

Concentrated Brokerage of Perishable Production: Informal Markets and Vertical Control*

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Abstract

This is a case study of a high-value exporting fishery, which represents a pioneering case of self-government developments within small-scale fishing communities in Chile. Despite entry restrictions and global catch quotas, this fishery faced a productivity crisis between the late 1980s and the late 1990s. In response the fishermen approached the Government on the concern of introducing new management rules. Today, after gradual evolution, a well-developed system of *de facto* individual non-transferable catch quotas exists, subject to a high degree of self-management by fishermen organisations. In order to understand the conditioning factors behind the exchange solutions adopted at this fishery, analysis is provided for the use of informal markets, interlinkage contracting and vertical control strategies between transacting parties along the production and marketing stages, the latter being characterised by concentrated wholesale brokerage.

Key words: Brokerage of perishable production; Vertical control; Small-scale fisheries.

JEL Classification Numbers: Q22; Q13; O13; O17; D23; J54; L14; L42; L81; N56

1. Introduction

This paper concerns the Chilean small-scale (artisanal) fishery of austral hake (*Merluccius Australis*), a species with a high export price which is found along the southernmost regions of Chile.¹ Institutional change in this fishery over the past decade has meant a pioneering and unique process in Chile and, doubtlessly, an exceptional case worldwide, when referring to productive sectors that exploit common pool mobile resources.

A group of small-scale fishing communities has achieved organisational success in coordinating the fishing efforts of the different fleets operating in this fishery, in a context where harvesting efforts are atomised and fish resources are *de jure* common property. The current management scheme at this fishery involves areas self-governed by fishermen organisations, including a *de facto* system of individual non transferable catch quotas.

‘Artisanal’ fisheries are often defined according to the technological features of the operating fishing fleets. Atomised (small-scale) harvesting is one of these features. Nonetheless, artisanal fisheries often share a series of other interesting aspects. On the one hand, production tends to be of a perishable nature, as well as of heterogeneous quality (fish size, texture and freshness). While perishability creates specific product value in terms of its temporal dimension, implying risk of opportunism by the business counterpart (e.g., Pirrong, 1993), quality heterogeneity implies monitoring costs and related adverse selection problems affecting the supply of fishing production (e.g., Kenney and Klein 1983).

On the other hand, artisanal fisheries often present significant degrees of informality, particularly in transactions directly involving the fishermen. The fact that fishermen usually do not possess formal labour records nor training, and cannot offer assets as collateral to have access to formal credit, contribute to the prevalence of informal exchange. To make trade viable, the supply of different goods and services by the same business counterpart tends to prevail in transactions with fishermen. By contributing to solve out different agency

problems, e.g. due to costly monitoring of fishing efforts, of heterogeneous product quality and also because of absent or incomplete insurance and credit markets, transaction costs tend to be reduced. The resulting amelioration of agency costs is due to complementary incentives that arise from the multidimensional contractual relations, known in the economic literature as interlinked contracting (Braverman and Stiglitz 1982; Platteau and Abraham 1987; Bardhan 1989; Basu 1997).²

The Chilean small-scale austral hake fishery is characterised by each one of the previously mentioned features. It is fully specialised in fresh-chilled fish production, which implies high temporal specificity in the production value as well as significant quality heterogeneity. Additionally, as will be described, it also involves significant informal trading, particularly as it relates to the commercial transactions within the harvesting sector.

The case study analysed in this paper offers insights on three general topics of discussion. Firstly, it refers to conditioning factors behind the organisation of successful collective action within informal and atomised productive sectors, partially operating in situations of rural poverty. It offers an illustration of institutional change patterns, as well as successful contractual adaptations that have worked to incorporate small-scale artisanal fishermen into a modern export trade industry.

Secondly, it analyses incentive structures underlying the contractual exchange solutions adopted by this fishing industry. In doing so, it offers general insights on how economic exchange is organised and made viable at productive sectors involving informal trading and production flows which are perishable and of heterogeneous quality. It is noticeable that many other food processing industries share transaction characteristics of a similar type.

Two general features stand out amongst the different trading schemes found at the fishery under analysis. One of these features is the persistence of high industrial concentration, both in processing as well as in wholesale commercialisation of fresh fish

trading. The other is the widespread use of different vertical control strategies, going beyond mere spot-market transactions. Several of these ‘vertical controls’ are indeed components of interlinked trading, which allow coordination of production and exchange flows between fishermen, processors, exporters, importers and wholesale intermediaries operating in the main export markets.

Lastly, the paper analyses the reasons for the widespread use of informal trading, particularly at the harvesting stage. As it has often been suggested when referring to informal markets (e.g., De Soto 1987; Thomas 1999), part of the arguments refer to efficient contracting, in the sense of minimising transaction costs. Nonetheless, the analysis also suggests other possible motivations for informality, e.g. aiming at by-passing costs associated with trading in a formal and legal manner.

The paper is organised as follows. Section 2 reviews literature related to the economic problems which play a central role in the case study being presented. Section 3 describes the historical evolution of the fishery analysed, while Section 4 describes the institutional change process that made it possible to reduce fish stock overexploitation. Sections 5 through 9 analyse industrial organisation features of the fishing industry studied, particularly with respect to industrial concentration, entry processes and vertical control strategies in the production stages, as well as in the wholesale commercialisation of fresh hake on its way to the final export markets. Finally, section 10 offers concluding remarks.

2. Related literature

(a) Collective action and local commons

A variant of the literature related to common property resources concerns the possibility of organising collective action to prevent overexploitation. This issue grows in importance in communities with local users of the common-pool resource. Successful collective action is conditioned by factors such as the number of users and heterogeneity among them, their

economic dependence with respect to the common property resource and the degree of repeated interactions between group members.

Berkes (1989), Ostrom (1990), Seabright (1993), Ostrom et al. (1994) and Sethi and Somanathan (1996) are classic references in this field. A significant proportion of the evidence of successful collective action, in the management of local commons, concerns non-mobile resources such as pastures and woodland.

In the case of marine resources which are quasi fixed to the sea bottom, Castilla (1994), Gonzalez (1996), Castilla and Defeo (2001) and Agüero (2001) analyse experiences in Chile with the allocation of *Territorial Use Rights* (TURFs) to artisanal fishing communities exploiting benthonic resources.³ For the case of similar (quasi-fixed) marine resources, Ruddle (1988) and Orensanz (2001) provide evidence of community management systems in Japan and different isles of Oceania and the Pacific Rim.

In the case of coastal fisheries that exploit mobile fish resources, evidence of successful collective action tends to be the exception. Ostrom (1990, ch. 5) mentions the cases of some fisheries in Sri Lanka, Turkey and the USA (e.g., McCay 1980 and Acheson 1988), each of them exhibiting different degrees of success in collective action organisation. On the other hand, Cordell and McKean (1992) analyse the allocation of informal property rights on marine areas which include diverse fish resources, in the manglars of Bahia, Brazil.

(b) Exchange and contractual solutions found at fishing industries

There is a line of literature that has analysed incentive, insurance and risk sharing issues in wage contracts for fishing fleet's crew (e.g., Sutinen 1979; Plourde & Smith 1989; Platteau & Nugent 1992; Anderson 1994). Nonetheless, there is still limited literature regarding contractual agreements and market structure in the commercialisation of fishing products; rare exceptions in this respect are Geirsson and Trondsen 1991, Platteau and Abraham 1987 and few other case studies.⁴ This paper is meant as a contribution in this area.

On the other hand, Gallick (1984) and Koss (1999) analyse contractual trading solutions and vertical control aspects which are similar to those discussed in this paper. Gallick (1984) examines exclusive supply agreements and vertical integration between processors and fishermen in the tuna canning industry (USA). Koss (1999) discusses contractual solutions between processors and fishing boats when there are specific investments, studying the fisheries of wild salmon, sablefish and halibut, all of them in British Columbia.

(c) Industrial concentration at food products processing and marketing

Different studies describe significant industrial concentration at the processing stage of diverse food producing industries (e.g. Scott 1984; Howard et al. 1996; Little and Watt, 1994). In a considerable number of cases, industrial concentration is also linked to quasi-monopsonic power in primary production purchase.

Along with quasi-monopsonic buyers, different vertical control mechanisms are often used, aiming at coordinating production, processing and commercialisation. ‘Production chains’ or ‘contract production’ are the names used in the literature to refer to such schemes. One of the main reasons for this kind of scheme is transaction cost reduction. Transaction cost savings are frequently associated with perishability and related value specificity, monitoring of heterogeneous product quality, efficient exchange of production and financial risks, as well as segmented credit markets where debtors are monitored by means of adding additional avenues of exchange between the transacting parties.

Different studies have discussed contractual schemes of this kind used in agribusiness sectors (e.g. Little and Watt, 1994; Glover and Kusterer 1990; Korovkin 1992). There is also evidence of ‘production chains’ in the beef, pork and poultry meat industries (Barkema et al. 2001 and Martínez 2002 provide evidence for the USA case).

Regarding fishing industries, the economic literature has examined the case of quasi-monopsonic processing sectors which buy the catch from atomised fishing sectors operating under common property resource conditions. This literature analyses vertical control decisions, though focusing exclusively on decisions directly related to processor's price power (Crutchfield and Pontecorvo 1969; Clark and Munro 1980; Munro 1982; Schworm 1983; Stollery 1987). The analysis of other (non price) vertical control instruments is frequently excluded. This paper is intended as a contribution in this respect.

The case analysed here also informs about significant industrial concentration in the wholesale marketing of fresh hake production. Very little has been published about brokerage of fishing production, though available evidence suggests that industrial concentration in fishing products wholesale marketing is not infrequent (Doeringer and Terkla 1995; Arnason, 1995; Anderson 2003). In relation to this hypothesis, Geirsson and Trondsen (1991) report, in a study developed in the late 1980s, that the four major frozen cod fillet importers in the USA market in 1987 had the control of over 60% of that product's total supply in the USA. Referring to the same general hypothesis, J. Ph. Platteau (1989) have talked of "domination of big corporate capital at the level of the (later stages of the) commercialization of fish products" (pp. 628).

The fact that the wholesale marketing of the austral hake for export presents high industrial concentration has been taken for granted in this paper. The reasons for finding industrial concentration in wholesale fish commercialisation are not explicitly analysed. The stress has been rather laid on examining vertical control strategies of the dominant wholesale marketing broker, in his relations with exporters, processors and with the fishermen.

3. Fishery Description

The austral hake catch occurs in inland waters (canals and fjords) and at open seas within the Chilean EEZ, in the southernmost regions of Chile, by large-scale (industrial) and small-scale

(artisanal) fleets. The artisanal fleets operate in inland waters, concentrating most of their activities between Regions X and XI (see Fig. 1). Since the end of 2002, the artisanal fishermen have enjoyed exclusive rights to catch hake and other fish species in the whole area covering the first 5 nautical miles off the shore. In the austral hake fishery the artisanal sector has been allocated 50% of the global quota annually assigned by the fisheries regulator.⁵ At the start of the 2000s, the official registers recorded a total of 5000 fishermen and 2300 small-scale vessels operating in this fishery between Regions X and XII.

Insert here Figure 1

Since the start of the Chilean Austral Demersal Fishery⁶, in the mid-1970s, the austral hake has been one of the main fish species targeted by the large-scale fleets operating in Chile's austral waters. The small-scale sector has increasingly joined the austral hake fishery since the mid-1980s.

Most of the production in this fishery is destined to export markets. The total export figure for this fishery during 2003 (industrial and artisanal sectors) was US\$65,5m⁷, of which US\$27,9m correspond to fresh-chilled products; the catch for the latter is mainly supplied by the artisanal sector.

The current regulatory status in the austral hake fishery allows no entry to additional boats and imposes annual global catch quotas, which at present are found distributed in the form of individual quotas in the case of the industrial fleet (Peña-Torres, 2002).

Since the early 1990s, different regulatory measures have been implemented in order to restrict entry to the artisanal sector. In this respect, the achievements over that decade, however, were only partial.⁸ On the other hand, since 1995 to date, the artisanal sector formally registered has been operating under annual global catch quotas. Different regulatory adjustments have been developed to improve compliance with the allocated quota for the

small scale sector. For one thing, the global quotas have been allocated according to different fishing areas in each region involved. For another, differentiated per-area fishing seasons have also been implemented.

Within this regulatory setting, since the late 1990s different groups of artisanal fishermen started a process of growing participation in self-monitoring and self-management to check on the artisanal fishing efforts. This is discussed in the next section.

Historically, the austral hake has been mainly used to produce frozen products. However, since the mid-1990s there has been a greater inclination for fresh-chilled hake in the volumes for export, which in the year 2003 stood for 40% of the total austral hake exports. This situation has been benefited with the production coordination success that has been achieved by the artisanal sector since the start of the 2000s. In the marketing of fresh hake both texture and freshness are key aspects that determine buyer price. In this context, the smaller operation scales of the artisanal sector offer relative advantages in fresh fish marketing.

Figure 2 shows the annual catch fluctuations of this fishery over the last twenty years. Over the 1980s, the annual average catch neared 40,000 tons, reaching a historic maximum of 70,000 tons in 1988. A sharp fall in the catch is later observed, which is associated with the previous increasing exploitation of this resource. The minimum catch volume over the last two decades was reached in 1993. In recent years the catch has fluctuated around 30,000 tons per annum, influenced by the annual catch quotas fixed for the different operating fleets.

The fall in average fishing yields reinforced the incentives the artisanal fishermen were faced with, given the common pool fish stock, to anticipate the fishing efforts made by the rest of the fleet. This process caused temporal concentration of the artisanal fishing supply, diminishing the spot prices of the landed catch. The fall in the prices received by the artisanal fishermen in 1996 and 1997 (see Fig. 3) played a key role in the incentives that later on encouraged artisanal fishing communities to start coordinating their fishing efforts.

Spain is Chile's main austral hake importer. In 2003, the Spanish market bought 94% of the total value exported by this fishery, including the production of both small- and large-scale fleets. In terms of total export value of the fresh-chilled austral hake, Spain purchased 97.4%.

In Spain the Chilean hake competes with other hake species from Argentina, New Zealand, Namibia, South Africa and Spain. The statistics supplied by Mercamadrid, Spain's main wholesale market for fishing transactions⁹, show a sustained increase of Chile's hake in that market, both in its frozen and fresh-chilled forms. In 2003, there was a total 16,700 tons of fresh hake that reached Mercamadrid, of which 9500 tons came from Chile; in 1996, the fresh austral hake volume in that market was 4750 tons. This growing trend is associated with the increasing production coordination reached by the artisanal austral hake fishing sector.

Insert here Figure 2

Insert here Figure 3

4. Coordination of Artisanal Fishing Efforts

The growing efficiency in the coordination of fishing efforts of the operating artisanal fleets is one of the fundamental developments since the late 1990s in this fishery. The start of the coordination initiatives coincides with the production crisis occurred in the late 1980s. The need to significantly reduce aggregate fishing effort was the basic motivation to begin a gradual institutional change process. This section discusses factors which facilitated this process.

4.1) Management System and Catch Quota Certification

As a result of the sustained fall in fishing yields, which was occurring since the early 1990s, conversations between the sectorial authority (*Subpesca*) and fishermen representatives were initiated in 1997, aiming at implementing a more effective enforcement of entry restrictions to the artisanal sector and their catch levels. From the beginning this dialogue was favoured by austral hake exporters, who saw it as a possibility to improve productive efficiency in the supply of raw fish.

Since 1992 there had been *de jure* entry restrictions to this artisanal fishery. However, the sector continued to *de facto* operate without restrictions. The regulatory initiatives of the late 1990s aimed to create a new legal instrument to effectively control the number of boats and artisanal fishermen taking part in this fishery.

The legal instrument since then used has been the implementation of a programme called “Research Fishing Trips Programme” (RFTP).¹⁰ Mutually agreed between the sectorial authority and the fishermen, this scheme defines the boats that will take part in the catch of the annual global quota. Then, fishermen organisations assign to each participating vessel an individual quota. Hence, this scheme works as a *de facto* individual (non-transferable) catch quota system. Additionally, in order to achieve greater compliance with the annual global quotas, since 1998 the quota for the artisanal sector has been distributed between two areas: *Norte Interior* (Regions X y XI) and *Sur Interior* (Region XII).

The new control scheme began to operate in 2000. Since then, private consultants have been in charge of implementing the RFTP in each of the fishing areas, monitoring the implementation of the fishing quotas allocated by the authority.¹¹ The per-area quotas have later been monthly subdivided, following joint decisions made by fishermen organisations and *Subpesca*.

The consulting firms fund themselves by charging a fixed value per kilogram of catch landed in areas under their control. This value is fixed in an *ex-ante* way by negotiation

between the consultant in charge of each RFTP, the fishermen's representatives and the firms buying the catch. Each fishermen union participating in the operation also receives an ex ante fixed payment for providing its intermediation services. At catch landing, both payments are deduced from the total catch gross value that has been ex-ante agreed between the fishermen and the catch buyers. Consultants' contracts, for each RFTP, lasts on a yearly basis. Contract renewal requires agreement from fishermen's representatives, the catch buyers and the regulator *Subpesca*.

Before starting fishing operations, the unit price of the catch is fixed as a single value which is valid for the total catch landings managed under a given RFTP fishing season. This single price is fixed in a seasonal meeting where buyers and fishermen's representatives participate and where each side of the market ('buyers' and 'sellers') negotiates as a coordinated single block. In this negotiation process, the consulting firms act as arbiters and legal witnesses of the agreement achieved.

Once the RFTP is operating, the consulting firms record and certify information about the vessels and the fishermen that take part in the austral hake fishing; they also monitor the fishing gears used. Along the evolution of this system, different control mechanisms have been used to control fleet operations, as it is described in what follows.

Being part of the monitoring process managed by each consulting firm, inspectors are sent to the different carrier boats (those that carry the catch to the final landing point) in order to certify the catch obtained in the areas where the fishing activity actually occurs. Once certification has taken place, the carrier boats reach the landing piers where the buyer's dispatch guide is checked by public sector officials in charge of enforcing fishing regulations. The checked catch lists are then checked back in the head offices of each consulting firm to detect possible 'double entry' problems; namely, cases where a boat delivers the authorised catch volume in more than just one landing area.

In some areas (e.g. Region X, northern area), in response to the occurrence of several ‘double entry’ cases, as from 2003 a ‘ticketing’ system has been introduced to complement the main certification system. On the one hand, there is an original document (the ‘ticket’) which defines an allowable catch volume and its receiver’s identity; on the other, there is also a copy to each ticket. The original remains with the buyer while the copy is meant for the involved fishermen union, which is the receiver of the catch quotas assigned by the fishing authority.

The consulting firm (in charge of an area-specific RFTP) gives the tickets to the corresponding fishermen federation, which then sends them to its union members, who, in turn, give them to each fisherman, granting this way the permit to fish. The design of the ticket is changed monthly. At the moment when the catch is transhipped to the carrier boat, each individual fisherman hands in the ticket which shows the catch data; in the ticket are recorded: a) the licence number of the boat; b) the boat’s owner; c) the crew members; d) the total volume caught in kilograms; e) the buyer of the catch and f) the name of the consulting firm in charge. This ticketing system has allowed effective control over the ‘double entry’ problem.

Another consulting firm (which administers the inland waters fishing quotas of southern Region XI) has implemented a computer-based control system. A data base with the names of all those fishermen wanting to officially appear in Sernapesca registers was created. The consulting firm sends an authorised inspector to each carrier boat. The inspector uses a portable PC connected to a digital weight. Each fisherman participating in this quota control programme has a card known as *TIPA* (in Spanish, the initials stand for *Artisanal Fisherman Identification Card*) similar to credit or debit cards with the pertinent fisherman’s coded data.

At the moment when the inspector receives the catch from a given fisherman, the latter’s *TIPA* is read electronically by the inspector’s portable PC, and the only valid weight (connected to the PC) to weigh the catch gets activated. After the weighing is over, all

relevant data remain registered in the portable PC (identity of the boat, crew members, kilograms delivered, buyer's identity). The registered data appear on a label with a bar code, a copy of which is stuck on the back of the dispatch guide and another on the container of the weighted catch. The dispatch guide is filled in printed form by the same PC used for weighing and registering the data. When the carrier boat reaches the landing pier, the dispatch guides are again checked by another authorised agent (also hired by the consulting firm), and later certified by Sernapesca officials.

The punishing system used since 2003 in an inland waters fishing area called Hualaihue (located in Region X) is quite illustrative. If any violation to catch or fishing effort regulations is observed, the buyer of the fraudulent catch is punished. However, punishment is applied gradually. Without enjoying the right to appeal, an illegal buyer must pay the fishermen federation that issued the authorisation of the boat involved a fixed sum of about US\$900¹² the first time he commits fraud. If the buyer is caught in a fraudulent transaction a second time, he will have to pay the double of the initial fine. If there is a third instance to this situation, that buyer's name is written off the registered data of the consulting firm in charge of the quota control system.

In another fishing region which is located further South (called Aysén and located in Region XI) the fines applied by the consulting firm in charge of catch quota controls mean suspension of the buyer's catch purchase license, during the following 30 days after having committed a violation for the first time. If a fraudulent transaction was repeated a second time, the involved buyer would not be allowed to buy a catch for as long as the RFTP Programme (which holds yearly) is in operation.

In spite of the results obtained by the RFTP Programme, some problems have been observed. For example, in the case of a consulting firm which was in charge of an area-specific RFTP scheme during the years 2000 and 2001, successful management was not reached.

At that time, per-area fishing quotas were allocated by public auctioning to the firms interested in buying catch.¹³ With the mentioned consulting firm, the transparency of this process was in doubt. In the fishing areas managed by this consultant, the same buying firm would always be the winner. As a result, the winner was suspected of having made previous illegal arrangements with the consultant in charge of the bidding. Finally, the fishermen demanded that consultant firm to stop participating in the research fishing trips programme.

The latter case described shows that institutional development has been gradual. Building and consolidating mutual trust between the different parties involved has been a key aspect of the problems to be solved. For making progress, it is necessary to count on intermediate agents and organisations to help obtain information and to facilitate an effective collective action process.

4.2) Fishermen Organisations

The artisanal fishermen organisational structure in Chile is made up of three representative units: the union, the federation and the confederation. The union is the local organisation that gathers the fishermen belonging in the same local port; the federation is regional and made up of different unions; the confederation is national and groups together federations and unions which are not members of a federation.

The organisational structure depends on the region concerned. In Region XI, characterised by a low-density population and at significant distance from important urban centres, geo-economic factors have furthered the development and efficiency of the artisanal fishing unions. Mutual dependence generally prevails between the different artisanal fishermen communities that operate in this region, a consequence of being far away from important urban centres and of quasi mono-productive specialisation in fishing activities.

In Region X, by contrast, there is a considerable number of fishermen unions located closer to urban areas. Therefore they enjoy greater economic independence as far as the

fishing activity is concerned. On the other hand, as compared with Region XI, the number of artisanal fishermen in Region X is considerably larger. Such conditions help to understand why in Region X the speed of the achieved developments have been slower than in Region XI, in terms of further consolidating the economic efficiency developments in self-governing and control over artisanal fishing effort.

There are six artisanal fishermen federations with direct participation in the austral hake fishery in Region X, while in Region XI there is only one artisanal fishermen federation; the latter enjoys a significant degree of cohesion and power over its associated unions. The leaders of this federation also enjoy very good relations with the consultant in charge of the Research Fishing Trips Programme.¹⁴

Insert here Table 1

The fishermen federation in the Hualaihue area (Region X) shows 100% participation of the fishermen from the represented areas; this has benefited collective decision-making efficiency. The geographic conditions where the union members work favour the efficiency of this federation. The physical distance of the participating fishing communities from important urban areas generates mutual dependence among them, thus encouraging cooperation in their different daily activities.

To possess the adequate information is essential for the consultants managing the quotas, being the fishermen unions' cooperation the main means to obtain it. To the extent fishermen organisations show appropriate organisational efficiency, monitoring and controlling the productive effort will be made easier. The repeated interactions between the consulting firms and the federations have raised increasing confidence in this quasi self-governed control programme; they have also facilitated continued fishermen participation according to the established regulations.

4.3) Direct Buyers of the Catch

The direct buyer of the catch organises and commands the fishing activities that he has personally commissioned (in no written form). He is responsible for financing the fuel, fishing gear, food and other needs supplied to the fishermen before they initiate their fishing trips. The per kilogram price of the catch is fixed ex-ante. The buyer usually enjoys prestige and exercises influence over the fishermen. He is a key figure in the marketing channel of the fishing production. For the exporting agents, the direct buyers of the catch are a key input to reach success in their operations.

The buyers of the catch are relatively numerous. The number of buyers is in direct relation to the geographic dispersion existing between the different fishing areas.

Everyday, the fishing boats return to the place operating as temporary base pier. Once the fishermen have their catch, they sail toward the carrier boats where the buyer's representative awaits them. The representative for the consulting firm is also there to certify the catch, which is weighed, boxed in and iced to keep it in adequate conditions; the catch is then stored in the hold, which is sealed until landing is reached. After the catch has been unloaded, the fishermen are paid in cash by the buyer; this is the moment when the pending accounts are cancelled since the fishermen have already received payments in advance.

Upon disembarking, the carrier boat is received by Semapesca officials who are the only agents authorised to remove the seal off the hold. Their function is to verify the weight at landing and the dispatch guides. If all is right, the dispatch guides are stamped to allow the catch to be carried to the processing plant and later exported. At the processing plant the catch is again checked; this is done to additionally control illegal hake marketing, which might be masked with the legally documented catch.

The buyer firms must comply with different norms, many of which are not formal. For example, the buyers need the established support of a fishing fleet to assure them the fish

supply if they mean to be competitive. A relation of mutual trust with the fishermen is required to this effect; such relations are built by constantly giving the fishermen the services they need, whether in bad or good fishing conditions. There is a cooperation logic which, therefore, is built: the fishermen give support to the supplier/buyer with their catch, and the buyer, in turn, provides the fishermen with food, goods and services.

4.4) Other Factors behind Institutional Change Success

The market development of the austral hake artisanal fishing has introduced new economic agents into this fishery. In the mid-1980s, a new fishermen's migration from the North of the country took place. A considerable number of them came from jobs other than fishing; some of the new entrants came directly from (lost) urban jobs.

With the arrival of the new fishermen, fishing objectives more closely related to market development began to consolidate, in contrast with the former prevailing traditional approach which was mainly concentrated on survival strategies. More market oriented priorities influenced decisions about operational scales and the organisation of production activities, thus facilitating the artisanal sector's access to modern industrial marketing and processing.

The new fishermen migration settled mainly in Region XI, which meant a relatively speedier institutional and productive modernisation experienced by the fishery of this region as opposed to Region X.

Another factor favouring institutional change has been the relative high unit price of the austral hake. Considering a sample of national average landing prices of the different marine species landed in Chile in 2001, the austral hake had an average landing price of 1.5 USD/kg., reaching position #15 (among a total of about 90 species) if the landed species are ranked considering the more expensive ones first.¹⁵

Additionally, the austral hake fishing industry represents a significant portion of the per-fisherman average income in the areas studied. Following talks with artisanal fishermen working for this fishery, the average income per fisherman would be roughly around US\$250-300 monthly, minimum half of which would be derived from austral hake fishing.¹⁶

Finally, high industrial concentration in fresh hake marketing also implies that there is a reduced number of wholesale brokers with direct incentives to support coordination and control of artisanal fishing efforts. A successful coordination of production flows gives wholesale brokers better chances to negotiate less risky sale contracts abroad and thus obtaining better sale prices. It should be noticed that most austral hake exporters favoured the idea of artisanal fishing effort coordination, from the beginning of the RFRP fishery management scheme.

5. Industrial Concentration in the Fresh Hake Wholesale Importing Sector

A relevant aspect of austral hake marketing is the high degree of industrial concentration that has prevailed over the past decade at the stage of wholesale importing into the dominant export market.

The Chilean hake import into Spain does not operate as an atomised market segment. In both the frozen and the fresh-chilled product cases, the wholesale importers control a significant market share. With respect to the fresh-chilled products, a sole importer (from now on denoted as broker **A**) trades no less than 70-80% of the total Chilean fresh hake that enters Spain.¹⁷

Broker **A** was one of several Spanish businessmen that arrived in Chile over the 1980s to start the fresh hake export business. However, he was one of the few exceptions able to reach success in this business. Most of the entrants did not survive because learning about fishermen's trading codes and working behaviour was difficult; for example, many of the

entrants' deals with fishermen turned into losses as the former paid in advance for fishermen's unfulfilled catch commitments.

There is no comprehensive explanation of the reasons why broker A has been able to maintain a dominant position over time with respect to importing into Spain the fresh hake exported by Chile. For instance, little is known about how entry to crucial distribution markets operates or how the fishing product retail sector works in Spain, as the case of Mercamadrid.

On the other hand, we have already quoted evidence suggesting the existence of important industrial concentration at processing and wholesale marketing stages of several food processing industries. In the case of the fresh hake export business, and related to the possibility that high industrial concentration at wholesale brokerage could reflect allocate efficiency, it is possible to think of two reasonable hypotheses.

Firstly, in cases where it is costly to monitor product quality, efficient scales of operation may work as a signalling device which internalises the benefits of building up the reputation of being a regular and reliable supplier of requested product qualities. In this context, expanded scales of operation could signal a credible commitment to be a reliable supplier, given the expected losses in case of failing to honour that commitment.

Secondly, important economies of scale at distribution, transport and inventory management stages could also help to explain the existence of high industrial concentration in the fresh hake wholesale brokerage.

In what follows, the presence of a wholesale market broker who controls a significant share of the Chilean fresh hake supply imported into Spain is taken for granted. Therefore, in the following sections emphasis is laid on analysing the trading strategies that broker A has implemented for developing the fresh hake business in Chile. From now on we denote these trading strategies by the generic name of 'vertical controls'.

6. Wholesale Brokerage and Vertical Controls

In this section it is argued that the following vertical control instruments operate, fundamentally, as mechanisms that make the fresh hake trade viable.

i) Multiple goods and services provision by the same commercial counterpart

Given the high transaction costs which determine the informal trade prevailing in the commercial transactions of the austral hake fishing sector, the fact that the buyer himself supplies multiple goods and services to the fishermen contributes to make the required exchanges viable. Such as with the provision of other services described before, ex-ante financing by the buyer of the catch is part of the contractual arrangements.

The provision of goods, services and inputs means that the buyer of the catch becomes a *de facto* quasi-partner of the fishermen, absorbing a considerable portion of the risks involved in the fishing activity. Notice that the services provided by the buyer of the catch not only reflect optimal risk distribution between parties with different abilities to absorb and diversify commercial risk, but they also help to alleviate diverse agency costs which originate from the absence of formal labour records or collateralisable assets in the hands of artisanal fishermen.

The provision of multiple services by the buyer of the catch creates improved incentives for fishermen's compliance with catch contracts. This is so as the supply of other services to fishermen gives the buyer of the catch additional instruments (rather than just the price paid) to regulate and control the raw fish desired flows.

Later on, it will be seen that a significant part of the funding for the different goods and services delivered ex-ante to the fishermen is provided by broker A, the importer dominating the fresh hake export to Spain.

ii) Exclusive catch supply and other production flows agreements

In return for the financial support and the ex-ante provision of diverse goods and services received by the fishermen, the buyer demands exclusive catch supply rights. However, exclusive supply agreements do not only occur in the direct transactions with fishermen. This type of supply agreements is also used along the fresh hake marketing channel; the direct buyers of the catch also work exclusively for a given exporter.¹⁸ In turn, several of the main exporters work almost exclusively for the dominant importer of the Chilean fresh hake sold in Spain.

The exclusive supply agreements fulfil different roles. Firstly, they offer the buyer control and greater predictability over the raw material supply and processed production. This favours the buyer's negotiating position vis-à-vis intermediaries operating in market stages closer to final consumers. The efficiency of the control over the raw material supply is backed by the complementary incentives arising in association with the simultaneous delivery of other goods and services to the fishermen.

Secondly, exclusive supply agreements also work as a mechanism that reduces adverse selection problems in the heterogeneous quality catch supply (Gallick 1984; Koss 1999). To the extent there is effective control over compliance with the exclusive supply agreement on the part of the fishermen, the latter will not find incentives for selling an inferior quality product while complying with the exclusive supply agreement¹⁹; there will be no option to negotiate better buyer prices for the higher quality product units with another buyer. Fresh hake marketing implies that the adverse selection problem, related to heterogeneous quality, also extends over to the following marketing stages.

With the reduction of the adverse selection problem in quality supply, the exclusive supply agreement diminishes the cost of monitoring the quality of the product bought. The exclusivity agreement also diminishes the cost of having to seek a reliable counterpart, for both buyers and suppliers.

Although the exclusivity agreements help to make fresh hake trading viable, they also exacerbate the risk of buyer's opportunistic behaviour on account of the perishability of the exchanged product and the prevailing increasing industrial concentration as the next marketing stages are reached. The next two sub-sections describe hedging mechanisms vis-à-vis buyer opportunistic behaviour risks.

(iii) Vertical integration between processors and exporters

Although industrial concentration prevails in the fresh-chilled hake processing segment to a degree very much like with exports, and being the largest exporting firms vertically integrated to processing plants ownership, in the rest of the fresh-chilled industry the exclusive supply agreements between processors and exporters do not necessarily prevail.

In 2001, the total number of hake processors was 22; 19 of them elaborated fresh-chilled products. Table 2 shows data for the 13 main processors that produce fresh-chilled hake²⁰; 5 of these 13 plants had the control of around 70-74% total fresh hake production in the years 2001-2002. If the 10 main plants are taken into consideration, the control percentage fluctuated around 95-98% those years. As seen in Table 3, in the exporting segment the industrial concentration percentages are similar.

The characteristics of hand labour and the processing techniques used in this industry are related to different technological factors conditioning the degree of industrial concentration that prevails at the processing stage. On the one hand, fresh hake processing demands skilled labour to obtain the maximum fish cutting efficiency while maintaining product quality. On the other, to be able to operate efficiently in this business, it is necessary to have an adequate logistics, involving control and coordination between catch volumes and the required number of skilled workers. The arrival of raw material may take place any time of day or night. Then, the necessary number of skilled workers must be

available 24hs round the clock. Not having the required personnel or adequate turnout may imply a high cost in terms of quality losses and/or lower production yields.

With respect to indications of vertical integration, Tables 2 and 3 show that the 5 largest exporting firms have their own fresh-chilled hake processing plants. The plants subject to vertical control are among those that process the highest fresh hake percentages. Regarding the cases of plants **F1** and **F3**, they process production which is nearly exclusively exported by firm **E1** (Table 3).

In the rest of the fresh hake industry, short-term supply agreements between processors and exporters tend to prevail. In such cases, to diversify between species and between processed product formats (See Table 2, Column 4) is one of the ways used to reduce risks associated with the perishability of the fresh-chilled product.

Insert here TABLE 2

In plants where dependency on austral hake processing is greater, the contractual responses to the risks associated to perishability fluctuate between total vertical integration and other vertical control mechanisms; such is the case of almost totally exclusive supply agreements for the dominant importer of the fresh hake imports into Spain, combined with other services (e.g. ex-ante financing) supplied by the same importing agent. Plants **F2** and **F12** are examples of this case.

iv) Determining ex-ante catch buyer price

Determining ex-ante the price of the catch represents a hedge to the fishermen vis-à-vis the risk of buyer opportunistic conduct, given the perishability of the product being transacted, the industrial concentration in the catch buyer segment, and the prevalence of exclusive supply agreements.

A similar hedging role may be attributed to the fact that the buyer provides the fishermen with a multiplicity of goods and services. This way the buyer becomes a *de facto* partner to the fishermen, in the face of uncertainties related to fishing effort productivity. This *de facto* partnership reduces the buyer's incentive to behave opportunistically to the detriment of the fishermen.

The following sections discuss additional aspects of how the fresh hake export business works. In particular, information is provided about the evolution of market shares in the export segment and how trade interactions between the main exporting firms and the dominant Spanish importing agent have developed and evolved.

7. Market shares in the fresh hake exporting segment

Table 3 shows the market share of the major exporters over the years 1997-2004. Included here are those firms that have reached or gone over an annual 500ton production volume for export.²¹ Also shown is the market share of the main 5 and 10 exporting firms and the total number of firms registering fresh-chilled austral hake exports from Chile.

In the period 1997-2004, the fresh hake export segment shows a considerable degree of industrial concentration. The share of the 5 major exporters fluctuates between 62-87%, while the 10 main exporters controlled around 86-97%. Additionally, the total number of exporters shows a declining trend. Toward the late 1990s there were some 50 exporters, while in 2004 the fresh hake exporters totalled 26.

A second interesting characteristic is the appreciable changes in the market shares of the major fresh hake exporters (Table 3). For one thing, the total number of fresh hake exporters which report operations during the period 1997-2003 is significant. In this period, 177 different legal entities recorded fresh hake exports (Customs data). For another, considering the 10 fresh hake exporters with greater market participation in 1987 (the time

near the beginning of the export boom at this fishery), only 2 of them remain currently operating in the fresh hake business. And only one of them was part of the main exporting group in the period 1997-2004 (Table 3). Finally, concentrating on the 10 firms shown in Table 3, only 3 of them uninterruptedly maintained export volumes over 500 tons/year during the period 1997-2004. In what follows it is argued that this ‘rotation pattern’ among the main exporters has been related to, though not necessarily caused by, interventions of the dominant importing broker into the Spanish market.

Insert here TABLE 3

A final element to consider is that a predominant proportion (at least 70-80%) of all fresh hake Chilean exports are imported into Spain by the dominant broker **A**. Additionally, some of the main fresh hake exporters operate under totally exclusive supply agreements with broker **A**. Moreover, all exporters currently operating according to such agreements started their business as direct buyers of the catch. Later on, as time passed and with broker **A**’s direct financial support, they became exporting agents.

8. Interactions between main exporters and the dominant fresh hake importer into Spain

This section analyses the pattern of commercial interactions that broker **A** has developed with some of the main exporters, in particular with the firms **E4**, **E5**, **E9** and **E10**. This group of firms, together with the firm **E1**, trade most (if not all) of their fresh hake production through the importing broker **A**. Indeed, all the first four firms work under fully exclusive supply agreements with the broker **A**. This group of firms (including exporter **E1**) controlled 30-40% of the total Chilean fresh hake exports in the period 1997-2004 (Table 3).

Regarding the rest of the firms that export a significant proportion of their fresh hake production into the Spanish market through the broker **A**, allowing this trader's control over 70-80% of total Chilean exports of fresh hake into Spain, we have no information about whether or not these remaining firms also operate under exclusive supply agreements.

Over the last decade, the firms **E4**, **E5**, **E9** and **E10** have all maintained full supply exclusivity with the importing broker **A**, having direct financial support on his part to finance these exporters' operational capital. However, broker **A**'s support has not always been equally constant in all cases.

The best example is the development of the exporting firm **E9**. The current owner of this firm began working for broker **A**, when austral hake exports were just being started, as direct buyer of the catch. Thanks to his broad network of contacts in the artisanal fishing world of Region X, this agent quickly became one of the most important hake buyers and intermediaries in that region.²² As a result of the success obtained, broker **A** backed him with growing financing flows, therefore encouraging his expansion. In the late 1980s, this agent was already operating as exporter, in exclusive supply conditions for broker **A**.

At the top of his business success (early 1990s), this agent tried to develop greater autonomy from broker **A**. As part of this process, the owner of **E9** demanded of broker **A** to pay higher prices for his production. Broker **A** responded removing his financial support and expanding operations with other fresh hake suppliers. Influenced by the loss of broker **A**'s commercial and financial support, the owner of **E9** had to exit this business in 1993, after facing a strong liquidity crisis.

Part of firm **E9** remained in the hands of the original owner's son, operating as an important trade agent for the exporting firm **E5** in the second half of the 1990s. The control of firm **E5** was later taken over by one of broker **A**'s close collaborators. Thus, firm **E5** continued to operate in conditions of total exclusive supply for broker **A**.

This time, however, broker **A** began to give other exporters more decisive support; among them was **E4**, a firm initially operating only in the more southern Region XI. Broker **A** gave this firm the financing support to enlarge their catch purchase operations at Region X. In later years, this firm was heading the list of major fresh hake exporters (see Table 3).

On the other hand, firm **E5** ceased to export fresh hake since 1999, after having reached a 21% share. Firm **E5**'s market share was absorbed essentially by firm **E1**, which also operates in close relations with broker **A** to trade his fresh-chilled hake production in Spain.

The recurrent dynamics in the interactions described has consisted in financing and giving commercial support to successful agents operating initially as intermediaries and direct buyers of the catch, and who later on become exporters²³, usually in exclusive supply conditions for broker **A**.

We have no further information about the type of market competition that has prevailed at the exporting segment of the fresh hake business. The observed changes in the main exporters' market shares could be related to different reasons. For example, due to strong direct competition among the exporters themselves; or because of changes in broker **A**'s financial support to different exporters, as a result of trader **A**'s supply-risk diversification strategies; or perhaps due to other (more strategically oriented) commercial aims, e.g. aiming at "dividing and later ruling". Unfortunately, the available evidence does not allow to discriminating between the empirical relevance of one and another hypothesis.

9. Entry into the wholesale brokerage of austral fresh hake

For more than a decade Broker **A** has maintained a dominant share in the business of importing Chilean fresh hake into Spain. Perhaps this is a market structure reflecting allocative efficiency. Or maybe it is the result of artificial barriers for entering into this business. This section analyses information related to the latter possibility.

During the late 1990s and early 2000s, broker **A**'s control as dominant importer of the Chilean fresh hake into Spain was faced with a sole real competition threat: the Spanish trader **C**, whose main business line has traditionally been frozen hake importing into the Spanish market.²⁴

Between 1998 and 2002, broker **C** competed directly with broker **A** for importing Chilean fresh hake into Spain. Broker **C** used firm **E8** as his main exporting agent (Table 3), supplying it with direct financial support. During 2001 and 2002, broker **C** indeed became a serious threat to broker **A** over control of the Chilean fresh hake export segment.²⁵

Broker **A** resorted to different measures to fight off broker **C**. He called back upon the original owner of **E9** as exporting agent in exclusive supply conditions, given the valuable contacts network this agent enjoyed with hake fishermen; with broker **A**'s financing support, this agent quickly returned (since 2002 to date) to the major fresh hake exporters group.

Broker **A** also implemented other measures to neutralise broker **C** in the Chilean fresh hake business. For instance, **A**'s competition with broker **C** and his exporting agent **E8** triggered buyer price wars for the austral hake catch in both Region X and Region XI. These buyer price wars were particularly severe during the year 2001.²⁶

Besides, broker **C** had to face other serious drawbacks to buy the catch, most of them directly incited by artisanal hake fishermen organizations. For example, bringing **E8** up for trial to prevent this firm from buying catch; inciting thorough controls by Sernapesca officials over the plants processing for **E8**; and competing via increases in the commissions paid to fishermen organizations to assure the catch. In brief, such actions caused broker **C** strong losses, and put an end to his attempt at consolidating a position in the brokerage segment under the control of firm **A**.

Why did Broker **C**'s entry into the Chilean fresh hake business fail? Given **C**'s experience as an international trader of hake products, it seems unreasonable to argue that the

problem was **C**'s lack of knowledge about the hake business. On the other hand, the commercial interaction that broker **C** built up with the Chilean exporter **E4**, and the latter's use of experienced local intermediaries for buying the catch, also seem to rule out the possibility that broker **A** had enjoyed significant cost advantages when buying the catch. Nor does it seem reasonable to argue that broker **C** faced significant cost disadvantages because of having access to higher cost funding.

Perhaps trader **A** has enjoyed privileged access to crucial distribution networks and retailing markets in Spain. Maybe the size of the fresh hake market does not allow the existence, in the importing segment of this market, of another competitor of similar size to broker **A**. This could be due to economies of scale in wholesale distribution and commercialisation. Unfortunately, we have no further information to assess the validity of these different possibilities.

There remains another option, mentioned by the sources interviewed: the possible existence of illegal practices in this business, such as illegal catches, different ways of exporting illegally, and tax evasion at the moment the products enter Spain. An agent inclined to committing fraudulent commercial practices might offer other agents (necessary to commit the fraud) side payments in addition to the invoiced amounts. In this business context, disclosing fraud might prove difficult. The latter would be even more so in a context of existing informal trading in which more than one good or services are simultaneously traded. Therefore, if profits could be obtained from illegal transactions, it might help in defending already operating firms vis-à-vis new competitors.

In relation to the possibility of illegal practices in this business, it is possible to quote the following evidence. Firstly, and regarding fish products commercialisation in the Spanish market, the Spanish publication *Mar* (1999) denounced consumer frauds occurring in Spain, related to the real species sold.²⁷ Among such cases, there is mention that occasionally the Chilean austral hake would be sold in Spain as hake from the Bay of Biscay (known as

'*merluza de pincho*'), which enjoys a higher transacting value compared with the hake from Chile.²⁸ This same practice is mentioned in Matamala (2004), a report funded by the Chilean public-sector institution *Sercotec*.²⁹

Another reason for fraudulent practices may be to evade import duties when the production reaches Spain.³⁰ One way to attain this aim would be to stick fraudulent labels on part of the production exported from Chile; for instance, by using labels corresponding to less expensive products. Regarding this possibility, in 2002 Sernapesca personnel who were performing their control duties at the airport in Santiago-Chile, found fresh hake export flows containing the 'eviscerated without head (HG)' product when, in fact, the cargo was labelled as 'eviscerated whole head on (H-ON)'. The HG product has a higher price.³¹

Yet another possible fraud mechanism, again suggested by people acquainted with this industry, may consist in the austral hake being exported bearing a different species name.³² To this effect, an important condition is that hake unit size be in accordance with the unit size of the species officially reported, which would probably avoid (only visual) controls by Sernapesca's officials.

10. Concluding Remarks

This paper has described contractual solutions through which small-scale fishing communities have been incorporated into international markets. Additionally, it provides analysis of the conditioning factors underlying the institutional change process which has permitted a successful coordination of fishing efforts from different small-scale fleets operating in the fishery studied. The paper has also identified sources of comparative contractual efficiency in the role of informal intermediaries who provide small-scale fishermen with an array of different interlocked services, in a trading context characterised by absent or incomplete markets. Our findings on these issues are in agreement with published

evidence referring to contractual trading solutions found in different small-scale fishing communities in Asia and Africa (e.g., see Platteau, 1989).

The case of the fishery analysed has additionally highlighted the empirical relevance of industrial concentration in the wholesale international brokerage of perishable high-quality fishing production. Furthermore, a highly concentrated wholesale buying sector was clearly supportive of fishermen's initiatives for improving the coordination of their fishing efforts, thereby contributing to the reduction in over-fishing losses. This finding is in line with theoretical propositions developed in the economic literature, suggesting that monopsonistic price powers could provide incentives for ameliorating the 'tragedy of the commons' in common-pool and highly atomised fisheries (e.g. Crutchfield and Pontecorvo 1969; Clark and Munro 1980; Cornes, Mason and Sandler 1986).

In cases where atomised small-scale harvesting does imply efficiency advantages relative to larger-scale and more centralised business units, as in the case of the fishery analysed in this paper, an interesting policy question is: up to what degree could state promotion of fishermen's greater involvement in marketing stages of the fishing industry (e.g. by encouraging a greater centralisation of artisanal fishermen's selling scales of their own production) assist in reducing over-fishing incentives, as well as improve small-scale fishermen's bargaining position vis-à-vis bigger-scale dealers operating in the following stages of fish marketing and distribution channels?

Nonetheless, an important problem with the latter policy issue is that, in general, very little is known about how fish products are marketed at different commercialisation stages in international markets. This is even more so for high-quality fish species which are exported as fresh product to developed countries' final consumer markets. In the context of these markets, could more centralised selling of small-scale fishing communities' production achieve competitive advantages vis-à-vis the marketing operations of big international fish dealers? This is a relevant question, considering that a non negligible proportion of the world

production of high-quality fish products is harvested by developing countries' small-scale producers. Hence, it would be desirable to improve the understanding on how international fish commercialisation markets work. In particular, by analysing issues affecting the facility of entry into these markets, as well as other factors conditioning the degree of competition which prevails at these markets.

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**Table 1: Number of Artisanal Fishermen and their Organisations
(Regions X and XI, end of 2001)**

<i>Artisanal Fishermen Organisations</i>	<i>Region X</i>	<i>Region XI</i>
Federations (number)	6	1
Unions (number)	111	16
Cooperatives and Trade-union Associations* (number)	24	8
Number of fishermen**	3660	1200

Source: Author's data based on information supplied by *Subpesca* (2002).

*: the latter refers to an organisational figure legally known in Chile as '*Asociación Gremial*'

** : fishermen directly involved in austral hake fishing (source: Consultants' Records, 2001).

Table 2: Main Fresh-Chilled Austral Hake Processing Plants (2001-2002)

Major Processing Plants fresh-chilled products, X-XI regions	(1) with V.I.	(2) Market Share, % 2001	(3) 2002*	(4) % hake processing** (year 2001)
Plant 1 (F1), X	(~E1)	12.4	5.8	15.7
Plant 2 (F2), X	yes (E6)	11.6	15.5	78.0
Plant 3 (F3), X	(~E1)	7.5	5.6	76.9
Plant 4 (F4), X	yes (E7)	7.4	8.8	44.8
Plant 5 (F5), X		5.6	5.7	65.1
Plant 6 (F6), X		1.7	2.1	30.4
Plant 7 (F7), X		1.5	2.9	2.4
Plant 8 (F8), X	yes	1.4	3.2	3.3
Plant 9 (F9), X		1.0	0.0	3.8
Plant 10 (F10), X		0.0	5.6	
Plant 11 (F11), XI	yes (E2)	21.5	24.4	17.7
Plant 12 (F12), XI	yes (E4)	14.6	13.4	85.7
Plant 13 (F13), XI	yes (E1)	13.7	7.1	11.4
(I) 13 plants with fresh-chilled production (total tons)		16,386.3	14,400	
% share of major 5 plants		73.9	69.1	
% share of major 10 plants		97.6	95.0	
(II) Total Plants (X, XI and XII regs.) (tons)		18,253	16,586	

* : % of tons processed with respect to sub-total (I)

** : % of tons processed by each plant corresponding to austral hake processing

col (1): V.I. means plant vertically integrated (with exporting firm Ei)

(~Ei): plant without V.I. equity rights, but under nearly exclusive supply agreement with exporter Ei

Source: Author's data based on information supplied by *Subpesca* (2002).

Note: the austral hake processing plants of Region XII produce mainly frozen products.

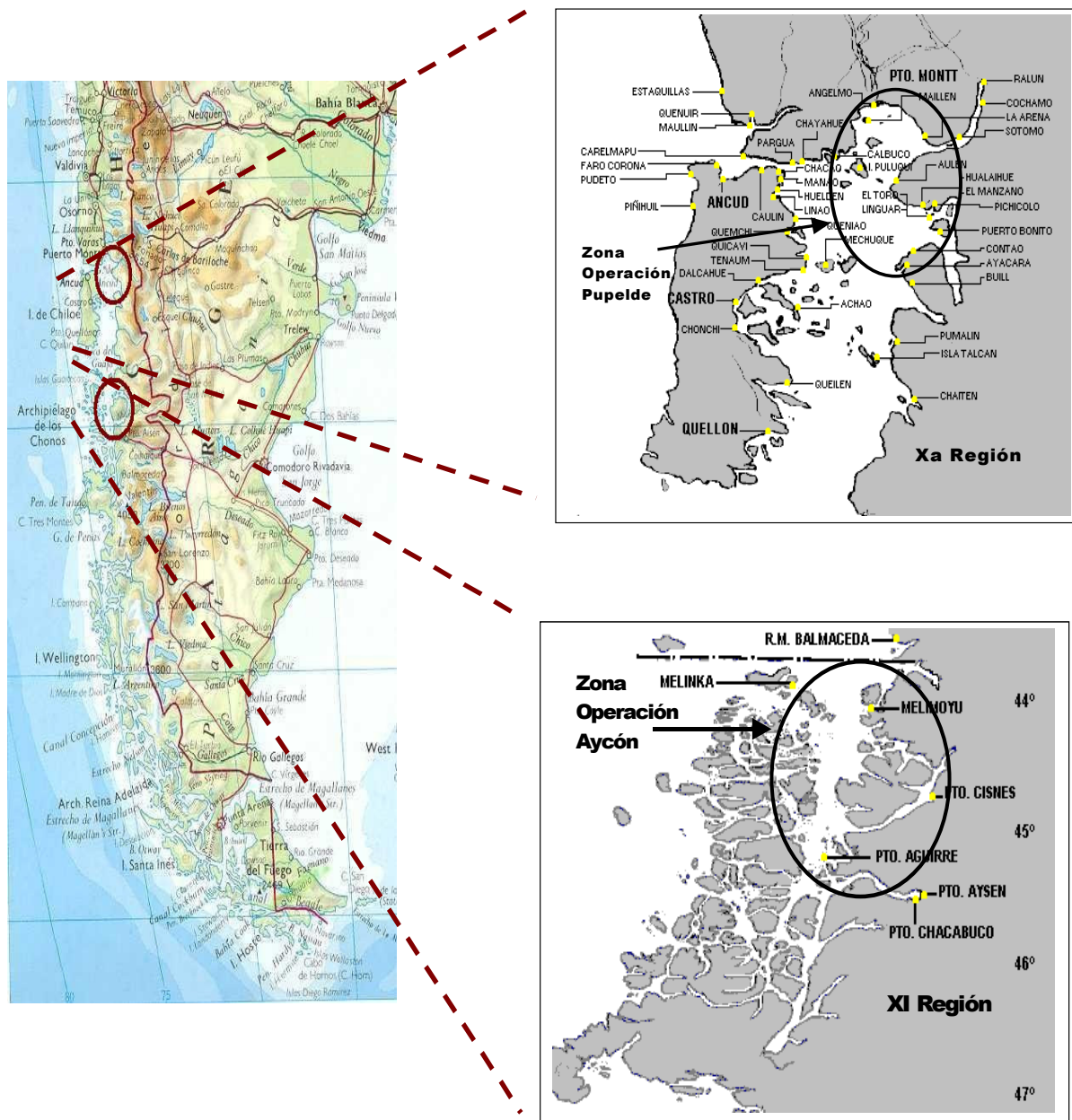
Table 3: Major Exporters Market Share (1997-2004)
(based on fresh-chilled austral hake export values)

Exporters	Market Share (%)							
	1997	1998	1999	2000	2001	2002	2003	2004*
Exporter 1 (E1)	5.8	8.6	38.0	40.3	10.2	12.2	10.7	12.6
Exporter 2 (E2)	7.6	8.7	20.4	8.6	7.1	8.9	11.2	16.8
Exporter 3 (E3)	14.9	11.7	0	0	0	0	0	0
Exporter 4 (E4)	14.4	8.0	4.1	6.6	12.3	15.1	21.2	13.8
Exporter 5 (E5)	25.6	20.8	0	0	0	0	0	0
Exporter 6 (E6)	0	11.7	10.5	14.2	22.8	15.3	13.8	14.4
Exporter 7 (E7)	0	0	13.9	12.4	15.8	11.3	10.5	10.1
Exporter 8 (E8)	0	0	0	0	5.8	7.3	0	0
Exporter 9 (E9)	0	0	0	0	0	8.7	12.9	9.1
Exporter 10 (E10)	0	0	0	0	5.0	4.4	5.9	5.9
Share of remaining firms	31.7	30.5	13.1	17.9	21.0	16.8	13.8	17.3
Total number of exporters	52	48	47	42	43	37	35	26
Share of major 5 firms	68.2	61.5	86.9	82.1	68.2	62.6	69.8	67.7
Share of major 10 firms	87.6	90.1	96.7	97.3	89.0	85.7	93	94.5
Total Export Value (USD millions)	17.16	17.67	24.68	19.32	16.26	22.61	27.49	19.57

*: up to September 2004

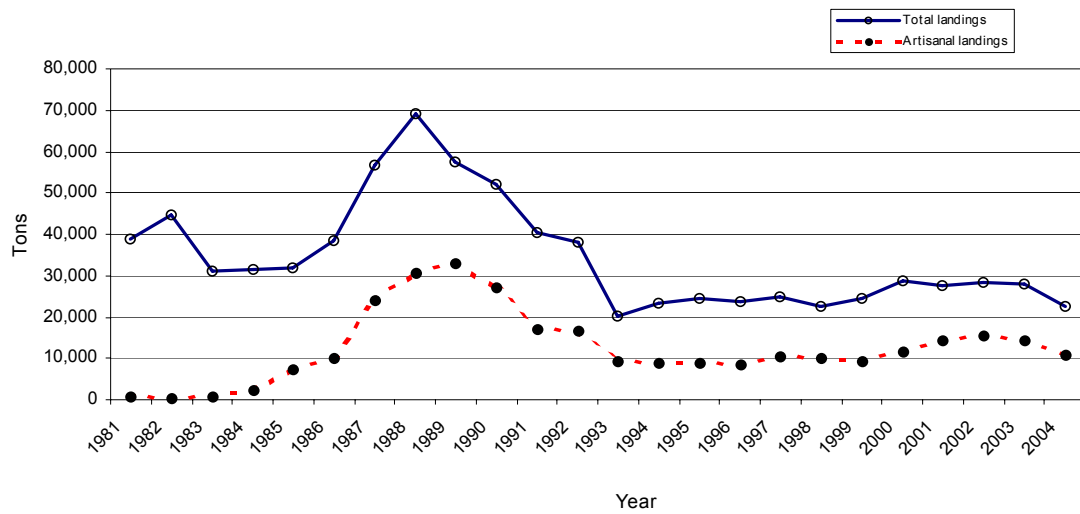
Source: Author's data based on information supplied by IFOP and ProChile.

Figure 1: Artisanal Hake Artisanal Fisheries (regions X and XI)



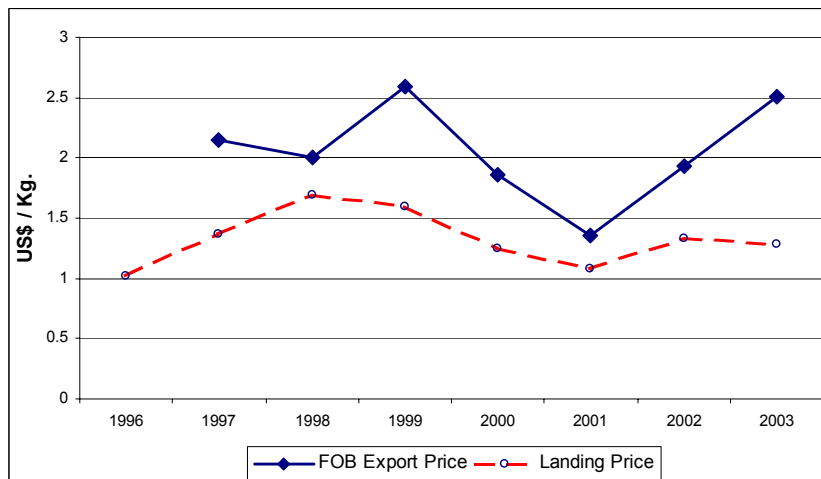
Source: Subpesca (2004; Ficha Técnica # 5)

Figure 2: Austral Hake Total Annual Landing
(industrial and artisanal fleets)



Source: Author's processing based on information supplied by Subsecretaría de Pesca (*Subpesca*) and Servicio Nacional de Pesca (*Sernapesca*).³³

Figure 3. Export (Fob) Price ^{i/} and Landing Price ^{ii/}(US\$/kg.)



Notes:

i/: Yearly average price of different fresh-chilled product formats.

ii/: Annual average for Regions X and XI. The *Landing Price* is a proxy of first transacting prices at landing. Sernapesca annually calculates this value per species, taking the sampled prices on shore at different unloading ports of the country. (Sources for Landing Prices: 1996-97, Sernapesca 2001; 1998-2000, from surveys performed by Sernapesca; 2001-2003, data gathered by consulting firms in charge of the RFTP).

iii/: Export and landing prices cannot be directly compared. The former refer to processed products, the latter to the non-processed fish. For example, for the fresh-chilled *eviscerated whole head on (H-ON)* product format, the average technological conversion coefficient is estimated at around 97%; for the *eviscerated without head (HG)* format, it is estimated at around 85%.

Source: Author's calculations based on information supplied by Subpesca and Sernapesca

Notes

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¹ From the point of view of Government administration, Chile is divided into thirteen regions. Of these, regions X, XI and XII are the southernmost regions.

² This type of contractual solution has been particularly analysed in rural transactions involving various agricultural products. For example, Little and Watts (1994) offer an interesting series of case studies related to the use of this type of contracts in different agribusiness industries in Sub Sahara, Africa.

³ For example, Chilean abalone, sea urchins and soft clams (*macha*). Chilean fishery legislation allows for the establishment of areas especially reserved for the use of artisanal fishing communities. These areas are known as “Areas for Management and Exploitation of Benthonic Resources” (AMEBR). In order to be granted an AMEBR, a fishing community must firstly constitute a legal organization (e.g. a fishermen’s union or cooperative) and then submit to the regulatory authority a management and exploitation project proposal.

⁴ For example, see Platteau and Nugent 1992 (pp. 396-97) for further references.

⁵ Act 19,849 (December, 2002) established allocation for 10 years of the annual global quota, assigned for different fish species, between the large-scale and the small-scale sectors. Since that date, different fish species have been regulated under an individual catch quota system, though this system applies only for the industrial fleets operating in each fishery (Peña-Torres, 2002)

⁶ This is the name given to demersal fisheries (different hake species and golden king clip) caught in the austral waters of Chile’s EEZ by both large and small-scale fleets in Regions X, XI, and XII.

⁷ In 2003, Chile exported a total US\$1.011m fishing products. Some additional US\$200m, of the national production, was destined to domestic consumption. Of the total volume national catch during 2003, artisanal fishing represented around 22%.

⁸ For example, in the late 1990s it was estimated that the number of small-scale fishermen operating regularly in this fishery, but not formally registered by the regulatory authority, represented around 40% over the total number of acting fishermen.

⁹ Mercamadrid is one of the largest provider markets currently operating in Europe, with a large section destined to selling fish. This is one of the main market places the Chilean austral hake reaches.

¹⁰ The starting of this programme occurred when the sectorial authority's political margin to use other regulatory instruments was very narrow. The RFTP has been defined by law with the basic purpose of assessing fishing resources availability. Nonetheless, by using this Programme the regulator is enabled to fix global catch quotas to the artisanal sector.

¹¹ The selection of consulting firms is jointly made by the representatives of the different fishermen groups and the sectorial regulatory authority. Up to date there has been no public price bidding to decide on the appointment of fishery management services according to fishing areas. At present there are five consultants operating with the RFTP system, depending on the fishing areas involved.

¹² This value represents about 25%-30% of the per-capita monthly income that catch direct buyers can obtain in this fishery.

¹³ Every prospective buyer had to submit a sealed envelope containing the purchase price offered to the consultant in charge of the Research Fishing Trips Programme. The consultant then had to choose the highest price offered; to this buyer was assigned the whole fishing quota that consultant administered. Currently, the catch volumes that the different companies buy are the result of private negotiations between buyers and fishermen; the per-unit price, a sole value holding for the total fishing quota managed by a given research fishing trips programme, is decided on in a meeting where the fishermen's representatives and the buyers' representatives negotiate as bilateral blocks.

¹⁴ A relevant factor that helped to achieve fluent communication has been that the owner of the consulting firm in charge of management and control over the quotas in this region had formerly been an artisanal fisherman himself.

¹⁵ The species with the highest landing price that year corresponded to the Chilean sea bass, with a first transacting price of about 5.9 USD/kg.. Other species exhibiting high landing price are: swordfish (4.7 USD/kg.), king crab (3.9 USD/kg.), orange roughy (3 USD/kg.), flounder (2.3 USD/kg.) and squid (1.6 USD/kg.). (Source: Sernapesca)

¹⁶ The rest corresponds to income from other fisheries as well as odd jobs other than fishing (e.g. fixing boats and jobs related to agricultural and wood-logging activities).

¹⁷ This information is based on interviews with different commercial agents who have worked in the fresh hake trade and also with personnel working at consulting companies which operate at the RFRP system.

¹⁸ It is the exporters who give ex-ante financial support to the direct buyers, who, in turn, transfer this liquidity in the form of working capital to the fishermen themselves. At the beginning of this funding chain, a significant proportion of the liquidity flows is funded by the fresh hake importers of Spain.

¹⁹ The exclusive supply agreement is usually tied, as is the case with the fishery here analysed, to a unique average buyer price for all units of the product supplied (Kenney and Klein, 1983).

²⁰ The production of the other fresh-chilled processing plants does not represent a relevant percentage. Processing essentially means cutting, cleaning and packing the product to be fresh chilled as H-ON (head on), HGT (head and tail off), HG (head off), fillets and barbels.

²¹ The per-firm average fresh hake tons annually exported by the Chilean industry between 1997 and 2002 have been: 1997, 154 tons; 1999, 203 tons; 2001, 279 tons; 2002, 316 tons. In the years shown in Table 3, the remaining exporting firms present significantly lower export volumes.

²² This agent is also called “20 millions”, in allusion to the significant sums of money he has usually managed. In the early 1990s, with the profits generated by the hake business, he built a high-tech processing plant which was a surprising achievement at that time for Puerto Montt (capital city of the southern Region X).

²³ Another example of this dynamics is given by firm **E10**. The current owner was initially a successful catch buyer for hake exporters in the early 1990s. At present, **E10** is one of the major firms exporting over 500 tons annually.

²⁴ Trader **C** also possesses an important hake fishing fleet operating in Namibia.

²⁵ In those years, firm **E8** reached a position among the major exporting group (Table 3). In 2001, **E8** exported 619,2 tons fresh austral hake, after experimenting fast progress in this business (in 1998 and 1999, firm **E8** had exported 8,5 tons and 7,5 tons, respectively).

²⁶ Figure 3 shows that the gap between the average export price for Chilean fresh hake products and the corresponding annual average landing price, in Regions X and XI, was particularly reduced during 2001.

²⁷ This analysis quotes Greenpeace reports based on studies by *Instituto de Investigaciones Marinas del Centro Superior de Investigaciones Científicas (CSIC)* located in Vigo, Galicia.

²⁸ During the years 2002 and 2003, the Chilean austral hake price was around 40% that of the hake from Bay of Biscay, in transactions reported by Mercamadrid.

²⁹ This public-sector agency is in charge of supporting commercial and productive development of small scale producers in Chile. The referred report had the aim of analysing the marketing channels of the Chilean fresh hake exported to Spain.

³⁰ Currently, the Chilean fresh hake production imported into Spain must pay around a 12% import tariff of its CIF declared product value.

³¹ We thank Sr. Manuel Ibarra, Chief of the Santiago office of the monitoring and enforcement public-sector agency Sernapesca, for providing us this information.

³² This kind of fraud might occur with both the fresh-chilled and the frozen hake exports. It has been suggested that fresh hake might be exported bearing the name of 'reineta' (*brama australis*) or salmon while the frozen austral hake might be classified as Chilean hake (*merluccius gayi*).

³³ *Subpesca* is the public sector agency in charge of defining all fishing regulations in Chile. *Sernapesca* is the public sector agency in charge of recording fishing activities, monitoring and enforcing prevailing fishing regulations.