Market Orientated Value Adding (MOVA) and Fisheries Management

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Abstract: This paper focus on motivation factors for market oriented value adding (MOVA) in the fishing industry of the limited fish resources. Analytical the paper interpreter the market orientation concept into the Structure- Conduct-Performance model from industrial economics. It shows that most established fisheries management systems as Olympic style, licenses and transferable quotas and licenses systems reduce the motivation for market oriented value adding and by this waste resource rent. An improved management model is introduced which make it possible to motivate market-orientation and cost-efficiency together with sustainability and fair social allocation. This model combines Seasonal Quota Auction (SQA) and administrative allocation (AA) through licenses and community or fisher group quota. In contrast to a pure ITQ model, this model offer a solution to motivate fishers to: (i) Increase resource rent without privatizing the fish resources on few private hands (ii) Ease seasonal quotas instead of purchasing permanent quotas as in ITQ. (iii) Improve rent generating from the most market oriented and efficient fishers by leasing quotas on credit. The auction mechanism makes it possible to collect the resource rent for use through fisher's co-operatives or regions, ITQ owners, government or redistributed as bonus to all fishers. This model is expected to impose increased social costs for the less competitive in each fisher group, generate both less resource rent and less social costs in the long run compared with free market solutions working without other constraints than maintaining biological TAC.

Key words: Market orientation, value adding, sustainable development, resource rent, fisheries management, institutional economics, fish auctions and fisheries marketing

1. Introduction

The resource rent in fisheries is the profit margin between market value and the costs related to catching, processing and sales of catch. Market values and the rent of fish catches vary significantly between groups of vessels. All fishermen can experience that the market values of landings are related to how well the catch mix and time of landing fit into the demand in the receiving market segments. Catch mix constitutes of fish species, fish size, product quality, degree of processing and fish by-product utilization (roe, liver etc). Maximizing of market values is therefor according to standard marketing theory dependent of the fish business' basic ability to strategic managing the catch mix and timing of sales towards the relative best market segments. Market values can further be improved by marketing activities in market information and customer relationships building which strengthen the transactions between seller and buyers.

Generally, the marketing management literature gives strong empirical evidence that both market oriented management and market orientation in general have significant positive effects on market performance, which is positive related to financial and business performance (Becker and Homburg 1999; Deshpandé, Farley and Webster, 1993; Jaworski and Kohli, 1993; Narver and Slater, 1990; Ruekert, 1992). Market orientation is conceptualized as the "organizationwide generation, dissemination, and responsiveness to market intelligence" (Kohli and Jaworski 1990), and as "an organizational culture (…) that most effectively and efficiently creates the necessary behavior for the creation of superior value for buyers"(Naver and Slater 1990). Capturing the added values in the market through differentiation and market orientation is all about long term business learning (Narver, Slater and Tietje 1998). The need for organizational learning is a barrier for change because it takes time, energy and is costly (Rogers 1983). So what motivates business and their employers to invest time and money in long term market oriented activities? More specific: how can motivation be influenced for maximizing market values through long term market orientation in fishing business?

This question will be discussed in using an analytical perspective from industrial organization and the Structure-Conduct-Performance (SPC) model (Scherer 1980, Porter 1981a).

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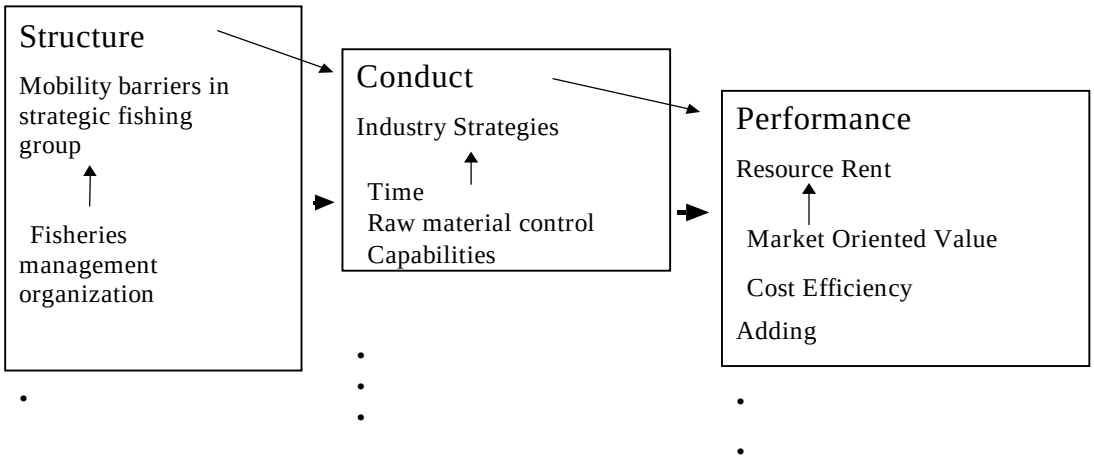

Figure 1. Analytical perspective. Figure 2: Season length Olympic Fisheries after Alaskan pollock 1993-1998.

US Offshore fleet in the Bering Sea.

Performance refers to resource rent related to market orientated value adding and cost efficiency. Conduct refers to the fish industry strategies where objectives, time slack, raw material control and business capabilities (resources as expertise, capital, equipment and vertical control) are main constraints. Structure refers to mobility (enter and exit) barriers in the strategic fishing groups (Barney 1996). Fisheries management controls the main raw material source in the seafood value chain and is a main constraint for operating fishing firms and for resource rent generation (Trondsen and Johnston 1999). The main tasks for fisheries management have developed from satisfying objectives as maintaining sustainable fish stocks, to allocating fishing rights to preferred fisher groups and lately to improve profitability through cost efficiency. Maximizing market value of the total catch has so far been less focused.

Market value and resource rent

The main focus in academic research and fisheries politics have been on the catching cost side of the resource rent equation. Little attention has been focused of variation in market oriented value adding.

This asymmetric focus is understandable due to the ability individual companies in the short-run have to maximize profits by overexploitation the fish stocks, i.e., harvesting more than a sustainable long-term biological reproduction. Such profit maximizing can in business terms be characterized as making profit by using the production machinery as raw material (here the fish stock) rather than relying of maximizing the long term market value of the annual biological production. This potential high short-run profit in open fisheries has given strong incentives for individual entrepreneurs to increase their harvest capacity and catch, even though total catch exceeds the long term sustainable catch level (MSY), a process described as the tragedy of the common (Gordon 1954 and Hardin 1968).

Fishery economists have proposed different cost oriented solutions to the resource rent depletion. Most solutions prescribe limitation of fishing entry, regulation of the effort, or allocation of individual quotas (Clark and Munro 1975, Scott and Neher, 1981). Other economists argue for governmental auction of limited number of licenses among the interested participants (Butlin 1982; De Voretz, Schwindt 1985). Stronger national control over the allocation is also advocated. (Neher et al., 1988). Most recently, significant support has been given to the idea of privatization of the common resource using individual transferable quotas (ITQ) and licenses (ITL) (Clark et al. 1988, Hanneson 1990 Helgason 1991, Kennedy 1991, Boyd and Dewees 1991, Grafton 1995). However, academic economists seldom take into account the political constraints and the social costs of the solutions (Copes 1986, Copes 1986b, Mc Kay and Creed 1990, Lipnowski 1991, Aquilera F. 1991). Fisheries managers experience these realities when they receive contradicting and heterogeneous demands from specialized advisers and interest groups like biologists, environmentalists, economists, fisher groups and local fishing communities (Davits 1991, Sissenwine and Mace 1992, Egthorson 1996, Charles 1998a).

Fish Industry Strategies and Fisheries Management

The literature of how fisheries management influences the variation in market oriented value adding is almost non-existing.

The market orientation literature acknowledges that the levels of existing capabilities may limit the companies' ability to be market oriented (e.g. Narver and Slater 1990). The seafood business' ability to satisfy

market wants is dependent of the access to the rawfish catch in term of the right quantity, quality and time (Trondsen & Johnston 1999). Fish prices are very elastic and vary a lot over the year dependent of the supply pressure in the available value chains (Trondsen 1994, Trondsen 1997). Supply management of fish products in demand is therefor a key factor for maximizing market values, rather than "Catch driven sales". Still, the nature has a significant influence for the supply pressure from fish catch. Fishers traditionally want to catch when the fish is available and when the catching costs are lowest. The fishing companies access to the fish are however, controlled by the governments. If such natural resource policy are solely based on conservation, it is expected to limit the ability for the fishing industry to be market oriented and may lead to market structures that stifle market orientation for these industries (Trondsen & Johnston 1999)

The relationship between marked value and fisheries management will in this paper be discussed in light of the experience from different management systems practiced under different political settings.

Data sources are literature and the authors' fisheries experience. The purpose of the study is to generate hypotheses for further discussion and testing.

2. Market orientation and fisheries management systems

In the following, we will analyze how the fisheries management systems Olympic style, licenses and transferable quotas and licenses influence the motivation for market orientation and by this the resource rent generation.

(1) Olympic style

Olympic style catch management gives the participants (with or without licenses) the right to catch until a total fish quota is taken. This is practiced in such disparate fisheries as the pollock fishery in the North Pacific, the offshore Japanese tuna fishery, and part of the Norwegian coastal fishery. The total quota (TAC) or shares of TAC are allocated to all qualified individual applicants among a chosen target-fishing group. Examples of such target groups are vessels that sell their catch in specific regions as in North Norway, offshore factory trawlers and onshore catches in the US's Alaska pollock fisheries, or coastal vessels and fresh fish trawlers in the Norwegian seithe fisheries.

Olympic style management without entry limitation, controls the total catch, but encourages also competition about quota shares between the participants. The competition pattern tends to focus on quickly catching. When the total quota is less than the catch capacity, the most efficient vessels that obtain the highest catch-share of the total quota will gather the best margins. The total yearly time for harvesting such quota tends to be shorter and shorter due to entry of new participants and increased individual efficiency. This has for example, been the case of the US Pacific pollock fisheries where the fishery is carried out only a couple of months every year.

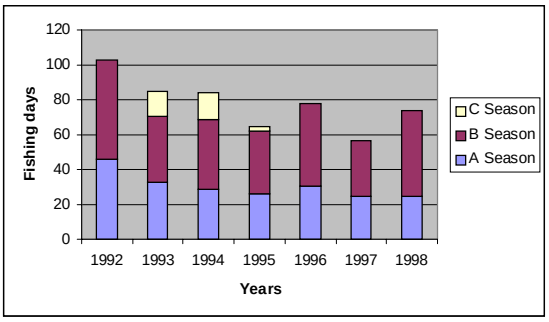

Figure 2: Season length Olympic Fisheries after Alaskan pollock 1993-1998. US Offshore fleet in the Bering Sea.

This was also the case for the halibut fishery in Canada and in the US (Casey, Dewees, Turris and Wilen 1995). The US halibut fishery lasted only about 24 hours when it was carried out as an Olympic system (Sjøholt 1997).

In order to maximize the quota share under the Olympic management system, the participants are motivated to invest in capacity increasing equipment, rather than in market value adding activities. The chosen fish processing lines are those which generate the best daily total margins, even if other processing lines would have given higher margins per ton if time hasn't been a limiting factor. For example, the pollock factory trawlers tend under an Olympic system to process more surimi than fillets even if the margin per ton fillet is higher than per ton surimi due to more quantity raw fish can be turned into surimi than fillets per day. A comparison of Alaska pollock offshore onboard processing between the Japanese factory vessels (until the 1980's) and US factory vessels (1980's and 90's), shows this different behavior. The Japanese had enough quotas for most of the year and could focus on products- and markets, while the US factory trawlers under an Olympic style management system have improved the efficiency when it comes to daily output from the same size of vessels,. The US trawlers had to compete about a limited total quota in a short time of the year and had to focus on daily processing efficiency to maximize their share of the total quota (Arnarson and Trondsen 1989).

Profitable market oriented value adding meets significant barriers under an Olympic management system where vessels operate few months under fierce time constraints. Processing for the higher valued fresh fish markets requires for example a more continuous rawfish supply and time limits on the fishing trips to secure fish quality. It is also much more time consuming to increase processing of value added products (as

fillets/steaks etc) or increase the utilization of the by-products from fish (roe, liver, head, enzymes, amino acids, fish meal to human consumption, Omega-3 oil etc.). It means that even if it is possible to increase the market value of the catch through value adding production, the time constraint under the Olympic quota system will hinder such value adding.

The conclusion is that Olympic style fisheries management without entry restriction will waste resource rent both on the income and the cost side even if it is successful in securing a sustainable fish stock. The utilization of possible market values from a limited total quota will be reduced if the time constraint reduces the industry's motivation to be market orientated. The over capacity cost may be reduced with entry restriction, but does no difference for motivating market orientation. Thus, a new generalization of this proposition is:

GENERAL PROPOSITION 1. Olympic style fisheries management without entry restrictions into strategic fishing groups diminishes the available time for market oriented value adding and reduce the possible resource rent.

(2) License management

Introducing licenses[3] for entry into specific fisheries is another method to regulate the total catch capacity through limitation of the number of participants in a fishery. When quotas are allocated to license owners, license allocation indirectly becomes an allocation of future harvest and resource rent between the participants.

If the license system reduces entry of new vessels and stimulating exit of existing vessels, the resource rent increases, according to economic theory, by reducing catching costs until the number of vessels has an optimum catch capacity for the total available quotas.

Norway is an example where the fishing effort has been regulated through a combination of total quota (TAC) and entry/exit license regulations. Fishing vessels may, for example, have both a general license to a specific fishery (e.g. the groundfish or herring fishery) and an individual quota of specific species as cod haddock, herring, mackerel, etc. A specific license required in fisheries representing for example more than half of all Norwegian catch in value in the late 1980's. 90% of the herring sector (catch of herring, mackerel, capelin and blue whiting) and 35% of the groundfish sector were covered by licenses (Angel and Trondsen 1992). After individual quota limitation was introduced in 1990 on smaller coastal vessels with conventional gears (net, long line etc), the coastal sector is gradually closing for new entrants. Today, licenses and/or individual quotas manage almost all values from Norwegian fishing industry (Holm et all 1998).

Introduction of licenses, when the capacity already is too high may hinder new entry, but may in fact also hinder reduction or even increase capacity in many fishing seasons stimulated by the attraction of the license's potential market value.

The fishers' income are mostly related to the vessels' part of the resource rent, which varies from species to species due to substantial fluctuations in catch and commodity prices. For example, the resource rent some years can be high in herring and low in prawns and cod. Other years, the situations are the opposite.

Fishers learn fast that to secure a high income level under changing price and catch variations in different seasons and fisheries, they have to secure all necessary rights (licenses) to have the option to choose the most profitable combination of seasons each year. When the licenses first was introduced, the Norwegian Government required that vessels had a record of catch activity in the fishery they required license. Similar method was used in both in the US Alaska pollock and Icelandic cod fisheries when licenses were introduced. To keep the license over time the Norwegian government also requires documented catch activity.

When records for catch participating in each seasonal fishery is a condition to maintain license rights, the fishers are motivated to keep a fleet consisting of all-round vessels. These vessels must, in many short seasonal fisheries, catch as much as possible under Olympic time constraints and as fast as possible under individual quota constraints. The time to take care of and process the catch will in both cases be reduced. Market oriented activities as quality management, value-adding packing, sorting, processing and just in time delivery would suffer.

The size of the quota has also in the Norwegian case been a function of the vessel size. This means that if the fisher increases the size of the vessel, their present and future quota may increase while they may lose quota shares if they reduce the size of the vessel. When quota is a main asset in the fisheries, fish boat owners are motivated to built or purchase second hand vessels according to license and quota rules more than accordingly to what has been economic wise regarding handling and processing onboard for maximizing the market value of the catch.

This means that under such license qualifying activity and technical license constraints, the fishing effort is expected to increase without increasing the catch value while the market value adding activities decrease. A generalization of this proposition is:

GENERAL PROPOSITION II. License systems which require catch records and size constraints motivates the industry to a behavior that may reduce the resource rent by increasing the catching costs without adding catch value and reduces the available time for market oriented value adding.

[3] Licenses can be non-transferable or transferable between vessels

(3) Individual transferable quotas (ITQ) and licenses (ITL)

Most economists consider ITQ as the most economically efficient system in fisheries management. This system is also practiced among others in Iceland, in New Zealand and in the US (halibut and sablefish fisheries). The experience with the system shows that it basically works according to theory when it comes to cost efficiency. The capacity cost used in the fisheries adapts to the income from the available individual transferable quota (ITQ). The most efficient and financially strong entrepreneurs and vessel owners buy the quota from the less efficient quota owners (Arnason 1991, Lindner et al. 1992). Iceland for example, has no specific size or gear regulation on vessels used in catching the quota besides that parts that is allocated to coastal vessels. The fleet structure has, therefor, adapted to a vessel size and catching technology that the fishers perceive as most efficient for his/her business without interference from the government. Ownership constraints may reduce this effect. Matthisasson (1997) has shown that local government ownership and employment interests in Iceland in the fresh fish trawlers fleet has hindered the capacity reduction favored by fisheries managers.

In Iceland all quota transactions are handled by the Icelandic Directorate of Fisheries to assure that the quota transaction happen to a real fish market price between anonymous partners. Earlier quotas were traded between business partners and priced accordingly to broader business interests, which tended to increase the quota price far beyond its fish market value[4].

Norway has a system with transferable licenses connected to vessel transactions controlled by the Government. Each licensed vessel has the right to catch a share of a total quota either through competition in Olympic regulated fisheries or as an governmental allocated individual share of a TAC. The Norwegian government had programs during the 1990s to reduce the capacity and effort through decommissioning schemes, support to sell the vessels abroad, support to establish international fishing and offer of increased quota when two or more licenses were used to one vessel.

The three first programs failed because the compensation was too low compared with the loss of permanent license rights. Most vessel owners gave priority to maintain future fishing rights instead of selling the license back to the government.

When the Government introduced quota incentives for adding more than one license to each vessel, the market started to work. The prices of vessels with licenses and quota rights went up to a very profitable price level which motivated the owners to sell vessels together with the license to another vessel owner that wanted to catch more on his/her present vessel. Through this process, especially in the Norwegian pelagic sector, capacity and the total catching costs have been substantially reduced. Norway did in practice introduce a transferable license system (ITL) controlled by the Government. This is indirectly a transferable quota system because quotas are allocated to licensed vessels. The Government denies it. They claim that there are no automatic license transfer between buyer and seller of vessels. Government has to issue the license, which follows the exchange of a vessel title. But, when such a transaction is very seldom denied, and there is always more than one buyer for licensed vessels, the seller can always choose among those who are approved by the Government. Therefore, both the value of the vessel plus the value of the license and related future quota rights are reflected in the traded vessel price (Flaaten, Heen and Salvanes 1995). The Norwegian experience shows that such transferable license system related to a market price is an effective system to adjust capacity in the fleet. The license becomes a valued equity asset. The fishers with a valuable license are protected from competitive pressure of the limited quota from entering competitors (Barney 1996). This means that they have secured their equity asset by performing their traditional catch and production oriented behavior. Only fishers with historical records in the industry get a license in the Norwegian case. The core capabilities in the industry are then limited to the traditional fishing knowledge, ideas and behavior. Introduction of new market oriented ideas and initiatives are often related to the entry of new motivated entrepreneurs with alternative core competencies (Porter 1990). Without available new licenses for more market-oriented entrepreneurs, the license system may hinder marked oriented value adding in the industry as a whole.

However, those in the ITQ and in the ITL system, who received the quota right for free (based on historical records) when the systems were established, receive all the resource rent when they sell the quota to the first buyer (Eythorsson 1996). This rents as a windfall profits are then capitalized through high mark-ups on vessels or quota sales. Quota or license values fluctuate due to changes in catch quantities and fish prices. Such fluctuations open up for profitable short-term asset play in the fishing business. It is expected that business'

[4] In Iceland it has been common practice that the quota owning companies exchange quotas between each other in barter trades. But, both partners are interested in pricing their quota units as high as possible in order to show high asset values in their books. Quota assets have also been subject for deprecations. High quota prices have therefore been an efficient way to get rid of high taxable income and quota prices increased far behind any economic reasonable level. It is anticipated that the quota prices will come down to a reasonable level when the companies are forced to do the quota transaction with anonymous buyers paid by money.

objective and motivation is profit satisfaction rather than profit maximizing (Simon 1958). Business practices change slowly constrained by their capabilities and motivation. Industry leaders typical search for solutions on business problems in the neighborhood of established business practices where the marginal profit satisfaction may be reached with lowest resource effort (Cyert & March 1963). The possibility for resource rent capitalization in the form of windfall profit is therefore expected to reduce the motivation for investment in more long-term value adding which require changes the fish business' market-oriented practice. The reduced motivation for increased market oriented value adding is a disadvantage effect of both the ITL and ITQ systems under strict TAC regulation. Both systems can secure a high resource rent through harvesting regardless of the contribution from market-oriented value adding

It is a lot of evidence that new business orientation in general comes from entering new ventures and entrepreneurs driven by external knowledge, ideas and social forces (Drucker 1986, Porter 1990, Trondsen 1985).

The openness for new entrepreneurs is an advantage for the open transferable license or quota systems. When the resource rent is fully capitalized trough traditional products, capital-controlling entrepreneurs may still purchase or rent quota and licenses and introduce market-oriented ideas (Barney 1986). However, the price to enter becomes much higher compared with the fishers that initially got the fishing right for free. The capital need becomes a new entry barrier and favors companies that control or have access to enough capital and exclude those entrepreneurs who don't. Market oriented value adding in the long term is however, motivated and improved by low barriers for entering entrepreneurs (Drucker 1986, Porter 1990, Trondsen 1985). Barriers in the form of non-transferable licenses or high-capitalized licenses and quotas hinder such entering entrepreneurial pressure in the fishing industry.

These evidences confirm that the outcomes of introducing exit mechanism through transferable quotas and licenses reduce the capacity costs per catch unit and increase the resource rent. However, the assets accumulated on private hands increase the monopoly power and economic satisfaction among the present participants without being marked oriented. This reduces the motivation for more market-oriented value adding if also licenses demanding historic participating records and high capital need restrict the entry of new entrepreneurs. Thus, a generalization of this proposition expressed in two parts:

GENERAL PROPOSITION III:

The motivation for market oriented value adding is reduced in fisheries which require licenses that

(i) Require historical catch records and increasing capital from the participants.

(ii) Increase entry barriers for new fishers

(iii) Increase quota-shares and profit satisfaction to the existent participants without market oriented value adding.

3. Market orientation through fish auctions.

Fish auctions have a great potential to allocate and exchange values where the demand and supply are very diversified (Kearny 1997). Fish auctions have been utilized as the main instrument to exchange landed fresh fish between fishers and firsthand buyers in most European countries. The experiences from these auctions shows that the fishers gain higher prices compared with all other exchange systems if the catch attributes and/or purchase preferences are heterogeneous (Arnarson and Trondsen 1998). Auctions that offer catch from many vessels, gives heterogeneous buyers the opportunity to purchase their preferred part of the landings (for example one species of a specific size and quality) from several catching vessels. The buyers then have the opportunity to specialize on products and markets. Such strategic specialized expertise may improve the market-oriented margin (Porter 1985). An alternative to auction is contracts (short or long run) directly between individual vessels and the first hand buyer as it is practiced in the Norwegian cod fishery. Buyers under such contracts are obliged to purchase the entire catch containing a broad range of heterogeneous product attributes. The product attributes in the catch that do not fit the purchasers specialization profile will in such cases meet less demand compared with the product attributes do. Such contracts between sellers of catch containing heterogeneous product attributes and specialized buyers, reduce the possibility for product specialization and market oriented value adding in this transaction compared with exchange trough auctions where heterogeneous buyers are present. This hypothesis is confirmed by findings from Icelandic fish auctions, which indicate that the average prices paid by catches under contracts are significant lower priced than fish traded through auctions (Arnarson and Trondsen 1998). It is also a trend in Iceland that buyers who control catchers under long term contracts, sell part of the catch in the auction that do not fit their own specialized production. It means that the first hand buyer collect the margin, the fishers otherwise would collect if they sold directly over the auction (ibid).

Fish auctions are so far not utilized to exchange fish quotas, because the owners (governments) allocate quotas after non-monetary rules. Fish quotas have heterogeneous product attributes, which have different values (product prices and cost of catching), for different fishing groups. The values varies with quota-attributes as species, quantity, fish size, season, catching area, catch gear, days at sea, allowed by-catch, closed fishing area, spawning ground regulations etc.. The fishers will have different preferences and put different values of the quota attributes depending of his/her capability related to type

of vessel, fishing gear, home location, season combinations, catching, processing and marketing. If the quota's attributes are exchanged through auctions, the fisher's possible number of attribute choices may increase, which increase the possibility to bundle attributes that best fit to his/her preferences and the vessel's capabilities. Such increased choices may improve the opportunity window for specialization of catch, processing and market orientation. Without governmental constraints of what type of vessel the fishers are allowed to use, the fishers are motivated to adapt to the products, markets and catch and processing capacity that gives the satisfactory income/cost relationship.

Exchange of quotas on auctions will create a price, actually a resource rent, that fishers are willing to pay to the owner and still be able to run a profitable catching and processing operation for themselves. Competition about quotas among the fishers also gives an incentive to increase the purchasing power in term of operation margins between costs and market values. This will put a pressure and motivate all participants to improve the value-added process from the limited TAC, which in turn may increase the resource rent. The resource rent may through such auction sales be collected by the owner (Government) or by the fishing community itself.

Auction of quotas is not a new idea. Butler (1982) and De Vores & Schwindt (1985) argued that auctioning of licenses combined with free quota rights is in fact the same as auctioning of quotas. Morgan (1995) and Brubaker (1995) argued also for quota auctions as means to solve the problems of current practices in allocation by administrative decisions which has been a source of great discontent in the introduction of transferable quota management systems. The only known example of fish quota auction is for Geoduck in the US Washington State (Brubaker 1995). Practical experiences are gained in other industries such as the communication, airline, financial industries and, forest industries, mineral onshore and offshore industries, which faces the same allocation problems. Auctions evolved in other industries have lead to the achievement of a wide range of public policy objectives in an economically efficient manner (Brubaker 1995).

But, if the auction mechanism is utilized without constraints, the sum of social costs soon may be higher than what are politically accepted (Charles 1998b). A main disadvantages of free market solution is that relative monopoly control of capital, processing and distribution chains tends to be more important for the allocation of quotas than firm's ability to maximise of market oriented values from the limited TAC. Governments market role are as Adam Smith argued, to set rules, which hinder monopoly power and increase the competition to gain the advantages from the free market mechanism. Most governments have also social objectives for the allocation of fishing rights. The question is, therefore, to what degree the auction mechanism can be integrated into a broader allocation management decision model that satisfy both objectives of market orientation and social allocation in addition to the objective of economic efficiency. Thus, a generalisation of this proposition is:

GENERAL PROPOSITION IV*: Fish auctions maximise market values through motivating exchange of heterogeneous product attributes with heterogeneous buyers' preferences. The social costs may increase and market values may reduce if increased capital requirement and vertical control in the value chain restrict entering into the purchasing group.*

4. Seasonal quota auctions (SQA)

Auction of seasonal quotas offers a solution of the problem in proposition IV. Seasonal group quota units (SGQU) are the assets that can be traded through an auction. Such quota unit may be limited for a time period and constrained by catch attributes according to management objectives e.g. as illustrated in Table 1

Attributes	**Example of constraints**
Fish species	Cod
Period	Jan. 1-March 31
Quantity	800 tons
Fish sizes	>2 kg
By-catch	Maximum 100 tons haddock. 50 tons redfish
Catching area	N 65°- N70°, Outside 4 nautic miles.
Gear	Long line
Landings places	North Norway
License	Home address North Norway (2A)

Table 1: Example of seasonal quota unit (SGQU) with catches constraint attributes.

The values of the SGQUs that are reflected in the auction prices would increase the better the units are designed to meet the fisher's preferences. The concept of seasonal quota units may fit into the fishers planning horizon. High uncertainties characterise fisheries and do this industry to a high-risk business. The fishers' planning

horizon tends therefor to be short term. A seasonal SQA system will in the same way as ITQ system give the fishing enterprises the necessary motivation to be competitive inside this regulation framework. To be competitive bidders in the quota auction, the fishers must keep the margin between operational costs and sales income as high as possible. It will be in the fisher's own interest to minimize the economic over-capacity, adapt to changing business cycles in different fisheries, be market oriented and maximize the market value.

Three types of problems must be handled before the auction can work according to the objectives. (1) Avoid concentration of buying power (2) Allocation of quota to meet demand from different target groups and between seasons (3) Managing an efficient exchange process.

(1) Concentration of buying power.

A seasonal quota auction may also as in free traded ITQ systems, be an arena for powerful buyers who control capital and willing to pay a high quota price without making profit for a shorter period to get rid of competitors and reduce future competition. Such strategic behaviour may also as suggested in Proposition IV, reduce the possible maximising of market oriented value gain, especially in small auctions with limited number of bidders. If the fishers are given credit for the payment of the SGQU's until after the quota is actually caught and sold, such market behaviour might be minimised. Those who are not able to catch the purchased may pay only for the quota they have actually caught while the rest quota may go back to the auction for re-sale. To make sure that the actually catch match the available quota, the management has the option to shortening the catching period for the sold quota units, for example a month or even a week.

(2) Target groups and seasons.

If the fishery management has a policy of allocation quotas between seasons and target fishing groups, it will develop a contradictions to the fishers interests in purchasing a higher quota than needed too be sure that quota don't limit his catch. The most efficient vessels will take the total quota early in the quota year and the effects may be as in Proposition 1. To avoid this effect, an alternative is to follow the international practice to allocate the total yearly TAC into total seasonal target group quotas (SGQ). These SGQs may then be divided into SGQUs and sold through the auction.

For example, shares of the total allowable catch quota (TAC) in both in the US and in the EU are first allocated to regions, before shared and allocated to individual vessels. In the EU each country constitutes one TAC region. TAC for each EU country is further partly allocated to vessels through Producer Organizations –POs (Salz 1992, Hatcher 1997). In the US the quotas are allocated to regional fishery management councils which set the rules for distribution of quotas to individual vessels.

In other countries as Norway quotas are allocated to target vessel groups with similar catch and processing technology, e.g. coastal fleet, purse-seiners, fresh fish trawlers, factory trawlers etc. Sometimes are region and vessel groups combined in one target group.

Target Group/ Season	**Year/ SGQ**	January 1-March 31	April 1-August 31	September 1-December 31
Year/TSQ	**400'**	**150'**	**125'**	**125'**
Vessel <10 m North Norway	**140'**	50'	50'	40'
Long liners 10-30 m	**100'**	40'	30'	30'
Danish seine vessel 10-30 m	**20'**	10'	5'	5'
Trawlers	**140'**	50'	40'	50'

Table 2. Example of allocation of quotas (1000 tons) on season and vessel target groups

Regional constraints are also possible to include in SQAs. Target group may be geographical regions or groups of vessels, fishers or processor. For example, cod vessels with passive gears (long-line, net and jigging) north of 62°N in Northern Norway are managed as a separate target group for quota allocation and has received 69,3% of the Norwegian Norwegian-Arctic cod quota in 1999 (Fiskets Gang no 3 1999:6).

Dividing the total allowable catch quotas (TACs) into seasonal group quotas (SGQs) may satisfy the governments' allocation objectives.

Throughout the auction process, management will receive information of the target groups' willingness to pay for the SGQU's in the different seasons. This valuable market information from the auction may be a basis for future design of quota units and allocation decisions. Auction statistics will show the impact of the

TAC allocation schemes on market prices and the resource rent generation. Without such market information, the political allocation process will be based on information about the relative need for quotas among the different participants in the fishery estimated, which rely on the relative number of fishers, political influence, regional impact etc. Market considerations are seldom a part of the decision background in for example the Norwegian quota allocations. Lack of such market orientation in fisheries management tends to be a main barrier for value adding in the fishing industry (Trondsen 1997).

Allocating TAC shares for one year or longer as proposed by Morgan (1995) and Brubaker (1995), makes it difficult to integrate other measures together with the total quota. Such allocation of yearly TAC shares opens also up as in ordinary ITQ systems, for short term seasonal quota trading and redistribution of the resource rent directly between the fish companies outside the auction when fishing conditions change. This effect may be avoided if the quota units are related to fishing seasons and other biological constraints, which better fit into both the fisher's and manager's planning horizon and objectives.

Licensing is an established method to discriminate between individuals, and may be an efficient tool especially to secure other governmental objectives than capturing the resource rent.

To get rid of the technical inefficiency problem where licenses are connected to specific vessels (as in Norway), the license rights may be separated from the vessels and related to persons or enterprises (as in Iceland). A license is a right based on a legal contract between the user and the owner (all citizens) represented by the Government. The anticipated behavior of the license holder regarding limitation of quotas, by-catch, exchanges of quotas with other users etc., may be regulated in such contracts. The license system should not limit the number of licenses in each target group, to keep up a real bidding competition in the quota auction. Government may however, impose constraints on licenses, such as ownership of specific vessels, resident in specific areas, nationality etc.

All who satisfy a set of generic rules should be given a license, but to get a quota, the license holder must go to the auction and purchase quota in competition with other licensed fishers. License should therefore be a right to buy seasonal quota units in the auction not a right to get a quota allocated.

(3) The auction.

To be efficient, markets need as many competing and independent buyers and sellers as possible. In this case, Government is the only seller. Too create a real market situation, the role of the powerful seller of quota units should not be mixed with role as a political allocation institution influenced by interests groups. The selection of the two roles is secured by auctions of the same type as the European raw fish auctions between fishers as sellers and the first buyers (Kearny 1997). Transferred to quota exchange, this type of seasonal quota auction might be an independent institution with the pure purpose to manage the exchange process of SGQU's between buyers (licensed fishers) and the seller (Government's representative). By accepting only anonymous simultaneous bidding, the auction exchange process will also hinder collusion of bidders and tactical sequential bidding (Morgan 1995).

SGQUs may be auctioned separately where only licensed buyers belonging to the same group are allowed to bid.

The auction itself may in addition to managing the technical part of the auction also serve as an information database, which includes supplying various sales reports and other information, and statistics, which are available for any time period since implementation of the systems.

Experience from Iceland shows that fish auctions technically can be operated as a computerized system based on remote bidding that will increase the number of buyers and increase the efficiency of the market (Arnarson & Trondsen 1998).

Compared with established systems, there shouldn't be any significant increases in the management costs. Each auction can be run by few people and may be much more efficient than traditional quota allocations systems, which for example keep the Norwegian Directorate of Fisheries busy. When the system produces more resource rent, it becomes also a source to finance its own management and research costs.

Technically the auctions may be open for hundreds or thousands of fishers. The experience from Iceland shows that computer technology makes it very easy. Technically, it is possible for a fisher to sit in his/her boat and be connected to the auction. For those who do not have the necessary technical equipment, it is possible to arrange auctions in every landing place for fish along the coast. A great advantage for a quota auction is that the buyer does not have to see the product he is buying, as farmers do when they are buying live cattle, or when a fish buyer purchases iced fish on a land based fish auction. It means that the auction process can be done entirely by using computers and Internet. Quota auctions may also be combined with fresh fish auctions, where the fishers change role from buyer to seller and receive market signals forward in the value chain.

Based on learning curve theory, we also suggest that the market information gathered from the auction over time will improve the knowledge basis and the communication between regulators and their more business oriented clients.

Costs and benefits of a SQA

Governmental restrictions may as shown by Matthiasson (1997), reduce the theoretical economic gain

from an ITQ system without restrictions. The difference may be seen as a compensation for the social cost. The resource rent collected by the society through the auction may be a source for financing resource management, research and development of more value adding activities.

The market-orientated innovation may also be motivated and improved through lower entry barriers compared with the ITQ system. Without links between quota and vessels, all quota holding companies may buy and sell vessels without any significant interference from the Government. The vessel prices will adapt to an international price level and will only reflect the present value of the ship as a catching and processing machine and not the quota values. This will reduce the entry costs for young fishers and by this motivate entrepreneurship and innovation, which normally follow newcomers. Allocating of specific quotas too recruit new fishing entrepreneurs, as it is practiced in Norway, can also ease the entry costs for young fishers.

The purchasing price and the capital barrier for seasonal group quotas will be much lower compared with purchasing permanent quota shares in an ITQ system. Payment credit until after the fish is sold (as royalties-pay as you fish), will also favor entrepreneurs without much capital (Morgan 1995, Brubaker 1995). The system should also hinder such outcome as we have seen in Iceland, where freely traded ITQ tend to be concentrated in the hand of a few specialized quota owners. These quota barons, as they are called in Iceland, make profit by renting out the quotas further to the actual fishers (Eythorsson 1996, Arnarson and Trondsen 1998).

SQA's lower mobility barriers between different fisheries and seasons may also level out profit differences due to movement of vessels between fisheries. More flexibility in moving vessels between different fisheries will also reduce the political pressure for increased TAC driven by over-capacity. As pointed out, the advantages of an ITQ system are kept and most disadvantages removed.

GENERAL PROPOSITION V: *Auction of seasonal group quotas can*

(i) *Secure allocation objectives.*

(ii) *Motivate market-oriented value adding and cost efficiency in the value chain the lower required capital need and license barriers are for entering fishers.*

Resource rent collection

What about the collected resource rent? Does it go directly to the Treasury? This uncertainly is certainly a main factor to understand the lack of interest in collecting the resource rent from the fisheries. As Cunningham (1993) has observed, fisheries management essentially is a choice about how to spend the resource rent. However, it is also a relationship between resource rent generation and choice of fisheries management systems. Norway has a system where all governmental income belongs to the Treasury before it can be redistributed accordingly to the acting policy. This connection doesn't give the industry motivation to promote systems for resource rent collection. A better incentive would be to collect a resource rent in funds, which may be utilized in fisheries, coastal management, research and development to increase value adding in the resource based regions. Such regional funds based on resource rent from natural resources exist in oil (Alaska) and electricity (Norway) (Amundsen et al 1992). Development of co-management between fishing cooperatives and government as practiced in Japan is another possibility (Lim et al 1995). Such co-management is also practiced in Norway (Lofoten), in the US Pacific whiting fishery and is introduced in the Alaska pollock fisheries in 1999 by the American Fisheries Act S 1222. How the user group should be incorporated in the management process is a question of institutional design (Jentoft 1989, Jentoft & Mc Kay 1995).

One alternative is that the government allocates quota ownership to regions, fishing groups, or other entities. These entities may manage auctions as described above and collect the rental payments and redistribute the resource rent back to the participants as a bonus in the end of the year per ton catch or in collective development funds.

Competition about the resource rent is in itself a driving force in the development of the fishery management systems. It turns out that most countries develop management systems step by step. It is, therefor, interesting to note the political/legal process in Iceland, which in the late 1980's introduced a system of limited licenses and the ITQ system. This change developed a small group of private quota owners. In the fall of 1998 the Icelandic Supreme Court ruled that the system of limited licenses was unconstitutional. The Government had therefore to introduce a new license system, which was open for all, but kept the ITQ system for all fish stocks where TAC regulations were in force. It means that the Icelandic system in fact is developed to be a system with open access licenses and SQA, as proposed in this paper. The difference from the proposed SQA system is that the resource rent in the Icelandic system is collected by the private ITQ owners that auction/sell seasonal quotas to licensed vessel owners. It means that the resource generation effects should be the same if the private ITQ owners instead of governments organized share quota auctions as proposed in this paper. However, governments on behalf of all citizens are the owners of the fish resources and are looking for alternative management of fish resources without giving away the resources to few private companies.

5. Conclusion

In this paper it is analyzed how fisheries management systems motivates the industry's market orientated value adding, which together to cost efficiency constitutes the sources for the resource rent. We have found that both the Olympic system and the license systems give motivates for catch orientation rather than market orientation. Both systems will waste the potential resource rent by tying up too much capital costs in over-capacity and reducing the utilization of possible market values from the limited total quota due to the reduced time available for market orientation.

Introduction of licenses may reduce the catch costs in Olympic styles management, but may have the opposite effect if activity catch records are required to qualify and maintain license rights. The activity requirement may also limit the available time for market oriented value adding in the fishing companies.

Transferable license and quota systems are the only recognized systems which effectively create exit strategies in the industry where the participants themselves adapt the catch and processing costs to the possible income from the available quota. It means that the cost side of the resource rent may be maximized through the many individual judgements and decisions. These systems however, may increase the monetary and legal entry barriers for new entrants into the industry. Those who have the control over the quotas may generate monopoly profit without market oriented value adding. New entrepreneurs with new market oriented ideas may under such conditions be hindered to enter the industry and the industry structure may not fully gain the potential market oriented values.

We have found that fish auctions are an efficient mechanism to motivate maximizing of values between many buyers with heterogeneous preferences and a seller with products containing heterogeneous attributes. However, the presence of few powerful buyers with vertical control in the value chain, may increase the entry barriers and reduce the effect of the market orientation.

In this paper we have introduced the concept of seasonal quota auction (SQA). SQA combined with an open license system and quota allocation to target fisher groups, will lower the entry barrier for new entrants, stimulate marked orientation and cost efficiency. SQAs may also do it possible to collect resource rent for redistribution to the society or back to the fishing community.

This model differs from the ITQs in the sense that permanent quota ownership is not transferred, but fishers are offered a right to lease a natural resource on a temporary rental basis. SQA offer a management solution to improve market orientation and cost efficiency without first privatizing the fish resources on few private hands as in the ITQ system. The potential political attraction for such an idea is related to the degree to which coastal and fishing community can collect and take ownership in the resource rent through co-management.

SQA may also be complementary to an ITQ system, if private ITQ owners sell seasonal quotas to the fishers through auctions.

This seasonal fishing allocation model is similar with other leasing arrangement practiced in recreational fishing. Here, for example, the users could get rights to fish for some time a year in specific rivers or other areas, specific seasons or specific spots of the river, while the long-term rights still are held by the landowners. Sometimes we can also observe that such seasonal fishing rights are auctioned among users who are willing to pay the highest price. Leasing compared with ownership is not a new idea in economic theory. The ideas of seasonal quota auction in the commercial fisheries offered in this paper should further be analyzed in light of the experience from such recreational fishing and similar natural resources management scheme and in the light of economic leasing theory.

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