or of crustaceans, molluscs or other aquatic invertebrates, unfit for human consumption; greaves.	2		9	9	9.0	0		
ARGENTINA	2001	0 301	Live fish.	9		0	12.5	3.6	0		
		0 302	Fish, fresh or chilled, excluding fish fillets and other fish meat of heading No. 03.04.	22		2.5	12.5	12.0	0		
		0 303	Fish, frozen, excluding fish fillets and other fish meat of heading No. 03.04.	26		2.5	12.5	12.1	0		
		0 304	Fish fillets and other fish meat (whether or not minced), fresh, chilled or frozen.	4		12.5	12.5	12.5	0		
		0 305	Fish, dried, salted or in brine; smoked fish, whether or not cooked before or during the smoking process; flours, meals and pellets of fish, fit for human consumption.	14		0	12.5	8.9	0		
		0 306	Crustaceans, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; crustaceans, in shell, cooked by steaming or by boiling in water, whether or not chilled, frozen, dried, salted or in brine; flours, meals and pellets of crustaceans, fit for human consumption.	10		12.5	12.5	12.5	0		
		0 307	Molluscs, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; aquatic invertebrates other than crustaceans and molluscs, live, fresh, chilled, frozen, dried, salted or in brine; flours, meals and pellets of aquatic invertebrates other than crustaceans fit for human consumption.	15		12.5	12.5	12.5	0		

Table 6.10. **MFN customs duties and import volumes for fish products in selected countries (1998-2001)** *(cont.)*

Country	Year	HS Heading	Description	Number of		*Ad valorem* Duty Rates			Number of	Quantities	
				Tariff Lines	Unbound Items	Min	Max	Avg	Non *ad valorem* Items[2]	Tonnes	Other than Tonnes
		0 509	Natural sponges of animal origin.	1		6.5	6.5	6.5	0		
		1 504	Fats and oils and their fractions, of fish or marine mammals, whether or not refined, but not chemically modified.	5		6.5	12.5	10.1	0		
		1 603	Extracts and juices of meat, fish or crustaceans, molluscs or other aquatic invertebrates.	1		18.5	18.5	18.5	0		
		1 604	Prepared or preserved fish; caviar and caviar substitutes prepared from fish eggs.	15		18.5	18.5	18.5	0		
		1 605	Crustaceans, molluscs and other aquatic invertebrates, prepared or preserved.	5		18.5	18.5	18.5	0		
		2301[1]	Flours, meals and pellets, of meat or meat offal, of fish or of crustaceans, molluscs or other aquatic invertebrates, unfit for human consumption; greaves.	2		8.5	8.5	8.5	0		
AUSTRALIA	1998	0 301	Live fish.	5		0	0	0.0	0		7 235 384
		0 302	Fish, fresh or chilled, excluding fish fillets and other fish meat of heading No. 03.04.	21		0	0	0.0	0	3 862	
		0 303	Fish, frozen, excluding fish fillets and other fish meat of heading No. 03.04.	24		0	0	0.0	0	14 121	
		0 304	Fish fillets and other fish meat (whether or not minced), fresh, chilled or frozen.	3		0	0	0.0	0	39 309	
		0 305	Fish, dried, salted or in brine; smoked fish, whether or not cooked before or during the smoking process; flours, meals and pellets of fish, fit for human consumption.	12		0	0	0.0	0	3,160	
		0 306	Crustaceans, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; crustaceans, in shell, cooked by steaming or by boiling in water, whether or not chilled, frozen, dried, salted or in brine; flours, meals and pellets of crustaceans, fit for human consumption.	10		0	0	0.0	0	10 076	
		0 307	Molluscs, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; aquatic invertebrates other than crustaceans and molluscs, live, fresh, chilled, frozen, dried, salted or in brine; flours, meals and pellets of aquatic invertebrates other than crustaceans fit for human consumption.	12		0	0	0.0	0	13 275	
		0 509	Natural sponges of animal origin.	1		0	0	0.0	0	5	
		1 504	Fats and oils and their fractions, of fish or marine mammals, whether or not refined, but not chemically modified.	3		0	0	0.0	0		
		1 603	Extracts and juices of meat, fish or crustaceans, molluscs or other aquatic invertebrates.	1		0	0	0.0	0	124	
		1 604	Prepared or preserved fish; caviar and caviar substitutes prepared from fish eggs.	9		0	5	0.6	0	33 385	
		1 605	Crustaceans, molluscs and other aquatic invertebrates, prepared or preserved.	5		0	0	0.0	0	9 480	
		2 301[1]	Flours, meals and pellets, of meat or meat offal, of fish or of crustaceans, molluscs or other aquatic invertebrates, unfit for human consumption; greaves.	1		0	0	0.0	0	18,089	
AUSTRALIA	1999	0 301	Live fish.	5		0	0	0.0	0		7 238 445
		0 302	Fish, fresh or chilled, excluding fish fillets and other fish meat of heading No. 03.04.	21		0	0	0.0	0	4 336	
		0 303	Fish, frozen, excluding fish fillets and other fish meat of heading No. 03.04.	24		0	0	0.0	0	8,379	
		0 304	Fish fillets and other fish meat (whether or not minced), fresh, chilled or frozen.	3		0	0	0.0	0	44 114	
		0 305	Fish, dried, salted or in brine; smoked fish, whether or not cooked before or during the smoking process; flours, meals and pellets of fish, fit for human consumption.	12		0	0	0.0	0	5 170	

Table 6.10. **MFN customs duties and import volumes for fish products in selected countries (1998-2001)** *(cont.)*

Country	Year	HS Heading	Description	Number of		*Ad valorem* Duty Rates			Number of	Quantities	
				Tariff Lines	Unbound Items	Min	Max	Avg	Non *ad valorem* Items[2]	Tonnes	Other than Tonnes
		0 306	Crustaceans, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; crustaceans, in shell, cooked by steaming or by boiling in water, whether or not chilled, frozen, dried, salted or in brine; flours, meals and pellets of crustaceans, fit for human consumption.	10		0	0	0.0	0	12 339	
		0 307	Molluscs, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; aquatic invertebrates other than crustaceans and molluscs, live, fresh, chilled, frozen, dried, salted or in brine; flours, meals and pellets of aquatic invertebrates other than crustaceans fit for human consumption.	12		0	0	0.0	0	15 779	
		0 509	Natural sponges of animal origin.	1		0	0	0.0	0	5	
		1 504	Fats and oils and their fractions, of fish or marine mammals, whether or not refined, but not chemically modified.	3		0	0	0.0	0		
		1 603	Extracts and juices of meat, fish or crustaceans, molluscs or other aquatic invertebrates.	1		0	0	0.0	0	568	
		1 604	Prepared or preserved fish; caviar and caviar substitutes prepared from fish eggs.	9		0	5	0.6	0	40 038	
		1 605	Crustaceans, molluscs and other aquatic invertebrates, prepared or preserved.	5		0	0	0.0	0	9 682	
		2 301[1]	Flours, meals and pellets, of meat or meat offal, of fish or of crustaceans, molluscs or other aquatic invertebrates, unfit for human consumption; greaves.	1		0	0	0.0	0	22 102	
AUSTRALIA	2000	0 301	Live fish.	5		0	0	0.0	0		
		0 302	Fish, fresh or chilled, excluding fish fillets and other fish meat of heading No. 03.04.	21		0	0	0.0	0		
		0 303	Fish, frozen, excluding fish fillets and other fish meat of heading No. 03.04.	24		0	0	0.0	0		
		0 304	Fish fillets and other fish meat (whether or not minced), fresh, chilled or frozen.	3		0	0	0.0	0		
		0 305	Fish, dried, salted or in brine; smoked fish, whether or not cooked before or during the smoking process; flours, meals and pellets of fish, fit for human consumption.	12		0	0	0.0	0		
		0 306	Crustaceans, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; crustaceans, in shell, cooked by steaming or by boiling in water, whether or not chilled, frozen, dried, salted or in brine; flours, meals and pellets of crustaceans, fit for human consumption.	10		0	0	0.0	0		
		0 307	Molluscs, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; aquatic invertebrates other than crustaceans and molluscs, live, fresh, chilled, frozen, dried, salted or in brine; flours, meals and pellets of aquatic invertebrates other than crustaceans fit for human consumption.	12		0	0	0.0	0		
		0 509	Natural sponges of animal origin.	1		0	0	0.0	0		
		1 504	Fats and oils and their fractions, of fish or marine mammals, whether or not refined, but not chemically modified.	3		0	0	0.0	0		
		1 603	Extracts and juices of meat, fish or crustaceans, molluscs or other aquatic invertebrates.	1		0	0	0.0	0		
		1 604	Prepared or preserved fish; caviar and caviar substitutes prepared from fish eggs.	9		0	5	0.6	0		
		1 605	Crustaceans, molluscs and other aquatic invertebrates, prepared or preserved.	5		0	0	0.0	0		
		2 301[1]	Flours, meals and pellets, of meat or meat offal, of fish or of crustaceans, molluscs or other aquatic invertebrates, unfit for human consumption; greaves.	1		0	0	0.0	0		
AUSTRALIA	2001	0 301	Live fish.	5		0	0	0.0	0		
		0 302	Fish, fresh or chilled, excluding fish fillets and other fish meat of heading No. 03.04.	21		0	0	0.0	0		
		0 303	Fish, frozen, excluding fish fillets and other fish meat of heading No. 03.04.	24		0	0	0.0	0		
		0 304	Fish fillets and other fish meat (whether or not minced), fresh, chilled or frozen.	3		0	0	0.0	0		

Table 6.10. **MFN customs duties and import volumes for fish products in selected countries (1998-2001)** *(cont.)*

Country	Year	HS Heading	Description	Number of		*Ad valorem* Duty Rates			Number of	Quantities	
				Tariff Lines	Unbound Items	Min	Max	Avg	Non *ad valorem* Items[2]	Tonnes	Other than Tonnes
		0 305	Fish, dried, salted or in brine; smoked fish, whether or not cooked before or during the smoking process; flours, meals and pellets of fish, fit for human consumption.	12		0	0	0.0	0		
		0 306	Crustaceans, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; crustaceans, in shell, cooked by steaming or by boiling in water, whether or not chilled, frozen, dried, salted or in brine; flours, meals and pellets of crustaceans, fit for human consumption.	10		0	0	0.0	0		
		0 307	Molluscs, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; aquatic invertebrates other than crustaceans and molluscs, live, fresh, chilled, frozen, dried, salted or in brine; flours, meals and pellets of aquatic invertebrates other than crustaceans fit for human consumption.	12		0	0	0.0	0		
		0 509	Natural sponges of animal origin.	1		0	0	0.0	0		
		1 504	Fats and oils and their fractions, of fish or marine mammals, whether or not refined, but not chemically modified.	3		0	0	0.0	0		
		1 603	Extracts and juices of meat, fish or crustaceans, molluscs or other aquatic invertebrates.	1		0	0	0.0	0		
		1 604	Prepared or preserved fish; caviar and caviar substitutes prepared from fish eggs.	9		0	5	0.6	0		
		1 605	Crustaceans, molluscs and other aquatic invertebrates, prepared or preserved.	5		0	0	0.0	0		
		2301[1]	Flours, meals and pellets, of meat or meat offal, of fish or of crustaceans, molluscs or other aquatic invertebrates, unfit for human consumption; greaves.	1		0	0	0.0	0		
CANADA	1998	0 301	Live fish.	5		0	0	0.0	0	2 822	
		0 302	Fish, fresh or chilled, excluding fish fillets and other fish meat of heading No. 03.04.	21		0	3	0.1	0	33 856	
		0 303	Fish, frozen, excluding fish fillets and other fish meat of heading No. 03.04.	24		0	3	0.1	0	77 518	
		0 304	Fish fillets and other fish meat (whether or not minced), fresh, chilled or frozen.	3		0	0	0.0	0	34 726	
		0 305	Fish, dried, salted or in brine; smoked fish, whether or not cooked before or during the smoking process; flours, meals and pellets of fish, fit for human consumption.	12		0	3	0.3	0	16 751	
		0 306	Crustaceans, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; crustaceans, in shell, cooked by steaming or by boiling in water, whether or not chilled, frozen, dried, salted or in brine; flours, meals and pellets of crustaceans, fit for human consumption.	10		0	5	3.0	0	60 213	
		0 307	Molluscs, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; aquatic invertebrates other than crustaceans and molluscs, live, fresh, chilled, frozen, dried, salted or in brine; flours, meals and pellets of aquatic invertebrates other than crustaceans fit for human consumption.	14		0	4	0.5	0	20 306	
		0 509	Natural sponges of animal origin.	1		0	0	0.0	0		
		1 504	Fats and oils and their fractions, of fish or marine mammals, whether or not refined, but not chemically modified.	5		0	6.5	3.2	0	33 851	
		1 603	Extracts and juices of meat, fish or crustaceans, molluscs or other aquatic invertebrates.	2		3	7.5	5.3	0	1 489	
		1 604	Prepared or preserved fish; caviar and caviar substitutes prepared from fish eggs.	16		0	11	5.4	0	52 366	
		1 605	Crustaceans, molluscs and other aquatic invertebrates, prepared or preserved.	11		0	6.5	3.2	0	13 243	
		2301[1]	Flours, meals and pellets, of meat or meat offal, of fish or of crustaceans, molluscs or other aquatic invertebrates, unfit for human consumption; greaves.	2		0	3	1.5	0	62 198	
CANADA	1999	0 301	Live fish.	5		0	0	0.0	0	3 267	
		0 302	Fish, fresh or chilled, excluding fish fillets and other fish meat of heading No. 03.04.	21		0	3	0.1	0	42 662	

Table 6.10. **MFN customs duties and import volumes for fish products in selected countries (1998-2001)** *(cont.)*

Country	Year	HS Heading	Description	Number of		*Ad valorem* Duty Rates			Number of	Quantities	
				Tariff Lines	Unbound Items	Min	Max	Avg	Non *ad valorem* Items[2]	Tonnes	Other than Tonnes
		0 303	Fish, frozen, excluding fish fillets and other fish meat of heading No. 03.04.	24		0	3	0.1	0	61 291	
		0 304	Fish fillets and other fish meat (whether or not minced), fresh, chilled or frozen.	3		0	0	0.0	0	42 080	
		0 305	Fish, dried, salted or in brine; smoked fish, whether or not cooked before or during the smoking process; flours, meals and pellets of fish, fit for human consumption.	12		0	3	0.3	0	15 540	
		0 306	Crustaceans, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; crustaceans, in shell, cooked by steaming or by boiling in water, whether or not chilled, frozen, dried, salted or in brine; flours, meals and pellets of crustaceans, fit for human consumption.	10		0	5	3.0	0	75 380	
		0 307	Molluscs, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; aquatic invertebrates other than crustaceans and molluscs, live, fresh, chilled, frozen, dried, salted or in brine; flours, meals and pellets of aquatic invertebrates other than crustaceans fit for human consumption.	14		0	4	0.5	0	25 564	
		0 509	Natural sponges of animal origin.	1		0	0	0.0	0		
		1 504	Fats and oils and their fractions, of fish or marine mammals, whether or not refined, but not chemically modified.	5		0	6.5	3.2	0	40 111	
		1 603	Extracts and juices of meat, fish or crustaceans, molluscs or other aquatic invertebrates.	2		3	6.5	4.8	0	1 961	
		1 604	Prepared or preserved fish; caviar and caviar substitutes prepared from fish eggs.	16		0	11	5.4	0	57 606	
		1 605	Crustaceans, molluscs and other aquatic invertebrates, prepared or preserved.	11		0	6.5	3.2	0	15 754	
		2 301[1]	Flours, meals and pellets, of meat or meat offal, of fish or of crustaceans, molluscs or other aquatic invertebrates, unfit for human consumption; greaves.	3		0	3	1.0	0	65 772	
CANADA	2000	0 301	Live fish.	5		0	0	0.0	0	3 043	
		0 302	Fish, fresh or chilled, excluding fish fillets and other fish meat of heading No. 03.04.	21		0	3	0.1	0	48 039	
		0 303	Fish, frozen, excluding fish fillets and other fish meat of heading No. 03.04.	24		0	3	0.1	0	59 839	
		0 304	Fish fillets and other fish meat (whether or not minced), fresh, chilled or frozen.	3		0	0	0.0	0	39 174	
		0 305	Fish, dried, salted or in brine; smoked fish, whether or not cooked before or during the smoking process; flours, meals and pellets of fish, fit for human consumption.	12		0	3	0.3	0	20 309	
		0 306	Crustaceans, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; crustaceans, in shell, cooked by steaming or by boiling in water, whether or not chilled, frozen, dried, salted or in brine; flours, meals and pellets of crustaceans, fit for human consumption.	11		0	5	2.7	0	87 166	
		0 307	Molluscs, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; aquatic invertebrates other than crustaceans and molluscs, live, fresh, chilled, frozen, dried, salted or in brine; flours, meals and pellets of aquatic invertebrates other than crustaceans fit for human consumption.	14		0	4	0.5	0	25 623	
		0 509	Natural sponges of animal origin.	1		0	0	0.0	0		
		1 504	Fats and oils and their fractions, of fish or marine mammals, whether or not refined, but not chemically modified.	5		0	6.5	3.2	0	24 642	
		1 603	Extracts and juices of meat, fish or crustaceans, molluscs or other aquatic invertebrates.	2		3	6	4.5	0	1 762	
		1 604	Prepared or preserved fish; caviar and caviar substitutes prepared from fish eggs.	16		0	11	5.4	0	53 245	
		1 605	Crustaceans, molluscs and other aquatic invertebrates, prepared or preserved.	11		0	6.5	3.2	0	13 188	
		2 301[1]	Flours, meals and pellets, of meat or meat offal, of fish or of crustaceans, molluscs or other aquatic invertebrates, unfit for human consumption; greaves.	3		0	3	1.0	0	97 951	

Table 6.10. **MFN customs duties and import volumes for fish products in selected countries (1998-2001)** *(cont.)*

Country	Year	HS Heading	Description	Number of		*Ad valorem* Duty Rates			Number of	Quantities	
				Tariff Lines	Unbound Items	Min	Max	Avg	Non *ad valorem* Items[2]	Tonnes	Other than Tonnes
CHILE	1998	0 301	Live fish.	9		11	11	11.0	0	4	
		0 302	Fish, fresh or chilled, excluding fish fillets and other fish meat of heading No. 03.04.	25		11	11	11.0	0	2	
		0 303	Fish, frozen, excluding fish fillets and other fish meat of heading No. 03.04.	28		11	11	11.0	0	738	
		0 304	Fish fillets and other fish meat (whether or not minced), fresh, chilled or frozen.	24		11	11	11.0	0	112	
		0 305	Fish, dried, salted or in brine; smoked fish, whether or not cooked before or during the smoking process; flours, meals and pellets of fish, fit for human consumption.	12		11	11	11.0	0	3	
		0 306	Crustaceans, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; crustaceans, in shell, cooked by steaming or by boiling in water, whether or not chilled, frozen, dried, salted or in brine; flours, meals and pellets of crustaceans, fit for human consumption.	18		11	11	11.0	0	266	
		0 307	Molluscs, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; aquatic invertebrates other than crustaceans and molluscs, live, fresh, chilled, frozen, dried, salted or in brine; flours, meals and pellets of aquatic invertebrates other than crustaceans fit for human consumption.	25		11	11	11.0	0	714	
		0 509	Natural sponges of animal origin.	1		11	11	11.0	0	0	
		1 504	Fats and oils and their fractions, of fish or marine mammals, whether or not refined, but not chemically modified.	3		11	11	11.0	0	12 038	
		1 603	Extracts and juices of meat, fish or crustaceans, molluscs or other aquatic invertebrates.	2		11	11	11.0	0	40	
		1 604	Prepared or preserved fish; caviar and caviar substitutes prepared from fish eggs.	19		11	11	11.0	0	7 711	
		1 605	Crustaceans, molluscs and other aquatic invertebrates, prepared or preserved.	19		11	11	11.0	0	132	
		2 301[1]	Flours, meals and pellets, of meat or meat offal, of fish or of crustaceans, molluscs or other aquatic invertebrates, unfit for human consumption; greaves.	3		11	11	11.0	0	757	
CHILE	1999	0 301	Live fish.	9		10	10	10.0	0	4	
		0 302	Fish, fresh or chilled, excluding fish fillets and other fish meat of heading No. 03.04.	25		10	10	10.0	0	3	
		0 303	Fish, frozen, excluding fish fillets and other fish meat of heading No. 03.04.	28		10	10	10.0	0	887	
		0 304	Fish fillets and other fish meat (whether or not minced), fresh, chilled or frozen.	24		10	10	10.0	0	86	
		0 305	Fish, dried, salted or in brine; smoked fish, whether or not cooked before or during the smoking process; flours, meals and pellets of fish, fit for human consumption.	12		10	10	10.0	0	13	
		0 306	Crustaceans, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; crustaceans, in shell, cooked by steaming or by boiling in water, whether or not chilled, frozen, dried, salted or in brine; flours, meals and pellets of crustaceans, fit for human consumption.	18		10	10	10.0	0	259	
		0 307	Molluscs, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; aquatic invertebrates other than crustaceans and molluscs, live, fresh, chilled, frozen, dried, salted or in brine; flours, meals and pellets of aquatic invertebrates other than crustaceans fit for human consumption.	25		10	10	10.0	0	958	
		0 509	Natural sponges of animal origin.	1		10	10	10.0	0	0	
		1 504	Fats and oils and their fractions, of fish or marine mammals, whether or not refined, but not chemically modified.	3		10	10	10.0	0	60 301	
		1 603	Extracts and juices of meat, fish or crustaceans, molluscs or other aquatic invertebrates.	2		10	10	10.0	0	36	
		1 604	Prepared or preserved fish; caviar and caviar substitutes prepared from fish eggs.	19		10	10	10.0	0	7 536	
		1 605	Crustaceans, molluscs and other aquatic invertebrates, prepared or preserved.	19		10	10	10.0	0	36	

Table 6.10. **MFN customs duties and import volumes for fish products in selected countries (1998-2001)** *(cont.)*

Country	Year	HS Heading	Description	Number of		*Ad valorem* Duty Rates			Number of	Quantities	
				Tariff Lines	Unbound Items	Min	Max	Avg	Non *ad valorem* Items[2]	Tonnes	Other than Tonnes
		2 301[1]	Flours, meals and pellets, of meat or meat offal, of fish or of crustaceans, molluscs or other aquatic invertebrates, unfit for human consumption; greaves.	3		10	10	10.0	0	294 959	
CHILE	2000	0 301	Live fish.	9		9	9	9.0	0		
		0 302	Fish, fresh or chilled, excluding fish fillets and other fish meat of heading No. 03.04.	25		9	9	9.0	0		
		0 303	Fish, frozen, excluding fish fillets and other fish meat of heading No. 03.04.	28		9	9	9.0	0		
		0 304	Fish fillets and other fish meat (whether or not minced), fresh, chilled or frozen.	24		9	9	9.0	0		
		0 305	Fish, dried, salted or in brine; smoked fish, whether or not cooked before or during the smoking process; flours, meals and pellets of fish, fit for human consumption.	12		9	9	9.0	0		
		0 306	Crustaceans, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; crustaceans, in shell, cooked by steaming or by boiling in water, whether or not chilled, frozen, dried, salted or in brine; flours, meals and pellets of crustaceans, fit for human consumption.	18		9	9	9.0	0		
		0 307	Molluscs, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; aquatic invertebrates other than crustaceans and molluscs, live, fresh, chilled, frozen, dried, salted or in brine; flours, meals and pellets of aquatic invertebrates other than crustaceans fit for human consumption.	25		9	9	9.0	0		
		0 509	Natural sponges of animal origin.	1		9	9	9.0	0		
		1 504	Fats and oils and their fractions, of fish or marine mammals, whether or not refined, but not chemically modified.	3		9	9	9.0	0		
		1 603	Extracts and juices of meat, fish or crustaceans, molluscs or other aquatic invertebrates.	2		9	9	9.0	0		
		1 604	Prepared or preserved fish; caviar and caviar substitutes prepared from fish eggs.	19		9	9	9.0	0		
		1 605	Crustaceans, molluscs and other aquatic invertebrates, prepared or preserved.	19		9	9	9.0	0		
		2 301[1]	Flours, meals and pellets, of meat or meat offal, of fish or of crustaceans, molluscs or other aquatic invertebrates, unfit for human consumption; greaves.	3		9	9	9.0	0		
CHINA	1996	0 301	Live fish.	9		0	55	19.4	0	429	
		0 302	Fish, fresh or chilled, excluding fish fillets and other fish meat of heading No. 03.04.	21		25	35	29.8	0	12 522	
		0 303	Fish, frozen, excluding fish fillets and other fish meat of heading No. 03.04.	24		25	35	29.6	0	354 384	
		0 304	Fish fillets and other fish meat (whether or not minced), fresh, chilled or frozen.	3		45	45	45.0	0	3 099	
		0 305	Fish, dried, salted or in brine; smoked fish, whether or not cooked before or during the smoking process; flours, meals and pellets of fish, fit for human consumption.	14		3	55	51.3	0	10 173	
		0 306	Crustaceans, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; crustaceans, in shell, cooked by steaming or by boiling in water, whether or not chilled, frozen, dried, salted or in brine; flours, meals and pellets of crustaceans, fit for human consumption.	20		0	45	33.8	0	29 311	
		0 307	Molluscs, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; aquatic invertebrates other than crustaceans and molluscs, live, fresh, chilled, frozen, dried, salted or in brine; flours, meals and pellets of aquatic invertebrates other than crustaceans fit for human consumption.	21		0	55	33.1	0	58 902	
		0 509	Natural sponges of animal origin.	1		20	20	20.0	0	3	
		1 504	Fats and oils and their fractions, of fish or marine mammals, whether or not refined, but not chemically modified.	3		20	35	30.0	0	10 724	
		1 603	Extracts and juices of meat, fish or crustaceans, molluscs or other aquatic invertebrates.	1		45	45	45.0	0	45	

Table 6.10. **MFN customs duties and import volumes for fish products in selected countries (1998-2001)** *(cont.)*

Country	Year	HS Heading	Description	Number of		*Ad valorem* Duty Rates			Number of	Quantities	
				Tariff Lines	Unbound Items	Min	Max	Avg	Non *ad valorem* Items[2]	Tonnes	Other than Tonnes
		1 604	Prepared or preserved fish; caviar and caviar substitutes prepared from fish eggs.	9		45	45	45.0	0	1 557	
		1 605	Crustaceans, molluscs and other aquatic invertebrates, prepared or preserved.	6		45	45	45.0	0	2 231	
		2 301[1]	Flours, meals and pellets, of meat or meat offal, of fish or of crustaceans, molluscs or other aquatic invertebrates, unfit for human consumption; greaves.	2		3	5	4.0	0	884 477	
CHINA	1997	0 301	Live fish.	9		0	40	11.7	0	334	770 272
		0 302	Fish, fresh or chilled, excluding fish fillets and other fish meat of heading No. 03.04.	21		15	25	17.9	0	5 913	
		0 303	Fish, frozen, excluding fish fillets and other fish meat of heading No. 03.04.	24		15	20	18.5	0	393 849	
		0 304	Fish fillets and other fish meat (whether or not minced), fresh, chilled or frozen.	3		30	30	30.0	0	5 962	
		0 305	Fish, dried, salted or in brine; smoked fish, whether or not cooked before or during the smoking process; flours, meals and pellets of fish, fit for human consumption.	14		2	30	27.6	0	6 707	
		0 306	Crustaceans, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; crustaceans, in shell, cooked by steaming or by boiling in water, whether or not chilled, frozen, dried, salted or in brine; flours, meals and pellets of crustaceans, fit for human consumption.	24		0	35	24.0	0	24 916	
		0 307	Molluscs, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; aquatic invertebrates other than crustaceans and molluscs, live, fresh, chilled, frozen, dried, salted or in brine; flours, meals and pellets of aquatic invertebrates other than crustaceans fit for human consumption.	21		0	45	21.9	0	53 406	
		0 509	Natural sponges of animal origin.	1		15	15	15.0	0	6	
		1 504	Fats and oils and their fractions, of fish or marine mammals, whether or not refined, but not chemically modified.	3		15	25	21.7	0	1 760	
		1 603	Extracts and juices of meat, fish or crustaceans, molluscs or other aquatic invertebrates.	1		25	25	25.0	0	724	
		1 604	Prepared or preserved fish; caviar and caviar substitutes prepared from fish eggs.	10		25	25	25.0	0	2 248	
		1 605	Crustaceans, molluscs and other aquatic invertebrates, prepared or preserved.	8		20	25	24.4	0	860	
		2 301[1]	Flours, meals and pellets, of meat or meat offal, of fish or of crustaceans, molluscs or other aquatic invertebrates, unfit for human consumption; greaves.	2		3	5	4.0	0	988 455	
EC	1998	0 301	Live fish.	9		0	16	7.1	0	12 402	
		0 302	Fish, fresh or chilled, excluding fish fillets and other fish meat of heading No. 03.04.	68		0	23	13.2	0	548 533	
		0 303	Fish, frozen, excluding fish fillets and other fish meat of heading No. 03.04.	93		0	23	13.9	0	656 330	
		0 304	Fish fillets and other fish meat (whether or not minced), fresh, chilled or frozen.	62		0	18	10.8	0	743 066	
		0 305	Fish, dried, salted or in brine; smoked fish, whether or not cooked before or during the smoking process; flours, meals and pellets of fish, fit for human consumption.	32		10	20	13.3	0	193 276	
		0 306	Crustaceans, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; crustaceans, in shell, cooked by steaming or by boiling in water, whether or not chilled, frozen, dried, salted or in brine; flours, meals and pellets of crustaceans, fit for human consumption.	29		6	18	11.8	0	300 605	
		0 307	Molluscs, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; aquatic invertebrates other than crustaceans and molluscs, live, fresh, chilled, frozen, dried, salted or in brine; flours, meals and pellets of aquatic invertebrates other than crustaceans fit for human consumption.	34		0	11	7.4	0	402 968	
		0 509	Natural sponges of animal origin.	2		0	6.1	3.1	0	183	

Table 6.10. **MFN customs duties and import volumes for fish products in selected countries (1998-2001)** *(cont.)*

Country	Year	HS Heading	Description	Number of		*Ad valorem* Duty Rates			Number of	Quantities	
				Tariff Lines	Unbound Items	Min	Max	Avg	Non *ad valorem* Items[2]	Tonnes	Other than Tonnes
		1 504	Fats and oils and their fractions, of fish or marine mammals, whether or not refined, but not chemically modified.	8		0	12.9	5.4	0	96 201	
		1 603	Extracts and juices of meat, fish or crustaceans, molluscs or other aquatic invertebrates.	3		0	15.2	5.5	0	2 855	
		1 604	Prepared or preserved fish; caviar and caviar substitutes prepared from fish eggs.	34		5.5	25	18.9	0	463 436	
		1 605	Crustaceans, molluscs and other aquatic invertebrates, prepared or preserved.	11		0	26	17.8	0	103 961	
		2 301[1]	Flours, meals and pellets, of meat or meat offal, of fish or of crustaceans, molluscs or other aquatic invertebrates, unfit for human consumption; greaves.	1		0	0	0.0	0	697 671	
EC	1999	0 301	Live fish.	9		0	16	6.8	0	12 196	
		0 302	Fish, fresh or chilled, excluding fish fillets and other fish meat of heading No. 03.04.	68		0	23	12.9	0	588 289	
		0 303	Fish, frozen, excluding fish fillets and other fish meat of heading No. 03.04.	93		0	23	13.6	0	631 037	
		0 304	Fish fillets and other fish meat (whether or not minced), fresh, chilled or frozen.	62		0	18	10.1	0	655 558	
		0 305	Fish, dried, salted or in brine; smoked fish, whether or not cooked before or during the smoking process; flours, meals and pellets of fish, fit for human consumption.	32		10	20	13.3	0	182 347	
		0 306	Crustaceans, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; crustaceans, in shell, cooked by steaming or by boiling in water, whether or not chilled, frozen, dried, salted or in brine; flours, meals and pellets of crustaceans, fit for human consumption.	29		6	18	11.0	0	286 774	
		0 307	Molluscs, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; aquatic invertebrates other than crustaceans and molluscs, live, fresh, chilled, frozen, dried, salted or in brine; flours, meals and pellets of aquatic invertebrates other than crustaceans fit for human consumption.	34		0	11	7.2	0	434 035	
		0 509	Natural sponges of animal origin.	2		0	5.6	2.8	0	627	
		1 504	Fats and oils and their fractions, of fish or marine mammals, whether or not refined, but not chemically modified.	7		0	11.9	4.0	0	154 662	
		1 603	Extracts and juices of meat, fish or crustaceans, molluscs or other aquatic invertebrates.	3		0	14	4.9	0	3 019	
		1 604	Prepared or preserved fish; caviar and caviar substitutes prepared from fish eggs.	34		5.5	25	18.4	0	472 293	
		1 605	Crustaceans, molluscs and other aquatic invertebrates, prepared or preserved.	11		0	26	17.6	0	106 424	
		2 301[1]	Flours, meals and pellets, of meat or meat offal, of fish or of crustaceans, molluscs or other aquatic invertebrates, unfit for human consumption; greaves.	1		0	0	0.0	0	727 343	
EC	2000	0 301	Live fish	9		0	16	6.8	0		
		0 302	Fish, fresh or chilled, excluding fish fillets and other fish meat of heading No. 03.04.	62		0	23	13.4	0		
		0 304	Fish fillets and other fish meat (whether or not minced), fresh, chilled or frozen.	59		2	18	10.3	0		
		0 305	Fish, dried, salted or in brine; smoked fish, whether or not cooked before or during the smoking process; flours, meals and pellets of fish, fit for human consumption.	32		10	20	13.3	0		
		0 306	Crustaceans, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; crustaceans, in shell, cooked by steaming or by boiling in water, whether or not chilled, frozen, dried, salted or in brine; flours, meals and pellets of crustaceans, fit for human consumption.	29		6	18	11.0	0		
		0 307	Molluscs, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; aquatic invertebrates other than crustaceans and molluscs, live, fresh, chilled, frozen, dried, salted or in brine; flours, meals and pellets of aquatic invertebrates other than crustaceans fit for human consumption.	34		0	11	7.2	0		

Table 6.10. **MFN customs duties and import volumes for fish products in selected countries (1998-2001)** *(cont.)*

Country	Year	HS Heading	Description	Number of		*Ad valorem* Duty Rates			Number of	Quantities	
				Tariff Lines	Unbound Items	Min	Max	Avg	Non *ad valorem* Items[2]	Tonnes	Other than Tonnes
		0 509	Natural sponges of animal origin.	2		0	5.1	2.6	0		
		1 504	Fats and oils and their fractions, of fish or marine mammals, whether or not refined, but not chemically modified.	7		0	10.9	3.7	0		
		1 603	Extracts and juices of meat, fish or crustaceans, molluscs or other aquatic invertebrates.	3		0	12.8	4.3	0		
		1 604	Prepared or preserved fish; caviar and caviar substitutes prepared from fish eggs.	34		5.5	25	18.4	0		
		1 605	Crustaceans, molluscs and other aquatic invertebrates, prepared or preserved.	11		0	26	17.6	0		
		2 301[1]	Flours, meals and pellets, of meat or meat offal, of fish or of crustaceans, molluscs or other aquatic invertebrates, unfit for human consumption; greaves.	1		0	0	0.0	0		
EC	2001	0 301	Live fish.	9		0	16	6.8	0		
		0 302	Fish, fresh or chilled, excluding fish fillets and other fish meat of heading No. 03.04.	67		0	23	12.9	0		
		0 303	Fish, frozen, excluding fish fillets and other fish meat of heading No. 03.04.	93		0	23	13.6	0		
		0 304	Fish fillets and other fish meat (whether or not minced), fresh, chilled or frozen.	63		0	18	10.2	0		
		0 305	Fish, dried, salted or in brine; smoked fish, whether or not cooked before or during the smoking process; flours, meals and pellets of fish, fit for human consumption.	32		10	20	13.3	0		
		0 306	Crustaceans, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; crustaceans, in shell, cooked by steaming or by boiling in water, whether or not chilled, frozen, dried, salted or in brine; flours, meals and pellets of crustaceans, fit for human consumption.	29		6	18	11.0	0		
		0 307	Molluscs, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; aquatic invertebrates other than crustaceans and molluscs, live, fresh, chilled, frozen, dried, salted or in brine; flours, meals and pellets of aquatic invertebrates other than crustaceans fit for human consumption.	34		0	11	7.2	0		
		0 509	Natural sponges of animal origin.	2		0	5.1	2.6	0		
		1 504	Fats and oils and their fractions, of fish or marine mammals, whether or not refined, but not chemically modified.	7		0	10.9	3.7	0		
		1 603	Extracts and juices of meat, fish or crustaceans, molluscs or other aquatic invertebrates.	2		0	12.8	6.4	0		
		1 604	Prepared or preserved fish; caviar and caviar substitutes prepared from fish eggs.	34		5.5	25	18.4	0		
		1 605	Crustaceans, molluscs and other aquatic invertebrates, prepared or preserved.	11		0	26	17.6	0		
		2 301[1]	Flours, meals and pellets, of meat or meat offal, of fish or of crustaceans, molluscs or other aquatic invertebrates, unfit for human consumption; greaves.	1		0	0	0.0	0		
ICELAND	1998	0 301	Live fish.	8		0	0	0.0	0	2	
		0 302	Fish, fresh or chilled, excluding fish fillets and other fish meat of heading No. 03.04.	33		0	0	0.0	0	37 248	
		0 303	Fish, frozen, excluding fish fillets and other fish meat of heading No. 03.04.	46		0	0	0.0	0	14 944	
		0 304	Fish fillets and other fish meat (whether or not minced), fresh, chilled or frozen.	96		0	0	0.0	0	394	
		0 305	Fish, dried, salted or in brine; smoked fish, whether or not cooked before or during the smoking process; flours, meals and pellets of fish, fit for human consumption.	44		0	0	0.0	0	559	

Table 6.10. **MFN customs duties and import volumes for fish products in selected countries (1998-2001)** *(cont.)*

Country	Year	HS Heading	Description	Number of		*Ad valorem* Duty Rates			Number of	Quantities	
				Tariff Lines	Unbound Items	Min	Max	Avg	Non *ad valorem* Items[2]	Tonnes	Other than Tonnes
		0 306	Crustaceans, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; crustaceans, in shell, cooked by steaming or by boiling in water, whether or not chilled, frozen, dried, salted or in brine; flours, meals and pellets of crustaceans, fit for human consumption.	15		0	0	0.0	0	12 968	
		0 307	Molluscs, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; aquatic invertebrates other than crustaceans and molluscs, live, fresh, chilled, frozen, dried, salted or in brine; flours, meals and pellets of aquatic invertebrates other than crustaceans fit for human consumption.	21		0	0	0.0	0	1 993	
		0 509	Natural sponges of animal origin.	1		0	0	0.0	0	0	
		1 504	Fats and oils and their fractions, of fish or marine mammals, whether or not refined, but not chemically modified.	15		0	0	0.0	0	443	
		1 603	Extracts and juices of meat, fish or crustaceans, molluscs or other aquatic invertebrates.	4		0	0	0.0	0	0	
		1 604	Prepared or preserved fish; caviar and caviar substitutes prepared from fish eggs.	47		10	10	10.0	0	337	
		1 605	Crustaceans, molluscs and other aquatic invertebrates, prepared or preserved.	16		10	10	10.0	0	31	
		2 301[1]	Flours, meals and pellets, of meat or meat offal, of fish or of crustaceans, molluscs or other aquatic invertebrates, unfit for human consumption; greaves.	13		0	0	0.0	0	140	
INDIA	1996	0 301	Live fish.	5		12	12	12.0	0	6	
		0 302	Fish, fresh or chilled, excluding fish fillets and other fish meat of heading No. 03.04.	21		12	12	12.0	0	2 851	
		0 303	Fish, frozen, excluding fish fillets and other fish meat of heading No. 03.04.	24		12	12	12.0	0	2	
		0 304	Fish fillets and other fish meat (whether or not minced), fresh, chilled or frozen.	3		12	12	12.0	0	1	
		0 305	Fish, dried, salted or in brine; smoked fish, whether or not cooked before or during the smoking process; flours, meals and pellets of fish, fit for human consumption.	12		12	12	12.0	0	0	
		0 306	Crustaceans, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; crustaceans, in shell, cooked by steaming or by boiling in water, whether or not chilled, frozen, dried, salted or in brine; flours, meals and pellets of crustaceans, fit for human consumption.	10		12	12	12.0	0	18	
		0 307	Molluscs, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; aquatic invertebrates other than crustaceans and molluscs, live, fresh, chilled, frozen, dried, salted or in brine; flours, meals and pellets of aquatic invertebrates other than crustaceans fit for human consumption.	12		12	12	12.0	0	21	
		0 509	Natural sponges of animal origin.	1		12	12	12.0	0	3	
		1 504	Fats and oils and their fractions, of fish or marine mammals, whether or not refined, but not chemically modified.	3		42	42	42.0	0	282	
		1 603	Extracts and juices of meat, fish or crustaceans, molluscs or other aquatic invertebrates.	1		52	52	52.0	0	0	
		1 604	Prepared or preserved fish; caviar and caviar substitutes prepared from fish eggs.	9		52	52	52.0	0	1	
		1 605	Crustaceans, molluscs and other aquatic invertebrates, prepared or preserved.	5		52	52	52.0	0	1	
		2 301[1]	Flours, meals and pellets, of meat or meat offal, of fish or of crustaceans, molluscs or other aquatic invertebrates, unfit for human consumption; greaves.	1		0	0	0.0	0	7 066	
INDIA	1997	0 301	Live fish.	5		15	15	15.0	0		
		0 302	Fish, fresh or chilled, excluding fish fillets and other fish meat of heading No. 03.04.	21		15	15	15.0	0		
		0 303	Fish, frozen, excluding fish fillets and other fish meat of heading No. 03.04.	24		15	15	15.0	0		

Table 6.10. **MFN customs duties and import volumes for fish products in selected countries (1998-2001)** *(cont.)*

Country	Year	HS Heading	Description	Number of		*Ad valorem* Duty Rates			Number of	Quantities	
				Tariff Lines	Unbound Items	Min	Max	Avg	Non *ad valorem* Items[2]	Tonnes	Other than Tonnes
		0 304	Fish fillets and other fish meat (whether or not minced), fresh, chilled or frozen.	3		15	15	15.0	0		
		0 305	Fish, dried, salted or in brine; smoked fish, whether or not cooked before or during the smoking process; flours, meals and pellets of fish, fit for human consumption.	12		15	15	15.0	0		
		0 306	Crustaceans, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; crustaceans, in shell, cooked by steaming or by boiling in water, whether or not chilled, frozen, dried, salted or in brine; flours, meals and pellets of crustaceans, fit for human consumption.	10		15	15	15.0	0		
		0 307	Molluscs, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; aquatic invertebrates other than crustaceans and molluscs, live, fresh, chilled, frozen, dried, salted or in brine; flours, meals and pellets of aquatic invertebrates other than crustaceans fit for human consumption.	12		15	15	15.0	0		
		0 509	Natural sponges of animal origin.	1		15	15	15.0	0		
		1 504	Fats and oils and their fractions, of fish or marine mammals, whether or not refined, but not chemically modified.	3		45	45	45.0	0		
		1 603	Extracts and juices of meat, fish or crustaceans, molluscs or other aquatic invertebrates.	1		45	45	45.0	0		
		1 604	Prepared or preserved fish; caviar and caviar substitutes prepared from fish eggs.	9		45	45	45.0	0		
		1 605	Crustaceans, molluscs and other aquatic invertebrates, prepared or preserved.	5		45	45	45.0	0		
		2 301[1]	Flours, meals and pellets, of meat or meat offal, of fish or of crustaceans, molluscs or other aquatic invertebrates, unfit for human consumption; greaves.	1		0	0	0.0	0		
JAPAN	1998	0 301	Live fish.	13	1	0	10	2.4	0	23 068	
		0 302	Fish, fresh or chilled, excluding fish fillets and other fish meat of heading No. 03.04.	42	9	2.2	10	5.1	0	146 910	
		0 303	Fish, frozen, excluding fish fillets and other fish meat of heading No. 03.04.	51	6	2.2	10	4.7	0	1 089 672	
		0 304	Fish fillets and other fish meat (whether or not minced), fresh, chilled or frozen.	33	4	2.2	10	4.6	0	371 463	
		0 305	Fish, dried, salted or in brine; smoked fish, whether or not cooked before or during the smoking process; flours, meals and pellets of fish, fit for human consumption.	22	6	3	15	11.0	0	20 898	
		0 306	Crustaceans, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; crustaceans, in shell, cooked by steaming or by boiling in water, whether or not chilled, frozen, dried, salted or in brine; flours, meals and pellets of crustaceans, fit for human consumption.	26		1.4	11	4.2	0	378 697	
		0 307	Molluscs, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; aquatic invertebrates other than crustaceans and molluscs, live, fresh, chilled, frozen, dried, salted or in brine; flours, meals and pellets of aquatic invertebrates other than crustaceans fit for human consumption.	51	8	0	15	7.8	0	358 723	
		0 509	Natural sponges of animal origin.	2		0	3.8	1.9	0	18	
		1 504	Fats and oils and their fractions, of fish or marine mammals, whether or not refined, but not chemically modified.	4		0	3.8	2.5	1	27 985	
		1 603	Extracts and juices of meat, fish or crustaceans, molluscs or other aquatic invertebrates.	2		9.6	12.8	11.2	0	4 454	
		1 604	Prepared or preserved fish; caviar and caviar substitutes prepared from fish eggs.	22		6.4	12	9.4	0	158 946	
		1 605	Crustaceans, molluscs and other aquatic invertebrates, prepared or preserved.	26		4.8	11.4	8.3	0	92 818	
		2 301[1]	Flours, meals and pellets, of meat or meat offal, of fish or of crustaceans, molluscs or other aquatic invertebrates, unfit for human consumption; greaves.	2		0	0	0.0	0	329 627	
JAPAN	1999	0 301	Live fish.	13	1	0	10	2.2	0	24 040	

Table 6.10. **MFN customs duties and import volumes for fish products in selected countries (1998-2001)** *(cont.)*

Country	Year	HS Heading	Description	Number of		*Ad valorem* Duty Rates			Number of	Quantities	
				Tariff Lines	Unbound Items	Min	Max	Avg	Non *ad valorem* Items[2]	Tonnes	Other than Tonnes
		0 302	Fish, fresh or chilled, excluding fish fillets and other fish meat of heading No. 03.04.	42	9	2	10	4.8	0	152 195	
		0 303	Fish, frozen, excluding fish fillets and other fish meat of heading No. 03.04.	51	6	2	10	4.4	0	1 262 193	
		0 304	Fish fillets and other fish meat (whether or not minced), fresh, chilled or frozen.	33	4	2	10	4.2	0	404 159	
		0 305	Fish, dried, salted or in brine; smoked fish, whether or not cooked before or during the smoking process; flours, meals and pellets of fish, fit for human consumption.	22	6	2.8	15	10.4	0	19 479	
		0 306	Crustaceans, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; crustaceans, in shell, cooked by steaming or by boiling in water, whether or not chilled, frozen, dried, salted or in brine; flours, meals and pellets of crustaceans, fit for human consumption.	26		1	10	3.8	0	387 587	
		0 307	Molluscs, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; aquatic invertebrates other than crustaceans and molluscs, live, fresh, chilled, frozen, dried, salted or in brine; flours, meals and pellets of aquatic invertebrates other than crustaceans fit for human consumption.	51	8	0	15	7.4	0	398 865	
		0 509	Natural sponges of animal origin.	2		0	3.5	1.8	0	10	
		1 504	Fats and oils and their fractions, of fish or marine mammals, whether or not refined, but not chemically modified.	4		0	3.5	2.3	1	26 427	
		1 603	Extracts and juices of meat, fish or crustaceans, molluscs or other aquatic invertebrates.	2		9.6	13.3	11.5	0	5 079	
		1 604	Prepared or preserved fish; caviar and caviar substitutes prepared from fish eggs.	22		6.4	11	9.2	0	169 566	
		1 605	Crustaceans, molluscs and other aquatic invertebrates, prepared or preserved.	26		4.8	10.5	7.9	0	107 145	
		2 301[1]	Flours, meals and pellets, of meat or meat offal, of fish or of crustaceans, molluscs or other aquatic invertebrates, unfit for human consumption; greaves.	2		0	0	0.0	0	346 329	
JAPAN	2000	0 301	Live fish.	13	1	0	10	2.2	0		
		0 302	Fish, fresh or chilled, excluding fish fillets and other fish meat of heading No. 03.04.	42	9	2	10	4.8	0		
		0 303	Fish, frozen, excluding fish fillets and other fish meat of heading No. 03.04.	51	6	2	10	4.4	0		
		0 304	Fish fillets and other fish meat (whether or not minced), fresh, chilled or frozen.	33	4	2	10	4.4	0		
		0 305	Fish, dried, salted or in brine; smoked fish, whether or not cooked before or during the smoking process; flours, meals and pellets of fish, fit for human consumption.	22	6	2.8	15	10.4	0		
		0 306	Crustaceans, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; crustaceans, in shell, cooked by steaming or by boiling in water, whether or not chilled, frozen, dried, salted or in brine; flours, meals and pellets of crustaceans, fit for human consumption.	26		1	10	3.8	0		
		0 307	Molluscs, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; aquatic invertebrates other than crustaceans and molluscs, live, fresh, chilled, frozen, dried, salted or in brine; flours, meals and pellets of aquatic invertebrates other than crustaceans fit for human consumption.	51	8	0	15	7.4	0		
		0 509	Natural sponges of animal origin.	2		0	3.5	1.8	0		
		1 504	Fats and oils and their fractions, of fish or marine mammals, whether or not refined, but not chemically modified.	4		0	3.5	2.3	1		
		1 603	Extracts and juices of meat, fish or crustaceans, molluscs or other aquatic invertebrates.	2		9.6	12	10.8	0		
		1 604	Prepared or preserved fish; caviar and caviar substitutes prepared from fish eggs.	22		6.4	11	9.2	0		
		1 605	Crustaceans, molluscs and other aquatic invertebrates, prepared or preserved.	26		4.8	10.5	7.9	0		
		2 301[1]	Flours, meals and pellets, of meat or meat offal, of fish or of crustaceans, molluscs or other aquatic invertebrates, unfit for human consumption; greaves.	2		0	0	0.0	0		

Table 6.10. **MFN customs duties and import volumes for fish products in selected countries (1998-2001)** *(cont.)*

Country	Year	HS Heading	Description	Number of		*Ad valorem* Duty Rates			Number of	Quantities	
				Tariff Lines	Unbound Items	Min	Max	Avg	Non *ad valorem* Items[2]	Tonnes	Other than Tonnes
KOREA REP.	1998	0 301	Live fish.	26	1 9	10	10	10.0	0	10 914	
		0 302	Fish, fresh or chilled, excluding fish fillets and other fish meat of heading No. 03.04.	37	3 3	20	20	20.0	0	4 467	
		0 303	Fish, frozen, excluding fish fillets and other fish meat of heading No. 03.04.	50	1 7	10	10	10.0	0	194 207	
		0 304	Fish fillets and other fish meat (whether or not minced), fresh, chilled or frozen.	15	1 2	10	20	14.0	0	49 047	
		0 305	Fish, dried, salted or in brine; smoked fish, whether or not cooked before or during the smoking process; flours, meals and pellets of fish, fit for human consumption.	38	2 8	20	20	20.0	0	1 325	
		0 306	Crustaceans, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; crustaceans, in shell, cooked by steaming or by boiling in water, whether or not chilled, frozen, dried, salted or in brine; flours, meals and pellets of crustaceans, fit for human consumption.	19	1 8	15.2	20	19.7	0	16 964	
		0 307	Molluscs, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; aquatic invertebrates other than crustaceans and molluscs, live, fresh, chilled, frozen, dried, salted or in brine; flours, meals and pellets of aquatic invertebrates other than crustaceans fit for human consumption.	66	6 0	5	20	18.9	0	45 453	
		0 509	Natural sponges of animal origin.	1		8	8	8.0	0	0	
		1 504	Fats and oils and their fractions, of fish or marine mammals, whether or not refined, but not chemically modified.	5		3	3	3.0	0	5 735	
		1 603	Extracts and juices of meat, fish or crustaceans, molluscs or other aquatic invertebrates.	5	3	30	30	30.0	0	2 011	
		1 604	Prepared or preserved fish; caviar and caviar substitutes prepared from fish eggs.	34	1	20	20	20.0	0	1 169	
		1 605	Crustaceans, molluscs and other aquatic invertebrates, prepared or preserved.	29	2 3	20	20	20.0	0	10 072	
		2 301[1]	Flours, meals and pellets, of meat or meat offal, of fish or of crustaceans, molluscs or other aquatic invertebrates, unfit for human consumption; greaves.	2		5	5	5.0	0	24 804	
KOREA,REP.	1999	0 301	Live fish.	27	2 0	10	10	10.0	0	24 424	
		0 302	Fish, fresh or chilled, excluding fish fillets and other fish meat of heading No. 03.04.	37	3 3	20	20	20.0	0	17 248	
		0 303	Fish, frozen, excluding fish fillets and other fish meat of heading No. 03.04.	51	1 8	10	10	10.0	0	433 491	
		0 304	Fish fillets and other fish meat (whether or not minced), fresh, chilled or frozen.	15	1 2	10	20	14.0	0	88 119	
		0 305	Fish, dried, salted or in brine; smoked fish, whether or not cooked before or during the smoking process; flours, meals and pellets of fish, fit for human consumption.	38	2 9	20	20	20.0	0	3 286	
		0 306	Crustaceans, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; crustaceans, in shell, cooked by steaming or by boiling in water, whether or not chilled, frozen, dried, salted or in brine; flours, meals and pellets of crustaceans, fit for human consumption.	19	1 8	14	20	19.7	0	31 333	

Table 6.10. **MFN customs duties and import volumes for fish products in selected countries (1998-2001)** *(cont.)*

Country	Year	HS Heading	Description	Number of		*Ad valorem* Duty Rates			Number of	Quantities	
				Tariff Lines	Unbound Items	Min	Max	Avg	Non *ad valorem* Items[2]	Tonnes	Other than Tonnes
		0 307	Molluscs, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; aquatic invertebrates other than crustaceans and molluscs, live, fresh, chilled, frozen, dried, salted or in brine; flours, meals and pellets of aquatic invertebrates other than crustaceans fit for human consumption.	66	60	5	20	18.9	0	73 352	
		0 509	Natural sponges of animal origin.	1		8	8	8.0	0	0	
		1 504	Fats and oils and their fractions, of fish or marine mammals, whether or not refined, but not chemically modified.	5		3	3	3.0	0	7 129	
		1 603	Extracts and juices of meat, fish or crustaceans, molluscs or other aquatic invertebrates.	5	3	30	30	30.0	0	2 773	
		1 604	Prepared or preserved fish; caviar and caviar substitutes prepared from fish eggs.	34	1	20	20	20.0	0	2 214	
		1 605	Crustaceans, molluscs and other aquatic invertebrates, prepared or preserved.	30	24	20	20	20.0	0	18 557	
		2 301[1]	Flours, meals and pellets, of meat or meat offal, of fish or of crustaceans, molluscs or other aquatic invertebrates, unfit for human consumption; greaves	2		5	5	5.0	0	29 411	
KOREA,REP.	2000	0 301	Live fish.	27	20	10	10	10.0	0		
		0 302	Fish, fresh or chilled, excluding fish fillets and other fish meat of heading No. 03.04.	37	33	20	20	20.0	0		
		0 303	Fish, frozen, excluding fish fillets and other fish meat of heading No. 03.04.	52	19	10	10	10.0	0		
		0 304	Fish fillets and other fish meat (whether or not minced), fresh, chilled or frozen.	15	12	10	20	14.0	0		
		0 305	Fish, dried, salted or in brine; smoked fish, whether or not cooked before or during the smoking process; flours, meals and pellets of fish, fit for human consumption.	38	28	20	20	20.0	0		
		0 306	Crustaceans, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; crustaceans, in shell, cooked by steaming or by boiling in water, whether or not chilled, frozen, dried, salted or in brine; flours, meals and pellets of crustaceans, fit for human consumption.	21	19	14	20	19.4	0		
		0 307	Molluscs, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; aquatic invertebrates other than crustaceans and molluscs, live, fresh, chilled, frozen, dried, salted or in brine; flours, meals and pellets of aquatic invertebrates other than crustaceans fit for human consumption.	67	61	5	20	18.9	0		
		0 509	Natural sponges of animal origin.	1		8	8	8.0	0		
		1 504	Fats and oils and their fractions, of fish or marine mammals, whether or not refined, but not chemically modified.	5		3	3	3.0	0		
		1 603	Extracts and juices of meat, fish or crustaceans, molluscs or other aquatic invertebrates.	5	3	30	30	30.0	0		
		1 604	Prepared or preserved fish; caviar and caviar substitutes prepared from fish eggs.	34	1	20	20	20.0	0		
		1 605	Crustaceans, molluscs and other aquatic invertebrates, prepared or preserved.	30	24	20	20	20.0	0		
		2 301[1]	Flours, meals and pellets, of meat or meat offal, of fish or of crustaceans, molluscs or other aquatic invertebrates, unfit for human consumption; greaves.	2		5	5	5.0	0		

Table 6.10. **MFN customs duties and import volumes for fish products in selected countries (1998-2001)** *(cont.)*

Country	Year	HS Heading	Description	Number of		*Ad valorem* Duty Rates			Number of	Quantities	
				Tariff Lines	Unbound Items	Min	Max	Avg	Non *ad valorem* Items[2]	Tonnes	Other than Tonnes
MEXICO	1998	0 301	Live fish.	6		0	20	14.0	0	6 439	
		0 302	Fish, fresh or chilled, excluding fish fillets and other fish meat of heading No. 03.04..	22		10	20	19.5	0	1 709	
		0 303	Fish, frozen, excluding fish fillets and other fish meat of heading No. 03.04	24		10	20	19.2	0	5 381	
		0 304	Fish fillets and other fish meat (whether or not minced), fresh, chilled or frozen.	3		20	20	20.0	0	4 436	
		0 305	Fish, dried, salted or in brine; smoked fish, whether or not cooked before or during the smoking process; flours, meals and pellets of fish, fit for human consumption.	15		20	20	20.0	0	1 155	
		0 306	Crustaceans, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; crustaceans, in shell, cooked by steaming or by boiling in water, whether or not chilled, frozen, dried, salted or in brine; flours, meals and pellets of crustaceans, fit for human consumption.	11		0	20	18.2	0	13 561	
		0 307	Molluscs, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; aquatic invertebrates other than crustaceans and molluscs, live, fresh, chilled, frozen, dried, salted or in brine; flours, meals and pellets of aquatic invertebrates other than crustaceans fit for human consumption.	14		20	20	20.0	0	5 040	
		0 509	Natural sponges of animal origin.	1		20	20	20.0	0	4	
		1 504	Fats and oils and their fractions, of fish or marine mammals, whether or not refined, but not chemically modified.	5		0	10	8.0	0	1 007	
		1 603	Extracts and juices of meat, fish or crustaceans, molluscs or other aquatic invertebrates.	2		20	20	20.0	0	45	
		1 604	Prepared or preserved fish; caviar and caviar substitutes prepared from fish eggs.	13		20	20	20.0	0	5 953	
		1 605	Crustaceans, molluscs and other aquatic invertebrates, prepared or preserved.	6		20	20	20.0	0	1 385	
		2 301[1]	Flours, meals and pellets, of meat or meat offal, of fish or of crustaceans, molluscs or other aquatic invertebrates, unfit for human consumption; greaves.	1		15	15	15.0	0	16 960	
MEXICO	1999	0 301	Live fish.	6		10	30	24.0	0	5 624	
		0 302	Fish, fresh or chilled, excluding fish fillets and other fish meat of heading No. 03.04.	22		20	30	29.5	0	932	
		0 303	Fish, frozen, excluding fish fillets and other fish meat of heading No. 03.04.	24		20	30	29.2	0	10 432	
		0 304	Fish fillets and other fish meat (whether or not minced), fresh, chilled or frozen.	3		30	30	30.0	0	4 368	
		0 305	Fish, dried, salted or in brine; smoked fish, whether or not cooked before or during the smoking process; flours, meals and pellets of fish, fit for human consumption..	15		30	30	30.0	0	1 411	
		0 306	Crustaceans, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; crustaceans, in shell, cooked by steaming or by boiling in water, whether or not chilled, frozen, dried, salted or in brine; flours, meals and pellets of crustaceans, fit for human consumption	11		10	30	28.2	0	4 108	
		0 307	Molluscs, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; aquatic invertebrates other than crustaceans and molluscs, live, fresh, chilled, frozen, dried, salted or in brine; flours, meals and pellets of aquatic invertebrates other than crustaceans fit for human consumption.	14		30	30	30.0	0	4 483	
		0 509	Natural sponges of animal origin.	1		30	30	30.0	0	8	
		1 504	Fats and oils and their fractions, of fish or marine mammals, whether or not refined, but not chemically modified.	5		0	10	8.0	0	57 440	
		1 603	Extracts and juices of meat, fish or crustaceans, molluscs or other aquatic invertebrates.	2		23	23	23.0	0	72	
		1 604	Prepared or preserved fish; caviar and caviar substitutes prepared from fish eggs.	13		23	23	23.0	0	6 742	

Table 6.10. **MFN customs duties and import volumes for fish products in selected countries (1998-2001)** *(cont.)*

Country	Year	HS Heading	Description	Number of		*Ad valorem* Duty Rates			Number of	Quantities	
				Tariff Lines	Unbound Items	Min	Max	Avg	Non *ad valorem* Items[2]	Tonnes	Other than Tonnes
		1 605	Crustaceans, molluscs and other aquatic invertebrates, prepared or preserved.	6		23	23	23.0	0	1 541	
		2 301[1]	Flours, meals and pellets, of meat or meat offal, of fish or of crustaceans, molluscs or other aquatic invertebrates, unfit for human consumption; greaves.	1		18	18	18.0	0	22 341	
MEXICO	2000	0 301	Live fish.	6		10	30	24.0	0		
		0 302	Fish, fresh or chilled, excluding fish fillets and other fish meat of heading No. 03.04.	22		20	30	29.5	0		
		0 303	Fish, frozen, excluding fish fillets and other fish meat of heading No. 03.04.	24		20	30	29.2	0		
		0 304	Fish fillets and other fish meat (whether or not minced), fresh, chilled or frozen.	3		30	30	30.0	0		
		0 305	Fish, dried, salted or in brine; smoked fish, whether or not cooked before or during the smoking process; flours, meals and pellets of fish, fit for human consumption.	15		30	30	30.0	0		
		0 306	Crustaceans, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; crustaceans, in shell, cooked by steaming or by boiling in water, whether or not chilled, frozen, dried, salted or in brine; flours, meals and pellets of crustaceans, fit for human consumption.	11		10	30	28.2	0		
		0 307	Molluscs, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; aquatic invertebrates other than crustaceans and molluscs, live, fresh, chilled, frozen, dried, salted or in brine; flours, meals and pellets of aquatic invertebrates other than crustaceans fit for human consumption	14		30	30	30.0	0		
		0 509	Natural sponges of animal origin.	1		30	30	30.0	0		
		1 504	Fats and oils and their fractions, of fish or marine mammals, whether or not refined, but not chemically modified.	5		0	10	8.0	0		
		1 603	Extracts and juices of meat, fish or crustaceans, molluscs or other aquatic invertebrates.	2		23	23	23.0	0		
		1 604	Prepared or preserved fish; caviar and caviar substitutes prepared from fish eggs.	13		23	23	23.0	0		
		1 605	Crustaceans, molluscs and other aquatic invertebrates, prepared or preserved.	6		23	23	23.0	0		
		2 301[1]	Flours, meals and pellets, of meat or meat offal, of fish or of crustaceans, molluscs or other aquatic invertebrates, unfit for human consumption; greaves.	1		18	18	18.0	0		
NEW ZEALAND	1997	0 301	Live fish.	5		0	0	0.0	0	13	
		0 302	Fish, fresh or chilled, excluding fish fillets and other fish meat of heading No. 03.04.	23		0	0	0.0	0	42	
		0 303	Fish, frozen, excluding fish fillets and other fish meat of heading No. 03.04.	26		0	0	0.0	0	1 178	
		0 304	Fish fillets and other fish meat (whether or not minced), fresh, chilled or frozen.	3		0	0	0.0	0	414	
		0 305	Fish, dried, salted or in brine; smoked fish, whether or not cooked before or during the smoking process; flours, meals and pellets of fish, fit for human consumption.	12		0	0	0.0	0	54	
		0 306	Crustaceans, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; crustaceans, in shell, cooked by steaming or by boiling in water, whether or not chilled, frozen, dried, salted or in brine; flours, meals and pellets of crustaceans, fit for human consumption.	15		0	8.5	2.8	0	987	

Table 6.10. **MFN customs duties and import volumes for fish products in selected countries (1998-2001)** *(cont.)*

Country	Year	HS Heading	Description	Number of		*Ad valorem* Duty Rates			Number of	Quantities	
				Tariff Lines	Unbound Items	Min	Max	Avg	Non *ad valorem* Items[2]	Tonnes	Other than Tonnes
		0 307	Molluscs, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; aquatic invertebrates other than crustaceans and molluscs, live, fresh, chilled, frozen, dried, salted or in brine; flours, meals and pellets of aquatic invertebrates other than crustaceans fit for human consumption.	14		0	7.5	0.5	0	595	173 586
		0 509	Natural sponges of animal origin.	1		0	0	0.0	0	8	41 082
		1 504	Fats and oils and their fractions, of fish or marine mammals, whether or not refined, but not chemically modified.	5		0	8.5	3.4	0		
		1 603	Extracts and juices of meat, fish or crustaceans, molluscs or other aquatic invertebrates.	2		2.5	9.5	6.0	0	77	
		1 604	Prepared or preserved fish; caviar and caviar substitutes prepared from fish eggs.	21		0	9	2.5	0	7 184	
		1 605	Crustaceans, molluscs and other aquatic invertebrates, prepared or preserved.	18		0	8.5	3.1	0	1 005	
		2 301[1]	Flours, meals and pellets, of meat or meat offal, of fish or of crustaceans, molluscs or other aquatic invertebrates, unfit for human consumption; greaves.	1		8.5	8.5	8.5	0	16 101	
NEW ZEALAND	1998	0 301	Live fish.	5		0	0	0.0	0		
		0 302	Fish, fresh or chilled, excluding fish fillets and other fish meat of heading No. 03.04.	23		0	0	0.0	0		
		0 303	Fish, frozen, excluding fish fillets and other fish meat of heading No. 03.04.	26		0	0	0.0	0		
		0 304	Fish fillets and other fish meat (whether or not minced), fresh, chilled or frozen.	3		0	0	0.0	0		
		0 305	Fish, dried, salted or in brine; smoked fish, whether or not cooked before or during the smoking process; flours, meals and pellets of fish, fit for human consumption.	12		0	0	0.0	0		
		0 306	Crustaceans, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; crustaceans, in shell, cooked by steaming or by boiling in water, whether or not chilled, frozen, dried, salted or in brine; flours, meals and pellets of crustaceans, fit for human consumption.	15		0	7.5	2.5	0		
		0 307	Molluscs, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; aquatic invertebrates other than crustaceans and molluscs, live, fresh, chilled, frozen, dried, salted or in brine; flours, meals and pellets of aquatic invertebrates other than crustaceans fit for human consumption.	14		0	6.5	0.5	0		
		0 509	Natural sponges of animal origin.	1		0	0	0.0	0		
		1 504	Fats and oils and their fractions, of fish or marine mammals, whether or not refined, but not chemically modified.	5		0	7.5	3.0	0		
		1 603	Extracts and juices of meat, fish or crustaceans, molluscs or other aquatic invertebrates.	2		0	8	4.0	0		
		1 604	Prepared or preserved fish; caviar and caviar substitutes prepared from fish eggs.	21		0	7.5	2.1	0		
		1 605	Crustaceans, molluscs and other aquatic invertebrates, prepared or preserved.	18		0	7.5	2.5	0		
		2 301[1]	Flours, meals and pellets, of meat or meat offal, of fish or of crustaceans, molluscs or other aquatic invertebrates, unfit for human consumption; greaves.	1		7.5	7.5	7.5	0		
NEW ZEALAND	1999	0 301	Live fish.	5		0	0	0.0	0		
		0 302	Fish, fresh or chilled, excluding fish fillets and other fish meat of heading No. 03.04.	23		0	0	0.0	0		
		0 303	Fish, frozen, excluding fish fillets and other fish meat of heading No. 03.04.	26		0	0	0.0	0		
		0 304	Fish fillets and other fish meat (whether or not minced), fresh, chilled or frozen.	3		0	0	0.0	0		

Table 6.10. **MFN customs duties and import volumes for fish products in selected countries (1998-2001)** *(cont.)*

Country	Year	HS Heading	Description	Number of		*Ad valorem* Duty Rates			Number of	Quantities	
				Tariff Lines	Unbound Items	Min	Max	Avg	Non *ad valorem* Items[2]	Tonnes	Other than Tonnes
		0 305	Fish, dried, salted or in brine; smoked fish, whether or not cooked before or during the smoking process; flours, meals and pellets of fish, fit for human consumption.	12		0	0	0.0	0		
		0 306	Crustaceans, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; crustaceans, in shell, cooked by steaming or by boiling in water, whether or not chilled, frozen, dried, salted or in brine; flours, meals and pellets of crustaceans, fit for human consumption.	15		0	6.5	2.2	0		
		0 307	Molluscs, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; aquatic invertebrates other than crustaceans and molluscs, live, fresh, chilled, frozen, dried, salted or in brine; flours, meals and pellets of aquatic invertebrates other than crustaceans fit for human consumption.	14		0	5	0.4	0		
		0 509	Natural sponges of animal origin.	1		0	0	0.0	0		
		1 504	Fats and oils and their fractions, of fish or marine mammals, whether or not refined, but not chemically modified.	5		0	6.5	2.6	0		
		1 603	Extracts and juices of meat, fish or crustaceans, molluscs or other aquatic invertebrates.	2		0	7	3.5	0		
		1 604	Prepared or preserved fish; caviar and caviar substitutes prepared from fish eggs.	21		0	6.5	2.0	0		
		1 605	Crustaceans, molluscs and other aquatic invertebrates, prepared or preserved.	18		0	6.5	2.2	0		
		2 301[1]	Flours, meals and pellets, of meat or meat offal, of fish or of crustaceans, molluscs or other aquatic invertebrates, unfit for human consumption; greaves.	1		6.5	6.5	6.5	0		
NORWAY	1998	0 301	Live fish.	7		0	0	0.0	0	83	
		0 302	Fish, fresh or chilled, excluding fish fillets and other fish meat of heading No. 03.04.	39		0	0	0.0	0	206 161	
		0 303	Fish, frozen, excluding fish fillets and other fish meat of heading No. 03.04.	40		0	0	0.0	0	76 858	
		0 304	Fish fillets and other fish meat (whether or not minced), fresh, chilled or frozen.	32		0	0	0.0	0	10 501	
		0 305	Fish, dried, salted or in brine; smoked fish, whether or not cooked before or during the smoking process; flours, meals and pellets of fish, fit for human consumption.	37		0	0	0.0	0	6 085	
		0 306	Crustaceans, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; crustaceans, in shell, cooked by steaming or by boiling in water, whether or not chilled, frozen, dried, salted or in brine; flours, meals and pellets of crustaceans, fit for human consumption.	16		0	0	0.0	0	12 878	
		0 307	Molluscs, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; aquatic invertebrates other than crustaceans and molluscs, live, fresh, chilled, frozen, dried, salted or in brine; flours, meals and pellets of aquatic invertebrates other than crustaceans fit for human consumption.	13		0	0	0.0	0	9 949	
		0 509	Natural sponges of animal origin.	1		0	0	0.0	0	1	
		1 504	Fats and oils and their fractions, of fish or marine mammals, whether or not refined, but not chemically modified.	15		0	5.1	0.9	3	157 127	
		1 603	Extracts and juices of meat, fish or crustaceans, molluscs or other aquatic invertebrates.	4		0	0	0.0	2	147	
		1 604	Prepared or preserved fish; caviar and caviar substitutes prepared from fish eggs.	30		0	0	0.0	0	11 815	
		1 605	Crustaceans, molluscs and other aquatic invertebrates, prepared or preserved.	7		0	0	0.0	0	3 311	
		2 301[1]	Flours, meals and pellets, of meat or meat offal, of fish or of crustaceans, molluscs or other aquatic invertebrates, unfit for human consumption; greaves.	2		0	0	0.0	0	99 753	
NORWAY	1999	0 301	Live fish.	7		0	0	0.0	0	103	

Table 6.10. **MFN customs duties and import volumes for fish products in selected countries (1998-2001)** *(cont.)*

Country	Year	HS Heading	Description	Number of		*Ad valorem* Duty Rates			Number of	Quantities	
				Tariff Lines	Unbound Items	Min	Max	Avg	Non *ad valorem* Items[2]	Tonnes	Other than Tonnes
		0 303	Fish, frozen, excluding fish fillets and other fish meat of heading No. 03.04.	40		0	0	0.0	0	83 440	
		0 304	Fish fillets and other fish meat (whether or not minced), fresh, chilled or frozen.	32		0	0	0.0	0	8 588	
		0 305	Fish, dried, salted or in brine; smoked fish, whether or not cooked before or during the smoking process; flours, meals and pellets of fish, fit for human consumption.	37		0	0	0.0	0	4 800	
		0 306	Crustaceans, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; crustaceans, in shell, cooked by steaming or by boiling in water, whether or not chilled, frozen, dried, salted or in brine; flours, meals and pellets of crustaceans, fit for human consumption.	16		0	0	0.0	0	16 554	
		0 307	Molluscs, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; aquatic invertebrates other than crustaceans and molluscs, live, fresh, chilled, frozen, dried, salted or in brine; flours, meals and pellets of aquatic invertebrates other than crustaceans fit for human consumption.	13		0	0	0.0	0	5 613	
		0 509	Natural sponges of animal origin.	1		0	0	0.0	0	4	
		1 504	Fats and oils and their fractions, of fish or marine mammals, whether or not refined, but not chemically modified.	15		0	5.1	0.9	3	219 571	
		1 603	Extracts and juices of meat, fish or crustaceans, molluscs or other aquatic invertebrates.	4		0	0	0.0	2	121	
		1 604	Prepared or preserved fish; caviar and caviar substitutes prepared from fish eggs.	30		0	0	0.0	0	10 262	
		1 605	Crustaceans, molluscs and other aquatic invertebrates, prepared or preserved.	8		0	0	0.0	0	3 114	
		2 301[1]	Flours, meals and pellets, of meat or meat offal, of fish or of crustaceans, molluscs or other aquatic invertebrates, unfit for human consumption; greaves.	2		0	0	0.0	0	144 689	
NORWAY	2000	0 301	Live fish.	7		0	0	0.0	0		
		0 302	Fish, fresh or chilled, excluding fish fillets and other fish meat of heading No. 03.04.	39		0	0	0.0	0		
		0 303	Fish, frozen, excluding fish fillets and other fish meat of heading No. 03.04.	40		0	0	0.0	0		
		0 304	Fish fillets and other fish meat (whether or not minced), fresh, chilled or frozen.	33		0	0	0.0	0		
		0 305	Fish, dried, salted or in brine; smoked fish, whether or not cooked before or during the smoking process; flours, meals and pellets of fish, fit for human consumption.	37		0	0	0.0	0		
		0 306	Crustaceans, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; crustaceans, in shell, cooked by steaming or by boiling in water, whether or not chilled, frozen, dried, salted or in brine; flours, meals and pellets of crustaceans, fit for human consumption.	16		0	0	0.0	0		
		0 307	Molluscs, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; aquatic invertebrates other than crustaceans and molluscs, live, fresh, chilled, frozen, dried, salted or in brine; flours, meals and pellets of aquatic invertebrates other than crustaceans fit for human consumption.	13		0	0	0.0	0		
		0 509	Natural sponges of animal origin.	1		0	0	0.0	0		
		1 504	Fats and oils and their fractions, of fish or marine mammals, whether or not refined, but not chemically modified.	15		0	5.1	0.9	3		
		1 603	Extracts and juices of meat, fish or crustaceans, molluscs or other aquatic invertebrates.	4		0	0	0.0	2		
		1 604	Prepared or preserved fish; caviar and caviar substitutes prepared from fish eggs.	30		0	0	0.0	0		
		1 605	Crustaceans, molluscs and other aquatic invertebrates, prepared or preserved.	9		0	0	0.0	0		
		2 301[1]	Flours, meals and pellets, of meat or meat offal, of fish or of crustaceans, molluscs or other aquatic invertebrates, unfit for human consumption; greaves.	2		0	0	0.0	0		

Table 6.10. **MFN customs duties and import volumes for fish products in selected countries (1998-2001)** *(cont.)*

Country	Year	HS Heading	Description	Number of		*Ad valorem* Duty Rates			Number of	Quantities	
				Tariff Lines	Unbound Items	Min	Max	Avg	Non *ad valorem* Items[2]	Tonnes	Other than Tonnes
NORWAY	2001	0 301	Live fish.	7		0	0	0.0	0		
		0 302	Fish, fresh or chilled, excluding fish fillets and other fish meat of heading No. 03.04.	44		0	0	0.0	0		
		0 303	Fish, frozen, excluding fish fillets and other fish meat of heading No. 03.04.	40		0	0	0.0	0		
		0 304	Fish fillets and other fish meat (whether or not minced), fresh, chilled or frozen.	34		0	0	0.0	0		
		0 305	Fish, dried, salted or in brine; smoked fish, whether or not cooked before or during the smoking process; flours, meals and pellets of fish, fit for human consumption.	37		0	0	0.0	0		
		0 306	Crustaceans, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; crustaceans, in shell, cooked by steaming or by boiling in water, whether or not chilled, frozen, dried, salted or in brine; flours, meals and pellets of crustaceans, fit for human consumption.	16		0	0	0.0	0		
		0 307	Molluscs, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; aquatic invertebrates other than crustaceans and molluscs, live, fresh, chilled, frozen, dried, salted or in brine; flours, meals and pellets of aquatic invertebrates other than crustaceans fit for human consumption.	16		0	0	0.0	0		
		0 509	Natural sponges of animal origin.	1		0	0	0.0	0		
		1 504	Fats and oils and their fractions, of fish or marine mammals, whether or not refined, but not chemically modified.	14		0	5.1	0.9	3		
		1 603	Extracts and juices of meat, fish or crustaceans, molluscs or other aquatic invertebrates.	4		0	0	0.0	2		
		1 604	Prepared or preserved fish; caviar and caviar substitutes prepared from fish eggs.	30		0	0	0.0	0		
		1 605	Crustaceans, molluscs and other aquatic invertebrates, prepared or preserved.	9		0	0	0.0	0		
		2 301[1]	Flours, meals and pellets, of meat or meat offal, of fish or of crustaceans, molluscs or other aquatic invertebrates, unfit for human consumption; greaves.	2		0	0	0.0	0		
POLAND[3]	2000	0 301	Live fish.	17	17	5	40	11.2	0	1 695	
		0 302	Fish, fresh or chilled, excluding fish fillets and other fish meat of heading No. 03.04.	72	72	5	25	14.3	0	6 323	
		0 303	Fish, frozen, excluding fish fillets and other fish meat of heading No. 03.04.	98	98	5	25	14.3	0	26 246	
		0 304	Fish fillets and other fish meat (whether or not minced), fresh, chilled or frozen.	61	53	5	20	13.9	0	40 765	
		0 305	Fish, dried, salted or in brine; smoked fish, whether or not cooked before or during the smoking process; flours, meals and pellets of fish, fit for human consumption.	32	32	10	20	15.2	0	1 487	
		0 306	Crustaceans, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; crustaceans, in shell, cooked by steaming or by boiling in water, whether or not chilled, frozen, dried, salted or in brine; flours, meals and pellets of crustaceans, fit for human consumption.	29	26	15	30	28.4	0	3 946	
		0 307	Molluscs, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; aquatic invertebrates other than crustaceans and molluscs, live, fresh, chilled, frozen, dried, salted or in brine; flours, meals and pellets of aquatic invertebrates other than crustaceans fit for human consumption.	34	34	10	30	19.4	0	389	
		0 509	Natural sponges of animal origin.	2		5	5	5.0	0	1	

Table 6.10. **MFN customs duties and import volumes for fish products in selected countries (1998-2001)** *(cont.)*

Country	Year	HS Heading	Description	Number of		*Ad valorem* Duty Rates			Number of	Quantities	
				Tariff Lines	Unbound Items	Min	Max	Avg	Non *ad valorem* Items[2]	Tonnes	Other than Tonnes
		1 504	Fats and oils and their fractions, of fish or marine mammals, whether or not refined, but not chemically modified.	7	7	5	20	12.9	0	80	
		1 603	Extracts and juices of meat, fish or crustaceans, molluscs or other aquatic invertebrates.	3		30	30	30.0	0	31	
		1 604	Prepared or preserved fish; caviar and caviar substitutes prepared from fish eggs.	34	3 4	35	55	36.5	0	16 607	
		1 605	Crustaceans, molluscs and other aquatic invertebrates, prepared or preserved.	11		35	45	41.4	0	695	
		2 301[1]	Flours, meals and pellets, of meat or meat offal, of fish or of crustaceans, molluscs or other aquatic invertebrates, unfit for human consumption; greaves.	1		10	10	10.0	0	1 869	
SINGAPORE	1998	0 301	Live fish.	9		0	0	0.0	0	3 349	1 441 120
		0 302	Fish, fresh or chilled, excluding fish fillets and other fish meat of heading No. 03.04.	22		0	0	0.0	0	23 047	
		0 303	Fish, frozen, excluding fish fillets and other fish meat of heading No. 03.04.	25		0	0	0.0	0	51 371	
		0 304	Fish fillets and other fish meat (whether or not minced), fresh, chilled or frozen.	3		0	0	0.0	0	9 743	
		0 305	Fish, dried, salted or in brine; smoked fish, whether or not cooked before or during the smoking process; flours, meals and pellets of fish, fit for human consumption.	13		0	0	0.0	0	2 983	
		0 306	Crustaceans, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; crustaceans, in shell, cooked by steaming or by boiling in water, whether or not chilled, frozen, dried, salted or in brine; flours, meals and pellets of crustaceans, fit for human consumption.	15		0	0	0.0	0	18 876	
		0 307	Molluscs, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; aquatic invertebrates other than crustaceans and molluscs, live, fresh, chilled, frozen, dried, salted or in brine; flours, meals and pellets of aquatic invertebrates other than crustaceans fit for human consumption.	20		0	0	0.0	0	20 113	
		0 509	Natural sponges of animal origin.	1		0	0	0.0	0	2	
		1 504	Fats and oils and their fractions, of fish or marine mammals, whether or not refined, but not chemically modified.	4		0	0	0.0	0	175	
		1 603	Extracts and juices of meat, fish or crustaceans, molluscs or other aquatic invertebrates.	4	2	0	0	0.0	0	1 670	
		1 604	Prepared or preserved fish; caviar and caviar substitutes prepared from fish eggs.	12		0	0	0.0	0	16 023	
		1 605	Crustaceans, molluscs and other aquatic invertebrates, prepared or preserved.	6		0	0	0.0	0	3 425	
		2 301[1]	Flours, meals and pellets, of meat or meat offal, of fish or of crustaceans, molluscs or other aquatic invertebrates, unfit for human consumption; greaves.	1		0	0	0.0	0	2 690	
SINGAPORE	1999	0 301	Live fish.	9		0	0	0.0	0	3 411	1 452 503
		0 302	Fish, fresh or chilled, excluding fish fillets and other fish meat of heading No. 03.04.	22		0	0	0.0	0	27 405	
		0 303	Fish, frozen, excluding fish fillets and other fish meat of heading No. 03.04.	25		0	0	0.0	0	55 160	
		0 304	Fish fillets and other fish meat (whether or not minced), fresh, chilled or frozen.	3		0	0	0.0	0	12 969	
		0 305	Fish, dried, salted or in brine; smoked fish, whether or not cooked before or during the smoking process; flours, meals and pellets of fish, fit for human consumption.	13		0	0	0.0	0	3 896	
		0 306	Crustaceans, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; crustaceans, in shell, cooked by steaming or by boiling in water, whether or not chilled, frozen, dried, salted or in brine; flours, meals and pellets of crustaceans, fit for human consumption.	15		0	0	0.0	0	18 497	

Table 6.10. **MFN customs duties and import volumes for fish products in selected countries (1998-2001)** *(cont.)*

Country	Year	HS Heading	Description	Number of		*Ad valorem* Duty Rates			Number of	Quantities	
				Tariff Lines	Unbound Items	Min	Max	Avg	Non *ad valorem* Items[2]	Tonnes	Other than Tonnes
		0 307	Molluscs, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; aquatic invertebrates other than crustaceans and molluscs, live, fresh, chilled, frozen, dried, salted or in brine; flours, meals and pellets of aquatic invertebrates other than crustaceans fit for human consumption.	20		0	0	0.0	0	28 999	
		0 509	Natural sponges of animal origin.	1		0	0	0.0	0	6	
		1 504	Fats and oils and their fractions, of fish or marine mammals, whether or not refined, but not chemically modified.	4		0	0	0.0	0	234	
		1 603	Extracts and juices of meat, fish or crustaceans, molluscs or other aquatic invertebrates.	4	2	0	0	0.0	0	2 120	
		1 604	Prepared or preserved fish; caviar and caviar substitutes prepared from fish eggs.	12		0	0	0.0	0	22 785	
		1 605	Crustaceans, molluscs and other aquatic invertebrates, prepared or preserved.	6		0	0	0.0	0	5 623	
		2 301[1]	Flours, meals and pellets, of meat or meat offal, of fish or of crustaceans, molluscs or other aquatic invertebrates, unfit for human consumption; greaves.	1		0	0	0.0	0	2,856	
SINGAPORE	2000	0 301	Live fish.	9		0	0	0.0	0	3 797	1 458 605
		0 302	Fish, fresh or chilled, excluding fish fillets and other fish meat of heading No. 03.04.	22		0	0	0.0	0	27 233	
		0 303	Fish, frozen, excluding fish fillets and other fish meat of heading No. 03.04.	25		0	0	0.0	0	52 741	
		0 304	Fish fillets and other fish meat (whether or not minced), fresh, chilled or frozen.	3		0	0	0.0	0	12 232	
		0 305	Fish, dried, salted or in brine; smoked fish, whether or not cooked before or during the smoking process; flours, meals and pellets of fish, fit for human consumption.	13		0	0	0.0	0	3 908	
		0 306	Crustaceans, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; crustaceans, in shell, cooked by steaming or by boiling in water, whether or not chilled, frozen, dried, salted or in brine; flours, meals and pellets of crustaceans, fit for human consumption.	15		0	0	0.0	0	19 012	
		0 307	Molluscs, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; aquatic invertebrates other than crustaceans and molluscs, live, fresh, chilled, frozen, dried, salted or in brine; flours, meals and pellets of aquatic invertebrates other than crustaceans fit for human consumption.	20		0	0	0.0	0	24 691	
		0 509	Natural sponges of animal origin.	1		0	0	0.0	0	4	
		1 504	Fats and oils and their fractions, of fish or marine mammals, whether or not refined, but not chemically modified.	4		0	0	0.0	0	296	
		1 603	Extracts and juices of meat, fish or crustaceans, molluscs or other aquatic invertebrates.	4	2	0	0	0.0	0	1 467	
		1 604	Prepared or preserved fish; caviar and caviar substitutes prepared from fish eggs.	12		0	0	0.0	0	25 923	
		1 605	Crustaceans, molluscs and other aquatic invertebrates, prepared or preserved.	6		0	0	0.0	0	5 351	
		2 301[1]	Flours, meals and pellets, of meat or meat offal, of fish or of crustaceans, molluscs or other aquatic invertebrates, unfit for human consumption; greaves.	1		0	0	0.0	0	3 864	
SINGAPORE	2001	0 301	Live fish.	9		0	0	0.0	0		
		0 302	Fish, fresh or chilled, excluding fish fillets and other fish meat of heading No. 03.04.	22		0	0	0.0	0		
		0 303	Fish, frozen, excluding fish fillets and other fish meat of heading No. 03.04.	25		0	0	0.0	0		

Table 6.10. **MFN customs duties and import volumes for fish products in selected countries (1998-2001)** *(cont.)*

Country	Year	HS Heading	Description	Number of		*Ad valorem* Duty Rates			Number of	Quantities	
				Tariff Lines	Unbound Items	Min	Max	Avg	Non *ad valorem* Items[2]	Tonnes	Other than Tonnes
		0 304	Fish fillets and other fish meat (whether or not minced), fresh, chilled or frozen.	3		0	0	0.0	0		
		0 305	Fish, dried, salted or in brine; smoked fish, whether or not cooked before or during the smoking process; flours, meals and pellets of fish, fit for human consumption.	13		0	0	0.0	0		
		0 306	Crustaceans, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; crustaceans, in shell, cooked by steaming or by boiling in water, whether or not chilled, frozen, dried, salted or in brine; flours, meals and pellets of crustaceans, fit for human consumption.	15		0	0	0.0	0		
		0 307	Molluscs, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; aquatic invertebrates other than crustaceans and molluscs, live, fresh, chilled, frozen, dried, salted or in brine; flours, meals and pellets of aquatic invertebrates other than crustaceans fit for human consumption.	20		0	0	0.0	0		
		0 509	Natural sponges of animal origin.	1		0	0	0.0	0		
		1 504	Fats and oils and their fractions, of fish or marine mammals, whether or not refined, but not chemically modified.	4		0	0	0.0	0		
		1 603	Extracts and juices of meat, fish or crustaceans, molluscs or other aquatic invertebrates.	4	2	0	0	0.0	0		
		1 604	Prepared or preserved fish; caviar and caviar substitutes prepared from fish eggs.	12		0	0	0.0	0		
		1 605	Crustaceans, molluscs and other aquatic invertebrates, prepared or preserved.	6		0	0	0.0	0		
		2 301[1]	Flours, meals and pellets, of meat or meat offal, of fish or of crustaceans, molluscs or other aquatic invertebrates, unfit for human consumption; greaves.	1		0	0	0.0	0		
TAIWAN	1998	0 301	Live fish.	35		0	45	13.9	1		
		0 302	Fish, fresh or chilled, excluding fish fillets and other fish meat of heading No. 03.04.	42		12.5	42.5	27.0	5		
		0 303	Fish, frozen, excluding fish fillets and other fish meat of heading No. 03.04.	49		12.5	50	31.2	5		
		0 304	Fish fillets and other fish meat (whether or not minced), fresh, chilled or frozen.	39		15	45	30.7	2		
		0 305	Fish, dried, salted or in brine; smoked fish, whether or not cooked before or during the smoking process; flours, meals and pellets of fish, fit for human consumption.	47		9	42.5	34.2	3		
		0 306	Crustaceans, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; crustaceans, in shell, cooked by steaming or by boiling in water, whether or not chilled, frozen, dried, salted or in brine; flours, meals and pellets of crustaceans, fit for human consumption.	46		0	40	26.8	13		
		0 307	Molluscs, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; aquatic invertebrates other than crustaceans and molluscs, live, fresh, chilled, frozen, dried, salted or in brine; flours, meals and pellets of aquatic invertebrates other than crustaceans fit for human consumption.	74		0	50	36.5	34		
		0 509	Natural sponges of animal origin.	1		22	22	22.0	0		
		1 504	Fats and oils and their fractions, of fish or marine mammals, whether or not refined, but not chemically modified.	3		2.5	10	6.3	0		
		1 603	Extracts and juices of meat, fish or crustaceans, molluscs or other aquatic invertebrates.	1		30	30	30.0	0		
		1 604	Prepared or preserved fish; caviar and caviar substitutes prepared from fish eggs.	63		12.5	40	32.7	0		

Table 6.10. **MFN customs duties and import volumes for fish products in selected countries (1998-2001)** *(cont.)*

Country	Year	HS Heading	Description	Number of		*Ad valorem* Duty Rates			Number of	Quantities	
				Tariff Lines	Unbound Items	Min	Max	Avg	Non *ad valorem* Items[2]	Tonnes	Other than Tonnes
		1 605	Crustaceans, molluscs and other aquatic invertebrates, prepared or preserved.	46		20	50	31.0	6		
		2 301[1]	Flours, meals and pellets, of meat or meat offal, of fish or of crustaceans, molluscs or other aquatic invertebrates, unfit for human consumption; greaves.	2		0	0	0.0	0		
TAIWAN	1999	0 301	Live fish.	8		0	45	19.4	1	1 972	
		0 302	Fish, fresh or chilled, excluding fish fillets and other fish meat of heading No. 03.04.	33		12.5	42.5	25.1	5	9 641	
		0 303	Fish, frozen, excluding fish fillets and other fish meat of heading No. 03.04.	35		12.5	50	26.7	5	31 873	
		0 304	Fish fillets and other fish meat (whether or not minced), fresh, chilled or frozen.	14		15	45	23.4	2	18 082	
		0 305	Fish, dried, salted or in brine; smoked fish, whether or not cooked before or during the smoking process; flours, meals and pellets of fish, fit for human consumption.	21		9	42.5	27.7	1	732	
		0 306	Crustaceans, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; crustaceans, in shell, cooked by steaming or by boiling in water, whether or not chilled, frozen, dried, salted or in brine; flours, meals and pellets of crustaceans, fit for human consumption.	23		0	40	28.1	10	30 766	
		0 307	Molluscs, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; aquatic invertebrates other than crustaceans and molluscs, live, fresh, chilled, frozen, dried, salted or in brine; flours, meals and pellets of aquatic invertebrates other than crustaceans fit for human consumption.	52		0	50	34.2	26	11 119	
		0 509	Natural sponges of animal origin.	1		22	22	22.0	0	0	
		1 504	Fats and oils and their fractions, of fish or marine mammals, whether or not refined, but not chemically modified.	3		2.5	10	6.3	0	8 049	
		1 603	Extracts and juices of meat, fish or crustaceans, molluscs or other aquatic invertebrates.	1		30	30	30.0	0	56	
		1 604	Prepared or preserved fish; caviar and caviar substitutes prepared from fish eggs.	14		12.5	40	29.5	0	5 765	
		1 605	Crustaceans, molluscs and other aquatic invertebrates, prepared or preserved.	12		20	50	31.8	2	4 067	
		2 301[1]	Flours, meals and pellets, of meat or meat offal, of fish or of crustaceans, molluscs or other aquatic invertebrates, unfit for human consumption; greaves	2		0	0	0.0	0	293 914	
TAIWAN	2000	0 301	Live fish.	8		0	45	19.4	1		
		0 302	Fish, fresh or chilled, excluding fish fillets and other fish meat of heading No. 03.04.	33		12.5	42.5	25.1	5		
		0 303	Fish, frozen, excluding fish fillets and other fish meat of heading No. 03.04.	35		12.5	50	26.7	5		
		0 304	Fish fillets and other fish meat (whether or not minced), fresh, chilled or frozen.	14		15	45	23.4	2		
		0 305	Fish, dried, salted or in brine; smoked fish, whether or not cooked before or during the smoking process; flours, meals and pellets of fish, fit for human consumption.	21		9	42.5	27.7	1		
		0 306	Crustaceans, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; crustaceans, in shell, cooked by steaming or by boiling in water, whether or not chilled, frozen, dried, salted or in brine; flours, meals and pellets of crustaceans, fit for human consumption.	23		0	40	28.1	10		
		0 307	Molluscs, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; aquatic invertebrates other than crustaceans and molluscs, live, fresh, chilled, frozen, dried, salted or in brine; flours, meals and pellets of aquatic invertebrates other than crustaceans fit for human consumption.	52		0	50	34.2	26		
		0 509	Natural sponges of animal origin.	1		22	22	22.0	0		
		1 504	Fats and oils and their fractions, of fish or marine mammals, whether or not refined, but not chemically modified.	3		2.5	10	6.3	0		

Table 6.10. **MFN customs duties and import volumes for fish products in selected countries (1998-2001)** *(cont.)*

Country	Year	HS Heading	Description	Number of		*Ad valorem* Duty Rates			Number of	Quantities	
				Tariff Lines	Unbound Items	Min	Max	Avg	Non *ad valorem* Items[2]	Tonnes	Other than Tonnes
		1 603	Extracts and juices of meat, fish or crustaceans, molluscs or other aquatic invertebrates.	1		30	30	30.0	0		
		1 604	Prepared or preserved fish; caviar and caviar substitutes prepared from fish eggs.	14		12.5	40	29.5	0		
		1 605	Crustaceans, molluscs and other aquatic invertebrates, prepared or preserved.	12		20	50	31.8	2		
		2 301[1]	Flours, meals and pellets, of meat or meat offal, of fish or of crustaceans, molluscs or other aquatic invertebrates, unfit for human consumption; greaves.	2		0	0	0.0	0		
TAIWAN	2001	0 301	Live fish.	8		0	45	19.4	1		
		0 302	Fish, fresh or chilled, excluding fish fillets and other fish meat of heading No. 03.04.	33		12.5	42.5	25.1	5		
		0 303	Fish, frozen, excluding fish fillets and other fish meat of heading No. 03.04.	35		12.5	50	26.7	5		
		0 304	Fish fillets and other fish meat (whether or not minced), fresh, chilled or frozen.	14		15	45	23.4	2		
		0 305	Fish, dried, salted or in brine; smoked fish, whether or not cooked before or during the smoking process; flours, meals and pellets of fish, fit for human consumption.	21		9	42.5	27.7	1		
		0 306	Crustaceans, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; crustaceans, in shell, cooked by steaming or by boiling in water, whether or not chilled, frozen, dried, salted or in brine; flours, meals and pellets of crustaceans, fit for human consumption.	23		0	40	28.1	10		
		0 307	Molluscs, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; aquatic invertebrates other than crustaceans and molluscs, live, fresh, chilled, frozen, dried, salted or in brine; flours, meals and pellets of aquatic invertebrates other than crustaceans fit for human consumption.	52		0	50	34.2	26		
		0 509	Natural sponges of animal origin.	1		22	22	22.0	0		
		1 504	Fats and oils and their fractions, of fish or marine mammals, whether or not refined, but not chemically modified.	3		2.5	10	6.3	0		
		1 603	Extracts and juices of meat, fish or crustaceans, molluscs or other aquatic invertebrates.	1		30	30	30.0	0		
		1 604	Prepared or preserved fish; caviar and caviar substitutes prepared from fish eggs.	14		12.5	40	29.5	0		
		1 605	Crustaceans, molluscs and other aquatic invertebrates, prepared or preserved.	12		20	50	31.8	2		
		2 301[1]	Flours, meals and pellets, of meat or meat offal, of fish or of crustaceans, molluscs or other aquatic invertebrates, unfit for human consumption; greaves.	2		0	0	0.0	0		
THAILAND	1999	0 301	Live fish.	7		60	60	60.0	0	103	
		0 302	Fish, fresh or chilled, excluding fish fillets and other fish meat of heading No. 03.04.	21		60	60	60.0	0	2 836	
		0 303	Fish, frozen, excluding fish fillets and other fish meat of heading No. 03.04.	24		60	60	60.0	0	722 187	
		0 304	Fish fillets and other fish meat (whether or not minced), fresh, chilled or frozen.	3		60	60	60.0	0	1 957	
		0 305	Fish, dried, salted or in brine; smoked fish, whether or not cooked before or during the smoking process; flours, meals and pellets of fish, fit for human consumption.	13		60	60	60.0	1	3 154	
		0 306	Crustaceans, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; crustaceans, in shell, cooked by steaming or by boiling in water, whether or not chilled, frozen, dried, salted or in brine; flours, meals and pellets of crustaceans, fit for human consumption.	15		60	60	60.0	0	18 080	
		0 307	Molluscs, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; aquatic invertebrates other than crustaceans and molluscs, live, fresh, chilled, frozen, dried, salted or in brine; flours, meals and pellets of aquatic invertebrates other than crustaceans fit for human consumption.	28		60	60	60.0	0	44 122	

Table 6.10. **MFN customs duties and import volumes for fish products in selected countries (1998-2001)** *(cont.)*

Country	Year	HS Heading	Description	Number of		*Ad valorem* Duty Rates			Number of	Quantities	
				Tariff Lines	Unbound Items	Min	Max	Avg	Non *ad valorem* Items[2]	Tonnes	Other than Tonnes
		0 509	Natural sponges of animal origin.	1		35	35	35.0	0	1	
		1 504	Fats and oils and their fractions, of fish or marine mammals, whether or not refined, but not chemically modified.	6					6	5 616	
		1 603	Extracts and juices of meat, fish or crustaceans, molluscs or other aquatic invertebrates.	1					1	43	
		1 604	Prepared or preserved fish; caviar and caviar substitutes prepared from fish eggs.	11					11	263	
		1 605	Crustaceans, molluscs and other aquatic invertebrates, prepared or preserved.	9		60	60	60.0	0	5 850	
		2 301[1]	Flours, meals and pellets, of meat or meat offal, of fish or of crustaceans, molluscs or other aquatic invertebrates, unfit for human consumption; greaves.	2		10	10	10.0	0	114 123	
TURKEY	1997	0 301	Live fish.	9		37	65	43.2	0	89	
		0 302	Fish, fresh or chilled, excluding fish fillets and other fish meat of heading No. 03.04.	82		44	44	44.0	0	186	
		0 303	Fish, frozen, excluding fish fillets and other fish meat of heading No. 03.04.	105		3	53	47.8	0	36 191	
		0 304	Fish fillets and other fish meat (whether or not minced), fresh, chilled or frozen.	116		49	49	49.0	0	1 418	
		0 305	Fish, dried, salted or in brine; smoked fish, whether or not cooked before or during the smoking process; flours, meals and pellets of fish, fit for human consumption.	79		25	49	47.8	0	673	
		0 306	Crustaceans, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; crustaceans, in shell, cooked by steaming or by boiling in water, whether or not chilled, frozen, dried, salted or in brine; flours, meals and pellets of crustaceans, fit for human consumption.	31		55	55	55.0	0	101	
		0 307	Molluscs, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; aquatic invertebrates other than crustaceans and molluscs, live, fresh, chilled, frozen, dried, salted or in brine; flours, meals and pellets of aquatic invertebrates other than crustaceans fit for human consumption.	38		55	55	55.0	0	1 259	
		0 509	Natural sponges of animal origin.	3		0	6.6	4.4	0	3	
		1 504	Fats and oils and their fractions, of fish or marine mammals, whether or not refined, but not chemically modified.	11		6	18	15.8	0	781	
		1 603	Extracts and juices of meat, fish or crustaceans, molluscs or other aquatic invertebrates.	3		58	58	58.0	0	1	
		1 604	Prepared or preserved fish; caviar and caviar substitutes prepared from fish eggs.	38		80	86	80.3	0	224	
		1 605	Crustaceans, molluscs and other aquatic invertebrates, prepared or preserved.	14		58	58	58.0	0	267	
		2 301[1]	Flours, meals and pellets, of meat or meat offal, of fish or of crustaceans, molluscs or other aquatic invertebrates, unfit for human consumption; greaves.	2		2	2	2.0	0	46 144	
TURKEY	1998	0 301	Live fish.	9		23.5	30	24.9	0	69	
		0 302	Fish, fresh or chilled, excluding fish fillets and other fish meat of heading No. 03.04.	82		27	27	27.0	0	104	
		0 303	Fish, frozen, excluding fish fillets and other fish meat of heading No. 03.04.	105		0	30	26.9	0	27 607	
		0 304	Fish fillets and other fish meat (whether or not minced), fresh, chilled or frozen.	116		29.5	29.5	29.5	0	1 479	
		0 305	Fish, dried, salted or in brine; smoked fish, whether or not cooked before or during the smoking process; flours, meals and pellets of fish, fit for human consumption.	79		14.5	30.5	29.7	0	721	
		0 306	Crustaceans, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; crustaceans, in shell, cooked by steaming or by boiling in water, whether or not chilled, frozen, dried, salted or in brine; flours, meals and pellets of crustaceans, fit for human consumption.	31		33.5	33.5	33.5	0	90	

Table 6.10. **MFN customs duties and import volumes for fish products in selected countries (1998-2001)** *(cont.)*

Country	Year	HS Heading	Description	Number of		*Ad valorem* Duty Rates			Number of	Quantities	
				Tariff Lines	Unbound Items	Min	Max	Avg	Non *ad valorem* Items[2]	Tonnes	Other than Tonnes
		0 307	Molluscs, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; aquatic invertebrates other than crustaceans and molluscs, live, fresh, chilled, frozen, dried, salted or in brine; flours, meals and pellets of aquatic invertebrates other than crustaceans fit for human consumption.	38		33.5	33.5	33.5	0	1 398	
		0 509	Natural sponges of animal origin.	3		0	6.1	4.1	0	2	
		1 504	Fats and oils and their fractions, of fish or marine mammals, whether or not refined, but not chemically modified.	11		6	12	10.5	0	546	
		1 603	Extracts and juices of meat, fish or crustaceans, molluscs or other aquatic invertebrates.	3		38	38	38.0	0	0	
		1 604	Prepared or preserved fish; caviar and caviar substitutes prepared from fish eggs.	38		48	51	48.2	0	508	
		1 605	Crustaceans, molluscs and other aquatic invertebrates, prepared or preserved.	14		37	37	37.0	0	347	
		2 301[1]	Flours, meals and pellets, of meat or meat offal, of fish or of crustaceans, molluscs or other aquatic invertebrates, unfit for human consumption; greaves.	2		2	2	2.0	0	41 958	
TURKEY	1999	0 301	Live fish.	9		37	65	43.2	0	65	
		0 302	Fish, fresh or chilled, excluding fish fillets and other fish meat of heading No. 03.04.	82		44	44	44.0	0	2 353	
		0 303	Fish, frozen, excluding fish fillets and other fish meat of heading No. 03.04.	105		0	53	47.4	0	33 923	
		0 304	Fish fillets and other fish meat (whether or not minced), fresh, chilled or frozen.	116		49	49	49.0	0	956	
		0 305	Fish, dried, salted or in brine; smoked fish, whether or not cooked before or during the smoking process; flours, meals and pellets of fish, fit for human consumption.	79		25	49	47.8	0	1 321	
		0 306	Crustaceans, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; crustaceans, in shell, cooked by steaming or by boiling in water, whether or not chilled, frozen, dried, salted or in brine; flours, meals and pellets of crustaceans, fit for human consumption.	31		55	55	55.0	0	67	
		0 307	Molluscs, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; aquatic invertebrates other than crustaceans and molluscs, live, fresh, chilled, frozen, dried, salted or in brine; flours, meals and pellets of aquatic invertebrates other than crustaceans fit for human consumption.	38		55	55	55.0	0	932	
		0 509	Natural sponges of animal origin.	3		0	6.1	4.1	0	0	
		1 504	Fats and oils and their fractions, of fish or marine mammals, whether or not refined, but not chemically modified.	10		6	17.8	14.3	0	1 172	
		1 603	Extracts and juices of meat, fish or crustaceans, molluscs or other aquatic invertebrates.	3		57	57	57.0	0	4	
		1 604	Prepared or preserved fish; caviar and caviar substitutes prepared from fish eggs.	38		80	86	80.3	0	147	
		1 605	Crustaceans, molluscs and other aquatic invertebrates, prepared or preserved.	14		57	58	57.1	0	140	
		2 301[1]	Flours, meals and pellets, of meat or meat offal, of fish or of crustaceans, molluscs or other aquatic invertebrates, unfit for human consumption; greaves.	2		2	2	2.0	0	58 592	
USA	1998	0 301	Live fish.	5		0	0	0.0	0	385	
		0 302	Fish, fresh or chilled, excluding fish fillets and other fish meat of heading No. 03.04.	24		0	15	0.9	4	191 908	
		0 303	Fish, frozen, excluding fish fillets and other fish meat of heading No. 03.04.	26		0	15	0.7	3	233 037	
		0 304	Fish fillets and other fish meat (whether or not minced), fresh, chilled or frozen.	9		0	6	0.8	0	371 244	
		0 305	Fish, dried, salted or in brine; smoked fish, whether or not cooked before or during the smoking process; flours, meals and pellets of fish, fit for human consumption.	26		0	9	2.0	1	30 117	

Table 6.10. **MFN customs duties and import volumes for fish products in selected countries (1998-2001)** *(cont.)*

Country	Year	HS Heading	Description	Number of		*Ad valorem* Duty Rates			Number of	Quantities	
				Tariff Lines	Unbound Items	Min	Max	Avg	Non *ad valorem* Items[2]	Tonnes	Other than Tonnes
		0 306	Crustaceans, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; crustaceans, in shell, cooked by steaming or by boiling in water, whether or not chilled, frozen, dried, salted or in brine; flours, meals and pellets of crustaceans, fit for human consumption.	12		0	7.5	1.3	0	348 729	
		0 307	Molluscs, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; aquatic invertebrates other than crustaceans and molluscs, live, fresh, chilled, frozen, dried, salted or in brine; flours, meals and pellets of aquatic invertebrates other than crustaceans fit for human consumption.	12		0	5	0.4	0	103 942	
		0 509	Natural sponges of animal origin.	1		3	3	3.0	0	91	
		1 504	Fats and oils and their fractions, of fish or marine mammals, whether or not refined, but not chemically modified.	6		0	5.3	2.4	0	10 982	
		1 603	Extracts and juices of meat, fish or crustaceans, molluscs or other aquatic invertebrates.	2		0	8.5	4.3	0	663	
		1 604	Prepared or preserved fish; caviar and caviar substitutes prepared from fish eggs.	42		0	35	5.5	0	206 374	
		1 605	Crustaceans, molluscs and other aquatic invertebrates, prepared or preserved.	19		0	10.8	3.1	0	82 353	
		2 301[1]	Flours, meals and pellets, of meat or meat offal, of fish or of crustaceans, molluscs or other aquatic invertebrates, unfit for human consumption; greaves.	1		0	0	0.0	0	56 883	
USA	1999	0 301	Live fish.	5		0	0	0.0	0	327	
		0 302	Fish, fresh or chilled, excluding fish fillets and other fish meat of heading No. 03.04.	24		0	15	0.8	0	187 280	
		0 303	Fish, frozen, excluding fish fillets and other fish meat of heading No. 03.04.	26		0	15	0.6	1	198 621	
		0 304	Fish fillets and other fish meat (whether or not minced), fresh, chilled or frozen.	9		0	6	0.7	0	403 320	
		0 305	Fish, dried, salted or in brine; smoked fish, whether or not cooked before or during the smoking process; flours, meals and pellets of fish, fit for human consumption.	26		0	7.5	1.7	0	28 596	
		0 306	Crustaceans, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; crustaceans, in shell, cooked by steaming or by boiling in water, whether or not chilled, frozen, dried, salted or in brine; flours, meals and pellets of crustaceans, fit for human consumption.	12		0	7.5	1.3	0	374 948	
		0 307	Molluscs, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; aquatic invertebrates other than crustaceans and molluscs, live, fresh, chilled, frozen, dried, salted or in brine; flours, meals and pellets of aquatic invertebrates other than crustaceans fit for human consumption.	12		0	5	0.4	0	109 282	
		0 509	Natural sponges of animal origin.	1		3	3	3.0	0	87	
		1 504	Fats and oils and their fractions, of fish or marine mammals, whether or not refined, but not chemically modified.	6		0	9	3.1	0	11 645	
		1 603	Extracts and juices of meat, fish or crustaceans, molluscs or other aquatic invertebrates.	2		0	8.5	4.3	0	931	
		1 604	Prepared or preserved fish; caviar and caviar substitutes prepared from fish eggs.	42		0	35	5.1	0	268 832	
		1 605	Crustaceans, molluscs and other aquatic invertebrates, prepared or preserved.	19		0	10	2.6	0	103 691	
		2 301[1]	Flours, meals and pellets, of meat or meat offal, of fish or of crustaceans, molluscs or other aquatic invertebrates, unfit for human consumption; greaves.	1		0	0	0.0	0	33 144	
USA	2000	0 301	Live fish.	5		0	0	0.0	0		
		0 302	Fish, fresh or chilled, excluding fish fillets and other fish meat of heading No. 03.04.	24		0	15	0.8	1		
		0 303	Fish, frozen, excluding fish fillets and other fish meat of heading No. 03.04.	26		0	15	0.7	4		
		0 304	Fish fillets and other fish meat (whether or not minced), fresh, chilled or frozen.	9		0	6	0.7	0		

Table 6.10. **MFN customs duties and import volumes for fish products in selected countries (1998-2001)** *(cont.)*

Country	Year	HS Heading	Description	Number of		*Ad valorem* Duty Rates			Number of	Quantities	
				Tariff Lines	Unbound Items	Min	Max	Avg	Non *ad valorem* Items[2]	Tonnes	Other than Tonnes
		0 305	Fish, dried, salted or in brine; smoked fish, whether or not cooked before or during the smoking process; flours, meals and pellets of fish, fit for human consumption.	26		0	7.5	1.7	0		
		0 306	Crustaceans, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; crustaceans, in shell, cooked by steaming or by boiling in water, whether or not chilled, frozen, dried, salted or in brine; flours, meals and pellets of crustaceans, fit for human consumption.	12		0	7.5	1.3	0		
		0 307	Molluscs, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; aquatic invertebrates other than crustaceans and molluscs, live, fresh, chilled, frozen, dried, salted or in brine; flours, meals and pellets of aquatic invertebrates other than crustaceans fit for human consumption.	12		0	5	0.4	0		
		0 509	Natural sponges of animal origin.	1		3	3	3.0	0		
		1 504	Fats and oils and their fractions, of fish or marine mammals, whether or not refined, but not chemically modified.	6		0	2.5	0.8	3		
		1 603	Extracts and juices of meat, fish or crustaceans, molluscs or other aquatic invertebrates.	2		0	8.5	4.3	0		
		1 604	Prepared or preserved fish; caviar and caviar substitutes prepared from fish eggs.	42		0	35	5.2	1		
		1 605	Crustaceans, molluscs and other aquatic invertebrates, prepared or preserved.	19		0	10	2.6	0		
		2 301[1]	Flours, meals and pellets, of meat or meat offal, of fish or of crustaceans, molluscs or other aquatic invertebrates, unfit for human consumption; greaves.	1		0	0	0.0	0		

1. HS2301 includes only fish item 230120 (Flours, meals and pellets, of fish or of crustaceans, molluscs or other aquatic invertebrates).
2. NA items stands for items for which an *ad valorem* duty or an *ad valorem* equivalent is not available.
3. For Poland, import data is available for 1999 only.

Table 6.11 **Pre- and post-Uruguay Round customs duties for fish products in selected countries**

Country	Year	HS Heading	Description	Pre-Uruguay Round Duties					Post-Uruguay Round Duties				
				Number of		Min	Max	Avg	Number of	Min	Max	Avg	Number of
				Tariff Lines	Unbound Items				Unbound Items				Items Generated[2]
AUSTRALIA	1988	0 301	Live fish.	5	1	0	6.4	3.3	0	0	5	1.0	0
		0 302	Fish, fresh or chilled, excluding fish fillets and other fish meat of heading No. 0304.	21	1	0	5	1.9	0	0	5	0.5	1
		0 303	Fish, frozen, excluding fish fillets and other fish meat of heading No. 0304.	24	1	0	3.6	0.9	0	0	5	0.2	2
		0 304	Fish fillets and other fish meat (whether or not minced), fresh, chilled or frozen.	3	0	0.4	1.3	0.7	0	0	0.5	0.3	2
		0 305	Fish, dried, salted or in brine; smoked fish, whether or not cooked before or during the smoking process; fish meal fit for human consumption.	15	0	0	1.4	0.3	0	0	0	0.0	0
		0 306	Crustaceans, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; crustaceans, in shell, cooked by steaming or by boiling in water, whether or not chilled, frozen, dried, salted or in brine.	10	1	0	0	0.0	0	0	0	0.0	8
		0 307	Molluscs, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; aquatic invertebrates other than crustaceans and molluscs, live, fresh, chilled, frozen, dried, salted or in brine.	12	0	0	0	0.0	0	0	0	0.0	12
		0 509	Natural sponges of animal origin.	1	0	13	13	12.5	0	5	5	5.0	0
		1 504	Fats and oils and their fractions, of fish or marine mammals, whether or not refined, but not chemically modified.	4	3	0	0.2	0.1	0	0	5	2.5	0
		1 603	Extracts and juices of meat, fish or crustaceans, molluscs or other aquatic invertebrates.	1	1	2	2	2.0	0	1	1	1.0	0
		1 604	Prepared or preserved fish; caviar and caviar substitutes prepared from fish eggs.	10	9	0	15	2.8	0	0	10	4.5	0
		1 605	Crustaceans, molluscs and other aquatic invertebrates, prepared or preserved.	5	0	0	0	0.0	0	0	0	0.0	0
		2 301	Flours, meals and pellets, of meat or meat offal, of fish or of crustaceans, molluscs or other aquatic invertebrates, unfit for human consumption; greaves.	1	1	2	2	2.0	0	5	5	5.0	0
CANADA	1988	0 301	Live fish.	5	0	0	0	0.0	0	0	0	0.0	5
		0 302	Fish, fresh or chilled, excluding fish fillets and other fish meat of heading No. 0304.	21	0	0	5	0.2	0	0	3.4	0.2	20
		0 303	Fish, frozen, excluding fish fillets and other fish meat of heading No. 0304.	24	0	0	5	0.2	0	0	3.4	0.1	23
		0 304	Fish fillets and other fish meat (whether or not minced), fresh, chilled or frozen.	3	0	0	0	0.0	0	0	0	0.0	3
		0 305	Fish, dried, salted or in brine; smoked fish, whether or not cooked before or during the smoking process; fish meal fit for human consumption.	12	0	0	5	0.8	0	0	3.4	0.3	10
		0 306	Crustaceans, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; crustaceans, in shell, cooked by steaming or by boiling in water, whether or not chilled, frozen, dried, salted or in brine.	10	0	0	8	4.8	0	0	5.3	3.2	4
		0 307	Molluscs, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; aquatic invertebrates other than crustaceans and molluscs, live, fresh, chilled, frozen, dried, salted or in brine.	14	0	0	6	0.8	0	0	4	0.5	12
		0 509	Natural sponges of animal origin.	1	0	0	0	0.0	0	0	0	0.0	1
		1 504	Fats and oils and their fractions, of fish or marine mammals, whether or not refined, but not chemically modified.	3	0	7.3	10	8.3	0	4.9	6.7	5.5	0
		1 603	Extracts and juices of meat, fish or crustaceans, molluscs or other aquatic invertebrates.	3	0	5	10	6.7	0	3.4	6.4	4.4	0

Table 6.11 **Pre- and post-Uruguay Round customs duties for fish products in selected countries** *(cont.)*

Country	Year	HS Heading	Description	Pre-Uruguay Round Duties					Post-Uruguay Round Duties				
				Number of		Min	Max	Avg	Number of	Min	Max	Avg	Number of
				Tariff Lines	Unbound Items				Unbound Items				Items Generated[2]
		1 604	Prepared or preserved fish; caviar and caviar substitutes prepared from fish eggs.	18	1	0	18	8.6	0	0	11.3	5.6	1
		1 605	Crustaceans, molluscs and other aquatic invertebrates, prepared or preserved.	13	0	0	10	5.3	0	0	6.6	3.5	3
		2 301	Flours, meals and pellets, of meat or meat offal, of fish or of crustaceans, molluscs or other aquatic invertebrates, unfit for human consumption; greaves.	2	0	0	5	2.5	0	0	3.2	1.6	1
CHILE	1994	0 301	Live fish.	9	0	35	35	35.0	0	25	25	25.0	0
		0 302	Fish, fresh or chilled, excluding fish fillets and other fish meat of heading No. 0304.	25	0	35	35	35.0	0	25	25	25.0	0
		0 303	Fish, frozen, excluding fish fillets and other fish meat of heading No. 0304.	28	0	35	35	35.0	0	25	25	25.0	0
		0 304	Fish fillets and other fish meat (whether or not minced), fresh, chilled or frozen.	24	0	35	35	35.0	0	25	25	25.0	0
		0 305	Fish, dried, salted or in brine; smoked fish, whether or not cooked before or during the smoking process; fish meal fit for human consumption.	12	0	35	35	35.0	0	25	25	25.0	0
		0 306	Crustaceans, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; crustaceans, in shell, cooked by steaming or by boiling in water, whether or not chilled, frozen, dried, salted or in brine.	18	0	35	35	35.0	0	25	25	25.0	0
		0 307	Molluscs, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; aquatic invertebrates other than crustaceans and molluscs, live, fresh, chilled, frozen, dried, salted or in brine.	23	0	35	35	35.0	0	25	25	25.0	0
		0 509	Natural sponges of animal origin.	1	0	35	35	35.0	0	25	25	25.0	0
		1 504	Fats and oils and their fractions, of fish or marine mammals, whether or not refined, but not chemically modified.	3	0	35	35	35.0	0	25	25	25.0	0
		1 603	Extracts and juices of meat, fish or crustaceans, molluscs or other aquatic invertebrates.	2	0	35	35	35.0	0	25	25	25.0	0
		1 604	Prepared or preserved fish; caviar and caviar substitutes prepared from fish eggs.	19	0	35	35	35.0	0	25	25	25.0	0
		1 605	Crustaceans, molluscs and other aquatic invertebrates, prepared or preserved.	21	0	35	35	35.0	0	25	25	25.0	0
		2 301	Flours, meals and pellets, of meat or meat offal, of fish or of crustaceans, molluscs or other aquatic invertebrates, unfit for human consumption; greaves.	3	0	35	35	35.0	0	25	25	25.0	0
EC	1988	0 301	Live fish.	8	0	0	16	8.0	0	0	16	6.7	6
		0 302	Fish, fresh or chilled, excluding fish fillets and other fish meat of heading No. 0304.	51	0	0	23	13.8	0	0	23	12.5	38
		0 303	Fish, frozen, excluding fish fillets and other fish meat of heading No. 0304.	71	0	0	23	15.1	0	0	23	13.9	53
		0 304	Fish fillets and other fish meat (whether or not minced), fresh, chilled or frozen.	47	0	0	18	13.4	0	0	18	9.7	23
		0 305	Fish, dried, salted or in brine; smoked fish, whether or not cooked before or during the smoking process; fish meal fit for human consumption.	32	2	10	20	13.3	0	10	20	13.3	30
		0 306	Crustaceans, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; crustaceans, in shell, cooked by steaming or by boiling in water, whether or not chilled, frozen, dried, salted or in brine.	26	0	8	25	14.5	0	7.5	18	11.0	13
		0 307	Molluscs, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; aquatic invertebrates other than crustaceans and molluscs, live, fresh, chilled, frozen, dried, salted or in brine.	31	0	0	18	7.8	0	0	11	7.5	28

Table 6.11 **Pre- and post-Uruguay Round customs duties for fish products in selected countries** *(cont.)*

Country	Year	HS Heading	Description	Pre-Uruguay Round Duties					Post-Uruguay Round Duties				
				Number of		Min	Max	Avg	Number of	Min	Max	Avg	Number of
				Tariff Lines	Unbound Items				Unbound Items				Items Generated[2]
		0 509	Natural sponges of animal origin.	2	2	0	8	4.0	0	0	5.1	2.6	0
		1 504	Fats and oils and their fractions, of fish or marine mammals, whether or not refined, but not chemically modified.	8	3	0	17	7.9	0	0	10.9	5.0	2
		1 603	Extracts and juices of meat, fish or crustaceans, molluscs or other aquatic invertebrates.	3	0	0	20	8.0	0	0	12.8	4.3	1
		1 604	Prepared or preserved fish; caviar and caviar substitutes prepared from fish eggs.	23	2	5.5	30	20.1	0	5.5	25	17.2	14
		1 605	Crustaceans, molluscs and other aquatic invertebrates, prepared or preserved.	6	0	16	26	20.3	0	8	26	19.0	5
		2 301	Flours, meals and pellets, of meat or meat offal, of fish or of crustaceans, molluscs or other aquatic invertebrates, unfit for human consumption; greaves.	1	0	2	2	2.0	0	2	2	2.0	1
ICELAND	1988	0 301	Live fish.	8	8	40	40	40.0	8	40	40	40.0	8
		0 302	Fish, fresh or chilled, excluding fish fillets and other fish meat of heading No. 0304.	33	33	0	0	0.0	0	0	0	0.0	0
		0 303	Fish, frozen, excluding fish fillets and other fish meat of heading No. 0304.	46	46	0	0	0.0	0	0	0	0.0	0
		0 304	Fish fillets and other fish meat (whether or not minced), fresh, chilled or frozen.	96	96	0	0	0.0	1	0	0	0.0	1
		0 305	Fish, dried, salted or in brine; smoked fish, whether or not cooked before or during the smoking process; fish meal fit for human consumption.	44	44	0	0	0.0	0	0	0	0.0	0
		0 306	Crustaceans, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; crustaceans, in shell, cooked by steaming or by boiling in water, whether or not chilled, frozen, dried, salted or in brine.	15	0	0	0	0.0	0	0	0	0.0	15
		0 307	Molluscs, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; aquatic invertebrates other than crustaceans and molluscs, live, fresh, chilled, frozen, dried, salted or in brine.	21	0	0	0	0.0	0	0	0	0.0	21
		0 509	Natural sponges of animal origin.	1	0	10	10	10.0	0	3	3	3.0	0
		1 504	Fats and oils and their fractions, of fish or marine mammals, whether or not refined, but not chemically modified.	16	0	13	18	16.4	0	10	10	10.0	0
		1 603	Extracts and juices of meat, fish or crustaceans, molluscs or other aquatic invertebrates.	4	0	46	90	79.0	0	10	10	10.0	0
		1 604	Prepared or preserved fish; caviar and caviar substitutes prepared from fish eggs.	47	0	46	46	46.0	0	10	46	10.8	1
		1 605	Crustaceans, molluscs and other aquatic invertebrates, prepared or preserved.	16	0	46	46	46.0	0	10	10	10.0	0
		2 301	Flours, meals and pellets, of meat or meat offal, of fish or of crustaceans, molluscs or other aquatic invertebrates, unfit for human consumption; greaves.	13	0	18	18	18.0	0	10	10	10.0	0
INDIA	1988	0 301	Live fish.	5	5	60	60	60.0	5	60	60	60.0	5
		0 302	Fish, fresh or chilled, excluding fish fillets and other fish meat of heading No. 0304.	21	21	60	60	60.0	21	60	60	60.0	21
		0 303	Fish, frozen, excluding fish fillets and other fish meat of heading No. 0304.	24	24	60	60	60.0	24	60	60	60.0	24
		0 304	Fish fillets and other fish meat (whether or not minced), fresh, chilled or frozen.	3	3	60	60	60.0	3	60	60	60.0	3
		0 305	Fish, dried, salted or in brine; smoked fish, whether or not cooked before or during the smoking process; fish meal fit for human consumption.	12	12	60	60	60.0	12	60	60	60.0	12

Table 6.11 **Pre- and post-Uruguay Round customs duties for fish products in selected countries** *(cont.)*

Country	Year	HS Heading	Description	Pre-Uruguay Round Duties					Post-Uruguay Round Duties				
				Number of		Min	Max	Avg	Number of	Min	Max	Avg	Number of
				Tariff Lines	Unbound Items				Unbound Items				Items Generated[2]
		0 306	Crustaceans, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; crustaceans, in shell, cooked by steaming or by boiling in water, whether or not chilled, frozen, dried, salted or in brine.	10	10	60	60	60.0	10	60	60	60.0	10
		0 307	Molluscs, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; aquatic invertebrates other than crustaceans and molluscs, live, fresh, chilled, frozen, dried, salted or in brine.	12	12	60	60	60.0	12	60	60	60.0	12
		0 509	Natural sponges of animal origin.	1	1	100	100	100.0	0	100	100	100.0	0
		1 504	Fats and oils and their fractions, of fish or marine mammals, whether or not refined, but not chemically modified.	3	3	100	125	116.7	2	100	125	116.7	2
		1 603	Extracts and juices of meat, fish or crustaceans, molluscs or other aquatic invertebrates.	1	1	140	140	140.0	0	150	150	150.0	0
		1 604	Prepared or preserved fish; caviar and caviar substitutes prepared from fish eggs.	9	4	100	145	125.0	4	55	100	75.0	4
		1 605	Crustaceans, molluscs and other aquatic invertebrates, prepared or preserved.	5	5	140	140	140.0	0	150	150	150.0	0
		2 301	Flours, meals and pellets, of meat or meat offal, of fish or of crustaceans, molluscs or other aquatic invertebrates, unfit for human consumption; greaves.	1	0	100	100	100.0	0	100	100	100.0	0
JAPAN	1988	0 301	Live fish.	11	4	0	5	3.0	0	0	5	2.2	1
		0 302	Fish, fresh or chilled, excluding fish fillets and other fish meat of heading No. 0304.	37	9	3	10	6.1	9	2	10	5.1	10
		0 303	Fish, frozen, excluding fish fillets and other fish meat of heading No. 0304.	45	6	3	10	5.7	6	2	10	4.6	11
		0 304	Fish fillets and other fish meat (whether or not minced), fresh, chilled or frozen.	21	4	3	10	5.7	4	2	10	4.8	7
		0 305	Fish, dried, salted or in brine; smoked fish, whether or not cooked before or during the smoking process; fish meal fit for human consumption.	21	17	4	15	13.1	6	2.8	15	10.4	7
		0 306	Crustaceans, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; crustaceans, in shell, cooked by steaming or by boiling in water, whether or not chilled, frozen, dried, salted or in brine.	19	4	3	15	6.3	0	1	10	3.8	0
		0 307	Molluscs, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; aquatic invertebrates other than crustaceans and molluscs, live, fresh, chilled, frozen, dried, salted or in brine.	46	37	0	15	9.7	8	0	15	7.6	13
		0 509	Natural sponges of animal origin.	2	0	0	5	2.5	0	0	3.5	1.8	1
		1 504	Fats and oils and their fractions, of fish or marine mammals, whether or not refined, but not chemically modified.	4	1	0	10	5.0	0	0	7	3.5	1
		1 603	Extracts and juices of meat, fish or crustaceans, molluscs or other aquatic invertebrates.	2	0	15	20	17.5	0	9.6	12	10.8	0
		1 604	Prepared or preserved fish; caviar and caviar substitutes prepared from fish eggs.	21	2	10	16	14.2	0	6.4	11	9.2	0
		1 605	Crustaceans, molluscs and other aquatic invertebrates, prepared or preserved.	24	2	7.5	15	12.4	0	4.8	10.5	7.8	0
		2 301	Flours, meals and pellets, of meat or meat offal, of fish or of crustaceans, molluscs or other aquatic invertebrates, unfit for human consumption; greaves.	2	1	0	0	0.0	0	0	0	0.0	1

Table 6.11 **Pre- and post-Uruguay Round customs duties for fish products in selected countries** *(cont.)*

Country	Year	HS Heading	Description	Pre-Uruguay Round Duties					Post-Uruguay Round Duties				
				Number of		Min	Max	Avg	Number of	Min	Max	Avg	Number of
				Tariff Lines	Unbound Items				Unbound Items				Items Generated[2]
KOREA, REP.	1988	0 301	Live fish.	15	15	20	20	20.0	8	10	20	15.3	8
		0 302	Fish, fresh or chilled, excluding fish fillets and other fish meat of heading No. 0304.	35	35	20	20	20.0	32	20	20	20.0	32
		0 303	Fish, frozen, excluding fish fillets and other fish meat of heading No. 0304.	42	41	20	20	20.0	11	10	20	12.6	11
		0 304	Fish fillets and other fish meat (whether or not minced), fresh, chilled or frozen.	9	9	20	20	20.0	7	10	20	17.8	7
		0 305	Fish, dried, salted or in brine; smoked fish, whether or not cooked before or during the smoking process; fish meal fit for human consumption.	35	35	20	20	20.0	25	20	20	20.0	25
		0 306	Crustaceans, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; crustaceans, in shell, cooked by steaming or by boiling in water, whether or not chilled, frozen, dried, salted or in brine.	19	19	20	20	20.0	18	14	20	19.7	18
		0 307	Molluscs, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; aquatic invertebrates other than crustaceans and molluscs, live, fresh, chilled, frozen, dried, salted or in brine.	64	64	20	20	20.0	58	20	20	20.0	58
		0 509	Natural sponges of animal origin.	1	1	20	20	20.0	0	11	11	11.0	0
		1 504	Fats and oils and their fractions, of fish or marine mammals, whether or not refined, but not chemically modified.	6	6	10	10	10.0	0	4	4	4.0	0
		1 603	Extracts and juices of meat, fish or crustaceans, molluscs or other aquatic invertebrates.	5	5	35	41	37.6	3	32	35	33.6	3
		1 604	Prepared or preserved fish; caviar and caviar substitutes prepared from fish eggs.	25	0	80	80	80.0	0	20	20	20.0	0
		1 605	Crustaceans, molluscs and other aquatic invertebrates, prepared or preserved.	27	27	30	30	30.0	21	20	30	27.8	21
		2 301	Flours, meals and pellets, of meat or meat offal, of fish or of crustaceans, molluscs or other aquatic invertebrates, unfit for human consumption; greaves.	2	2	10	10	10.0	0	9	9	9.0	0
MEXICO	1988	0 301	Live fish.	6	0	50	50	50.0	0	35	35	35.0	0
		0 302	Fish, fresh or chilled, excluding fish fillets and other fish meat of heading No. 0304.	22	0	50	50	50.0	0	35	35	35.0	0
		0 303	Fish, frozen, excluding fish fillets and other fish meat of heading No. 0304.	24	0	50	50	50.0	0	35	35	35.0	0
		0 304	Fish fillets and other fish meat (whether or not minced), fresh, chilled or frozen.	3	0	50	50	50.0	0	35	35	35.0	0
		0 305	Fish, dried, salted or in brine; smoked fish, whether or not cooked before or during the smoking process; fish meal fit for human consumption.	15	0	30	50	42.0	0	30	35	33.0	6
		0 306	Crustaceans, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; crustaceans, in shell, cooked by steaming or by boiling in water, whether or not chilled, frozen, dried, salted or in brine.	10	0	50	50	50.0	0	35	35	35.0	0
		0 307	Molluscs, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; aquatic invertebrates other than crustaceans and molluscs, live, fresh, chilled, frozen, dried, salted or in brine.	14	0	50	50	50.0	0	35	35	35.0	0
		0 509	Natural sponges of animal origin.	1	0	50	50	50.0	0	35	35	35.0	0
		1 504	Fats and oils and their fractions, of fish or marine mammals, whether or not refined, but not chemically modified.	5	0	50	50	50.0	0	35	35	35.0	0
		1 603	Extracts and juices of meat, fish or crustaceans, molluscs or other aquatic invertebrates.	2	0	50	50	50.0	0	45	45	45.0	0
		1 604	Prepared or preserved fish; caviar and caviar substitutes prepared from fish eggs.	14	0	50	50	50.0	0	35	35	35.0	0

Table 6.11 **Pre- and post-Uruguay Round customs duties for fish products in selected countries** *(cont.)*

Country	Year	HS Heading	Description	Pre-Uruguay Round Duties					Post-Uruguay Round Duties				
				Number of		Min	Max	Avg	Number of	Min	Max	Avg	Number of
				Tariff Lines	Unbound Items				Unbound Items				Items Generated[2]
		1 605	Crustaceans, molluscs and other aquatic invertebrates, prepared or preserved.	6	0	50	50	50.0	0	35	35	35.0	0
		2 301	Flours, meals and pellets, of meat or meat offal, of fish or of crustaceans, molluscs or other aquatic invertebrates, unfit for human consumption; greaves.	2	0	50	50	50.0	0	35	35	35.0	0
NEW ZEALAND	1991	0 301	Live fish.	5	5	0	20	4.0	0	0	8.5	1.7	0
		0 302	Fish, fresh or chilled, excluding fish fillets and other fish meat of heading No. 0304.	23	23	0	0	0.0	0	0	0	0.0	0
		0 303	Fish, frozen, excluding fish fillets and other fish meat of heading No. 0304.	26	25	0	0	0.0	0	0	0	0.0	0
		0 304	Fish fillets and other fish meat (whether or not minced), fresh, chilled or frozen.	3	3	0	0	0.0	0	0	0	0.0	0
		0 305	Fish, dried, salted or in brine; smoked fish, whether or not cooked before or during the smoking process; fish meal fit for human consumption.	12	12	0	0	0.0	0	0	0	0.0	0
		0 306	Crustaceans, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; crustaceans, in shell, cooked by steaming or by boiling in water, whether or not chilled, frozen, dried, salted or in brine.	15	6	0	25	16.7	0	0	20	4.6	0
		0 307	Molluscs, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; aquatic invertebrates other than crustaceans and molluscs, live, fresh, chilled, frozen, dried, salted or in brine.	14	7	0	20	1.4	0	0	16.5	1.2	0
		0 509	Natural sponges of animal origin.	1	1	5	5	5.0	0	3.2	3.2	3.2	0
		1 504	Fats and oils and their fractions, of fish or marine mammals, whether or not refined, but not chemically modified.	5	1	0	25	12.0	0	0	16	7.0	0
		1 603	Extracts and juices of meat, fish or crustaceans, molluscs or other aquatic invertebrates.	2	2	10	34	21.8	0	7.5	21.4	14.5	0
		1 604	Prepared or preserved fish; caviar and caviar substitutes prepared from fish eggs.	21	9	0	29	4.7	0	0	22	5.0	1
		1 605	Crustaceans, molluscs and other aquatic invertebrates, prepared or preserved.	18	12	0	25	10.8	0	0	20	6.9	0
		2 301	Flours, meals and pellets, of meat or meat offal, of fish or of crustaceans, molluscs or other aquatic invertebrates, unfit for human consumption; greaves.	1	1	25	25	25.0	0	16	16	16.0	0
NORWAY	1988	0 301	Live fish.	6	0	0	0	0.0	0	0	0	0.0	6
		0 302	Fish, fresh or chilled, excluding fish fillets and other fish meat of heading No. 0304.	32	0	0	0	0.0	0	0	0	0.0	32
		0 303	Fish, frozen, excluding fish fillets and other fish meat of heading No. 0304.	34	0	0	0	0.0	0	0	0	0.0	34
		0 304	Fish fillets and other fish meat (whether or not minced), fresh, chilled or frozen.	14	0	0	0	0.0	0	0	0	0.0	14
		0 305	Fish, dried, salted or in brine; smoked fish, whether or not cooked before or during the smoking process; fish meal fit for human consumption.	31	0	0	0	0.0	0	0	0	0.0	31
		0 306	Crustaceans, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; crustaceans, in shell, cooked by steaming or by boiling in water, whether or not chilled, frozen, dried, salted or in brine.	12	0	0	0	0.0	0	0	0	0.0	12
		0 307	Molluscs, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; aquatic invertebrates other than crustaceans and molluscs, live, fresh, chilled, frozen, dried, salted or in brine.	12	0	0	0	0.0	0	0	0	0.0	12
		0 509	Natural sponges of animal origin.	1	0	0	0	0.0	0	0	0	0.0	1

Table 6.11 **Pre- and post-Uruguay Round customs duties for fish products in selected countries** *(cont.)*

Country	Year	HS Heading	Description	Pre-Uruguay Round Duties					Post-Uruguay Round Duties				
				Number of		Min	Max	Avg	Number of	Min	Max	Avg	Number of
				Tariff Lines	Unbound Items				Unbound Items				Items Generated[2]
		1 504	Fats and oils and their fractions, of fish or marine mammals, whether or not refined, but not chemically modified.	26	12	0	243	122.2	0	0	170	85.5	0
		1 603	Extracts and juices of meat, fish or crustaceans, molluscs or other aquatic invertebrates.	3	2	3	405	204.0	0	0.9	344	172.5	0
		1 604	Prepared or preserved fish; caviar and caviar substitutes prepared from fish eggs.	23	0	0	2.5	1.2	0	0	0	0.0	0
		1 605	Crustaceans, molluscs and other aquatic invertebrates, prepared or preserved.	6	0	0.4	3.8	1.7	0	0	0	0.0	0
		2 301	Flours, meals and pellets, of meat or meat offal, of fish or of crustaceans, molluscs or other aquatic invertebrates, unfit for human consumption; greaves.	2	0	0	223	111.5	0	0	156	78.0	0
POLAND	1989	0 301	Live fish.	5	5	5	15	9.6	5	5	15	9.6	5
		0 302	Fish, fresh or chilled, excluding fish fillets and other fish meat of heading No. 0304.	21	21	0	15	6.1	21	0	15	6.1	21
		0 303	Fish, frozen, excluding fish fillets and other fish meat of heading No. 0304.	24	24	0	15	6.1	24	0	15	6.1	24
		0 304	Fish fillets and other fish meat (whether or not minced), fresh, chilled or frozen.	3	3	8	17	12.7	1	8	15	11.6	1
		0 305	Fish, dried, salted or in brine; smoked fish, whether or not cooked before or during the smoking process; fish meal fit for human consumption.	12	12	5	15	10.8	12	5	15	10.8	12
		0 306	Crustaceans, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; crustaceans, in shell, cooked by steaming or by boiling in water, whether or not chilled, frozen, dried, salted or in brine.	10	10	25	30	29.0	9	15	30	27.5	9
		0 307	Molluscs, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; aquatic invertebrates other than crustaceans and molluscs, live, fresh, chilled, frozen, dried, salted or in brine.	12	12	25	40	37.5	12	25	40	37.5	12
		0 509	Natural sponges of animal origin.	1	1	20	20	20.0	0	5	5	5.0	0
		1 504	Fats and oils and their fractions, of fish or marine mammals, whether or not refined, but not chemically modified.	3	3	18	18	18.0	3	18	18	18.0	3
		1 603	Extracts and juices of meat, fish or crustaceans, molluscs or other aquatic invertebrates.	1	1	60	60	60.0	0	38	38	38.0	0
		1 604	Prepared or preserved fish; caviar and caviar substitutes prepared from fish eggs.	9	9	30	40	32.2	9	30	40	32.2	9
		1 605	Crustaceans, molluscs and other aquatic invertebrates, prepared or preserved.	5	5	25	30	29.0	5	25	30	29.0	5
		2 301	Flours, meals and pellets, of meat or meat offal, of fish or of crustaceans, molluscs or other aquatic invertebrates, unfit for human consumption; greaves.	1	1	3	3	3.0	1	3	3	3.0	1
SINGAPORE	1989	0 301	Live fish.	9	9	20	20	20.0	0	10	10	10.0	0
		0 302	Fish, fresh or chilled, excluding fish fillets and other fish meat of heading No. 0304.	22	22	20	20	20.0	0	10	10	10.0	0
		0 303	Fish, frozen, excluding fish fillets and other fish meat of heading No. 0304.	25	25	20	20	20.0	0	10	10	10.0	0
		0 304	Fish fillets and other fish meat (whether or not minced), fresh, chilled or frozen.	3	3	20	20	20.0	0	10	10	10.0	0
		0 305	Fish, dried, salted or in brine; smoked fish, whether or not cooked before or during the smoking process; fish meal fit for human consumption.	13	13	20	20	20.0	0	10	10	10.0	0

Table 6.11 **Pre- and post-Uruguay Round customs duties for fish products in selected countries** *(cont.)*

Country	Year	HS Heading	Description	Pre-Uruguay Round Duties					Post-Uruguay Round Duties				
				Number of		Min	Max	Avg	Number of	Min	Max	Avg	Number of
				Tariff Lines	Unbound Items				Unbound Items				Items Generated[2]
		0 306	Crustaceans, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; crustaceans, in shell, cooked by steaming or by boiling in water, whether or not chilled, frozen, dried, salted or in brine.	15	15	20	20	20.0	0	10	10	10.0	0
		0 307	Molluscs, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; aquatic invertebrates other than crustaceans and molluscs, live, fresh, chilled, frozen, dried, salted or in brine.	20	20	20	20	20.0	0	10	10	10.0	0
		0 509	Natural sponges of animal origin.	1	1	27	27	27.0	0	10	10	10.0	0
		1 504	Fats and oils and their fractions, of fish or marine mammals, whether or not refined, but not chemically modified.	4	4	27	27	27.0	0	10	10	10.0	0
		1 603	Extracts and juices of meat, fish or crustaceans, molluscs or other aquatic invertebrates.	4	4	0	27	13.5	2	0	10	5.0	2
		1 604	Prepared or preserved fish; caviar and caviar substitutes prepared from fish eggs.	11	11	20	20	20.0	0	10	10	10.0	0
		1 605	Crustaceans, molluscs and other aquatic invertebrates, prepared or preserved.	6	6	10	20	18.3	0	0	10	8.3	0
		2 301	Flours, meals and pellets, of meat or meat offal, of fish or of crustaceans, molluscs or other aquatic invertebrates, unfit for human consumption; greaves.	1	1	27	27	27.0	0	10	10	10.0	0
THAILAND	1988	0 301	Live fish.	7	7	60	60	60.0	0	30	30	30.0	0
		0 302	Fish, fresh or chilled, excluding fish fillets and other fish meat of heading No. 0304.	21	21	60	60	60.0	0	5	30	8.6	0
		0 303	Fish, frozen, excluding fish fillets and other fish meat of heading No. 0304.	24	24	60	60	60.0	0	5	30	7.1	0
		0 304	Fish fillets and other fish meat (whether or not minced), fresh, chilled or frozen.	3	3	60	60	60.0	0	5	5	5.0	0
		0 305	Fish, dried, salted or in brine; smoked fish, whether or not cooked before or during the smoking process; fish meal fit for human consumption.	13	13	60	60	60.0	0	5	30	6.9	0
		0 306	Crustaceans, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; crustaceans, in shell, cooked by steaming or by boiling in water, whether or not chilled, frozen, dried, salted or in brine.	15	15	60	60	60.0	0	5	5	5.0	0
		0 307	Molluscs, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; aquatic invertebrates other than crustaceans and molluscs, live, fresh, chilled, frozen, dried, salted or in brine.	28	28	60	60	60.0	0	5	30	6.8	0
		0 509	Natural sponges of animal origin.	1	1	35	35	35.0	1	35	35	35.0	1
		1 504	Fats and oils and their fractions, of fish or marine mammals, whether or not refined, but not chemically modified.	6	6	30	30	30.0	6	30	30	30.0	6
		1 603	Extracts and juices of meat, fish or crustaceans, molluscs or other aquatic invertebrates.	1	1	60	60	60.0	0	30	30	30.0	0
		1 604	Prepared or preserved fish; caviar and caviar substitutes prepared from fish eggs.	11	11	60	60	60.0	2	20	60	34.5	2
		1 605	Crustaceans, molluscs and other aquatic invertebrates, prepared or preserved.	10	10	60	60	60.0	0	20	20	20.0	0
		2 301	Flours, meals and pellets, of meat or meat offal, of fish or of crustaceans, molluscs or other aquatic invertebrates, unfit for human consumption; greaves.	2	2	10	10	10.0	2	10	10	10.0	2
TURKEY	1989	0 301	Live fish.	8	8	20	20	20.0	8	20	20	20.0	8
		0 302	Fish, fresh or chilled, excluding fish fillets and other fish meat of heading No. 0304.	70	70	20	20	20.0	70	20	20	20.0	70

Table 6.11 **Pre- and post-Uruguay Round customs duties for fish products in selected countries** *(cont.)*

Country	Year	HS Heading	Description	Pre-Uruguay Round Duties					Post-Uruguay Round Duties				
				Number of		Min	Max	Avg	Number of	Min	Max	Avg	Number of
				Tariff Lines	Unbound Items				Unbound Items				Items Generated[2]
		0 303	Fish, frozen, excluding fish fillets and other fish meat of heading No. 0304.	90	90	20	20	20.0	90	20	20	20.0	90
		0 304	Fish fillets and other fish meat (whether or not minced), fresh, chilled or frozen.	109	109	20	20	20.0	109	20	20	20.0	109
		0 305	Fish, dried, salted or in brine; smoked fish, whether or not cooked before or during the smoking process; fish meal fit for human consumption.	82	78	25	25	25.0	78	25	25	25.0	82
		0 306	Crustaceans, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; crustaceans, in shell, cooked by steaming or by boiling in water, whether or not chilled, frozen, dried, salted or in brine.	28	28	25	25	25.0	28	25	25	25.0	28
		0 307	Molluscs, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; aquatic invertebrates other than crustaceans and molluscs, live, fresh, chilled, frozen, dried, salted or in brine.	35	35	25	70	27.9	35	25	70	27.9	35
		0 509	Natural sponges of animal origin.	3	3	30	30	30.0	0	15	21.2	19.1	0
		1 504	Fats and oils and their fractions, of fish or marine mammals, whether or not refined, but not chemically modified.	14	10	7	60	32.4	0	5.5	46.8	25.3	0
		1 603	Extracts and juices of meat, fish or crustaceans, molluscs or other aquatic invertebrates.	3	3	60	60	60.0	0	54	54	54.0	0
		1 604	Prepared or preserved fish; caviar and caviar substitutes prepared from fish eggs.	27	27	91	91	91.0	0	82	81.9	81.9	0
		1 605	Crustaceans, molluscs and other aquatic invertebrates, prepared or preserved.	10	10	60	80	62.0	0	54	72	55.8	0
		2 301	Flours, meals and pellets, of meat or meat offal, of fish or of crustaceans, molluscs or other aquatic invertebrates, unfit for human consumption; greaves.	2	2	5	5	5.0	0	4.2	4.2	4.2	0
USA	1989	0 301	Live fish.	5	0	0	0	0.0	0	0	0	0.0	5
		0 302	Fish, fresh or chilled, excluding fish fillets and other fish meat of heading No. 0304.	24	3	0	15	1.0	0	0	15	0.8	15
		0 303	Fish, frozen, excluding fish fillets and other fish meat of heading No. 0304.	26	3	0	15	0.7	0	0	15	0.6	20
		0 304	Fish fillets and other fish meat (whether or not minced), fresh, chilled or frozen.	7	0	0	6	1.2	0	0	6	0.9	5
		0 305	Fish, dried, salted or in brine; smoked fish, whether or not cooked before or during the smoking process; fish meal fit for human consumption.	26	0	0	15	2.5	0	0	7.5	1.7	19
		0 306	Crustaceans, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; crustaceans, in shell, cooked by steaming or by boiling in water, whether or not chilled, frozen, dried, salted or in brine.	12	2	0	7.5	1.3	0	0	7.5	1.3	10
		0 307	Molluscs, whether in shell or not, live, fresh, chilled, frozen, dried, salted or in brine; aquatic invertebrates other than crustaceans and molluscs, live, fresh, chilled, frozen, dried, salted or in brine.	12	0	0	5	0.4	0	0	5	0.4	11
		0 509	Natural sponges of animal origin.	1	0	3	3	3.0	0	3	3	3.0	1
		1 504	Fats and oils and their fractions, of fish or marine mammals, whether or not refined, but not chemically modified.	6	0	0	7.3	3.0	0	0	7.3	3.0	6
		1 603	Extracts and juices of meat, fish or crustaceans, molluscs or other aquatic invertebrates.	2	0	0	8.5	4.3	0	0	8.5	4.3	2
		1 604	Prepared or preserved fish; caviar and caviar substitutes prepared from fish eggs.	44	1	0	35	7.4	0	0	35	5.2	20
		1 605	Crustaceans, molluscs and other aquatic invertebrates, prepared or preserved.	19	0	0	14	5.3	0	0	10	2.6	10
		2 301	Flours, meals and pellets, of meat or meat offal, of fish or of crustaceans, molluscs or other aquatic invertebrates, unfit for human consumption; greaves.	1	0	0	0	0.0	0	0	0	0.0	1

1. HS2301 includes only fish item 230120 (- Flours, meals and pellets, of fish or of crustaceans, molluscs or other aquatic invertebrates)
2. When no offer was available, the base duty has been used.