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RESOURCE RENT, TRANSFERABLE QUOTAS

AND

SUSTAINABLE REGIONAL DEVELOPEMENT

(The case of Norway)

by

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1. INTRODUCTION

Ever since H. Scott Gordons seminal article "The Economic Theory of a Common Property Resource : The Fishery" (1954), that founded "the science of fishery economics", the problems of fishery management has been tied to fleet overcapacity and the question of capacity control measures.

Gordons basic idea that in an open access fishery the fishing effort will increase to such an extent that stocks will be overfished, catch rates decrease and the resource rent disappear, has even been adopted by other social scientists as the main focus of fishery related studies.

"The tragedy for the commons" (Hardin, 1968) stands as a common denominator for a great part of the theoretical, as well as practical studies of the fishery sector over the past decades.

Gordons idea has in these studies been further developed and sophisticated both mathematically and with respect to practicability. The basic thesis of "tragedy" and "optimality" still remains.

When the new Law of the Sea came into effect in 1977, most costal states declared 200 mile economic zones. This, together with international cooperation on the management of straddling stocks gave basis for output control on most commercial species in the sence of TACs and TAC-shares.

In principle, the conditions of the free - competition solution of bio-economic models was therby altered. If, by output control through TACs the, stock can be held at MSY-level, then the biological tragedy of overfishing can be avoided.

In practice the correspondence between TAC and actual landings though can be weak in an overcapacity situation.

"Black markets", quota busting and "high-grading" are all features of an outputregulated fishery exploited by a overcapacity fleet.

To keep the landings on a MSY-level in such a situation is therefore at least very difficult.

Anyway the economic characteristics of the fishery will not change even if MSY-level is kept. The incentives to expand effort until the revenue reach the level of opportunity cost still remain.

The fact is that the overcapacity most probably will expand beyond the pure free competition solution, though at a higher level of aggregate income.

It is obvious then that output control has to be supplemented by some kind of input control to avoid the economic "tragedy" of the fishery.

Our concern in this article is to examine the range of possible input-control measures in a Norwegian - style economy and to evaluate each of these measures. This will be done with reference to different optimization options and to the case of Norway.

2. RESOURCE RENT, PRODUCERS SURPLUS AND THE OPTIMALIZATION PROBLEM

The resource rent of the fisheries is of the same nature as resource rent of other natural resources, exhaustible or renewable. The rent is a surplus - the difference between the price of the fish in a rawfish market and the unit cost of fishing.

The unit cost include the opportunity cost of labor, depreciation of the fishing vessel and gear and the cost of energy and materials used to convert a unit of "fish in the sea" to a unit of "fish in the market."

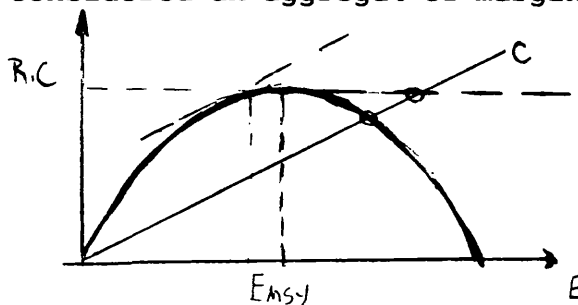
What is left after the remuneration of these factor inputs is the value of the natural resource itself: the per unit resource rent of the fishery.

Indeed it is so that the fishery still is more like a hunting game than harvesting. The fish is unevenly distributed over the sea, weather conditions play an important role as well as skills and the quality of the equipment used.

To get an idea of the magnitude of the aggregate resource rent of a fishery is therefore no simple matter.

The rent per unit as an average value is the difference between the price of the raw fish and the average costs of the inputs used. As a marginal value it is the difference between the price and the costs of the marginal fishing vessels.

Referring to the identification of the resource rent of the fishery in a traditional steady-state bio-economic model the rent has to be considered an aggregate of marginal rent per unit (diagram 1).



A specific calculation of the resource rent within such a diagram require an estimation of the slope of the total cost curve as well as a close examination of the harvest function.

Of different reasons this can be a rather complicated exercise, involving both biological and economic considerations.

The diagram has its advantages in demonstrating the nature of the resource rent and identifying the optimal and actual positions of stock - effort - combinations.

Indicating the magnitude of the resource rent should be left to the market. This can be done by estimating supply and demand curves of a free quota market, either by government auction of quotas or by some form of individual transferable quotas (ITQs).

In the first case (diagram 2) the supply will be totally elastic at a total supply corresponding to MSY or whatever level of exploitation which is decided.

In the second case each quotaholder make trade-offs between staying in the fishery or selling his quota, depending on the price level. This forms the supply curve, which in this case is less elastic (diagram 3).

Diagram 2

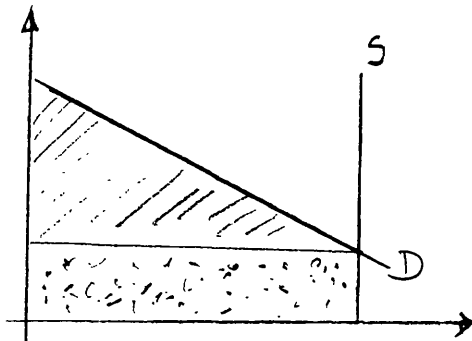
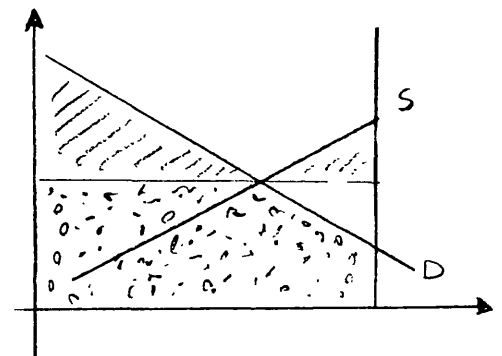


Diagram 3



This analysis introduces the concept of producers surplus in the

fishery. Formally it is likely to identify the dotted areas of the diagram as the resource rent and the hatched areas as consumers surplus. In this case however the consumers surplus will coincide with producers surplus, showing the expected aggregate net-profit of the quota-holders.

The substance of the producers surplus in the fishery is the aggregate difference between marginal opportunity costs which match revenue and the lower opportunity costs of intra-marginal fishing units. The existence of a producers surplus in the fishery is obvious. Even in depressed fisheries, where the resource rent is dissipated, there are always "high-liners" making good money. The nature of producers surplus in the fisheries should not be different from producers surplus in other sectors of the economy where net profit extending a normal revenue is due to market imperfections, adjustment problems and differences in skills or technology.

Ignoring the fact that the total rent of the fishery is made up of both the resource rent and producers surplus could lead to serious mistakes considering optimal utilization of fish stocks.

If management measures is aimed at maximization of the resource rent alone this can result in dissipation of the producers surplus, which could be equal or greater importance than the resource rent (Copes, 1972).

Optimalization of the net social benefits of the fisheries run into other problems as well.

Taking into account practical political objectives on income distribution between persons, between regions and between the present and later generations of fishermen, the optimalization problem has to be formulated as maximization of rent under constraints upon such distribution.

Theoretically these constraints can be "assumed away" referring

to the possibilities of redistribution when the total economic revenue to the society as a whole increase as a result of more efficient allocation of resources.

In practice the redistribution possibilities are limited. First, as we will discuss later, because the measures needed to move from an overcapacity situation to an "optimal" situation necessarily will privatize the rents yielded.

Secondly because the regional structure of Norway and most other fishery nations, does not allow for substantial development of non-fishery activities in the most fishery-dependent areas.

Thirdly, it should be mentioned a characteristic of the fishery that is peculiar. It is a fact that most fishermen do not respond "rational", in the economic sense of rationality, to the incentives which can be used to change the existing allocations. "The economic man" hardly exists in the fishery sector.

"Lifestyle preferences" and "highliner illusions" are two of the most obvious explanations of this behavioral syndrome. Being a fisherman, waiting for the big catch, is more important than pure economic benefits (Copes, 1987).

We can then conclude that in a Norwegian style economy, pure economic maximization of the resource rent of the fishery is not only undesirable but also impossible to attain.

The consequences for defining an optimum allocation of resources are grim, but in practice this does not mean that nothing useful can be done.

When it comes to policy the job of the economist, as well as other social scientists, is to find ways of improving matters, rather than to strive for the unattainable optimum position (George & Shorey, 1978).

Improving matters in the fishery sector means moving from an actual overcapacity situation and in the direction of optimal capacity or in the direction of less capacity utilization (Hannesson, 1992).

Implementing the first kind of movement will generate resource rent. The second will necessarily not do so, but increase the producers surplus.

3. METHODS OF CAPACITY REDUCTION

The sector-concept of fishing capacity consists of a sum of individual business decisions made by entrepreneurs: the fishermen.

It is initially important to put emphasis on this obvious reality because of the former mentioned tendency of adverse responses to economic incentives among fishermen.

In a Norwegian style economy with decentralized decision-making in the private sector, and where the fishery sector is part of the private sector, capacity reduction can only take place by changing these individual decisions. "Methods of capacity reduction" is thereby defined as incentives aimed at such changes. Neither the Parliament nor the Government can declare a reduction of fishing capacity. It has to come as a result of changed individual decisions.

So, what makes the individual fisherman change his his mind? To leave the fishery, to scrap his vessel, to limit his effort?

There are two classes of incentives that can be used. First, incentives that makes the fisherman worse off in his existing position (and thereby the alternatives more attractive). Second, incentives that make him better off in alternative positions (and thereby the existing position less attractive).

The first class of policy measures can be named push-models, the second pull-models.

Push-models

Taxes of different forms have a long tradition as a corrective to market imperfections. In other natural resource-sectors like mining, waterfalls and oil-extraction royalties play an important role to capture the resource rent, or a part of it, for the society.

In the fishery, taxes can be imposed on effort or on the harvest. From a theoretical point of view both, or a combination, is able to force the capacity in the direction of the pure economic optimal level.

It is though questionable if it is possible to reach this optimal level exactly by taxes. To find the correct tax level when it comes to reality is difficult. Depending on multi-species interaction, the actual level of stock size, fluctuations and so on, the tax-level has to be changed constantly.

To evaluate taxes as a method of capacity reduction it is necessary to consider the effects on a micro-level. How does a tax on harvest or effort affect the individual fisherman?

If the tax should reduce the capacity, some of them have to leave. Supposing no differentiation of the tax level between regions, vessel groups or individuals, the tax will make all fishermen worse off and force a number of marginal units out of business, but probably not the least efficient once.

It is reason to believe that those fishermen with the highest opportunity cost, often representing intra-marginal units will leave first. On the other hand, bankruptcies and non-ability to pay license fees will be the situation for many marginal units.

When the fishery is in an overcapacity situation, it is political "impossible" to tax poor fishermen out of business and into unemployment or social welfare programs. Such a policy will have no political legitimacy.

Taxes (in the sense of royalty) at a level that has a significant influence on total capacity, therefore only can be introduced in new fisheries that still has not expanded to an overcapacity situation.

Limited entry as a capacity reduction measure, has some of the same weaknesses as taxes when it comes to practical policy. From a theoretical point of view it seems convenient just to identify optimal effort and then issue a number of licences corresponding to this optimal level.

When it comes to the question of political legitimacy and legality we have to admit that it is too late to introduce limited entry when the overcapacity situation has been established. When Norway introduced limited entry and individual quotas in the coastal cod fishery in 1989, it was necessary to allow participation for all vessels with a catch record of down to 50 tons one of the three previous years. In addition all vessels under 8 meters were given participation rights.

In a new fishery, or as a method to prevent further expansion of overcapacity limited entry thus can play a role. Combined with some kind of pull methods, limited entry will be needed to secure the long-term effect of these.

Individual quotas (non-transferable) will have some of the same effects as a harvest tax. Limiting the individual vessels income or income potential over some time, will force economically marginal units out of business. Depending on how the quotas are distributed it is possible, to a certain degree, to control the effects on regions and vessel groups. As well as for taxes and licences there are though restrictions concerning political legitimacy and legality: The quotas has to be distributed after some objective criteria, like catch-records, vessel tonnage or number of crew members.

Individual quotas has been a part of national management systems in Norway as well as in many other countries for many years. As a spesific method of capacity reduction it has though hardly been used. The sum of the induvidual quotas has always added up to scientific set TACs, and never been set strategically with the purpose of capacity reduction. Rather on the contrary:

Non-transferable individual vessel quotas has been introduced to protect marginal units and prevent capacity reduction.

Norway is for this reason about to change its present individual quota system for the inshore fleet in the direction of free competition just to allow for "natural retirement" of non-competitive fishing units.

Pull-methods

The observation that some fishermen earn low incomes, often well beneath the average of the society, is not necessarily a feature of the fishery itself and definitely not directly connected to the common property features of the fishery (Copes, 1987).

The reason why so many fishermen stay in business with persistent low incomes is twofold.

First, the former mentioned adverse reaction to economic incentives and second, lack of alternatives.

If we set aside the psychological phenomena of "lifestyle preferences" and "highliner illusion" the question of pulling fishermen out of the fishing industry and thereby reduce overcapacity, is a question of alternative job opportunities. Even though such alternatives should exist in other sectors of the economy, these sectors most often are located in other areas. Given low mobility, such alternatives therefore are not real to fishermen.

The alternatives has to be established in the fishery areas if they shall have any significant effect on the capacity. Not only because of such expected capacity effects, but even more because of high unemployment rates in the fishing areas, Norway as well as other coastal states, has introduced regional programs to develop alternative industries in such areas. Few of them have been successful and most fishery dependent areas remain fishery

dependet, the fisermen remain fishermen and the capacity problem persist.

Alternative job opportunities is directed to pull fishermen out of the fishing industry. The other possible pull-method is directed to pull out fishing vessels. This can be done by different buy-back programs. Such programs can be divided into three categories:

- (i) Public programs, financed by the government.
- (ii) Private collective programs, financed by the industry.
- (iii) Private individual programs, individually financed.

The latter beeing synonymous with individual transferable quotas (ITQs).

Public buy-back programs has been introduced in several countries to reduce overcapacity. Well known are the Pacific salmon fleet rationalization program in Canada and the Purse seiner fleet program in Norway. None have been ultimately successful.

When a fishingboat-owner is offered a sum of money as an alternative to stay in business he will make trade offs. The sum needed to make him leave the fishing industry will differ, depending on his opportunity costs, his estimates of the future of the fisheries and some psychological factors.

Marginal units will demand less than intra-marginal units. The problem is that the sum requested will raise at an increasing speed as the capacity decrease and the income potential of the remaining fleet increase.

It is difficult to get public acceptance for necessary funding when the price not only reflects the value of the vessel, but discountet future resource rent as well. Both the Canadian and

the Norwegian experiment ran into this problem.

It has also been pointed out that capacity reduction through buy-back programs gives incentives to capacity expansion even if the program is supported by limited entry (Pearce & Wilen, 1979). If the length of the vessels are restricted in a licence document, the vessels are buildt wider and deeper. If the tonnage is restricted more horsepower and different kind of high-tecnology equipment are installed. The phenomenon has been named "capital stuffing".

Private collective buy-back programs in its pure form has not been in action so far. Some of the public buy-back programs has though been partly financed by the industry.

A private collective buy-back program where the quotas of scrapped vessels are given to the remaining fleet will not meet the same remonstrances to high recompensation, as public programs, but otherwise face the same problems.

Individual transferable quotas as a method of capacity reduction can be outlined in different ways. (Chrutchfield 1979, Neher et.al. 1988) In this context we decide to look upon it as a private buy-back program, where the quota of a vessel taken out of the fishery is transferred to the vessel paying for this retirement. There will then be established a quota market which represent an alternative to the individual vessel- owner/quota- holder.

If this market function in a proper way the quotas over time will be allocated to the most efficient vessels at an optimal level of total effort. It is though so that aspects like "lifestyle preferences" and "highliner illusion" will represent market imperfections. Some higher degree of divisibility than just vessel quotas is also needed to reach the optimal position.

Such private transactions of quotas in a quota/vessel - market of course imply privatization of the resources. It has been noted

that this privatization is limited to fishing rights, not the resource itself, but from the point of view of public control or redistribution possibilities, this is not important.

Besides from the more psycalogical and academic debate on "common property" or privatization, the Norwegian rejection of ITQ-systems is based on two main obstacles: The effects on distribution of resource rent and the effect on the regional distribution of fleet capacity.

The quota market will establish a quota-price pr. unit like in diagram 3. This price will reflect discounted resource rent, which means that this discounted rent entirely will be accumulated on the hands of the selling part. The buying parts benefit is the increase of producers suplus. The fishery sector then will be no better off with respect to earning resource rent and there will be no basis for resource - fees or taxes.

The relased resource rent, accumulated on the hands of the quota sellers is now free to be allocated into other sectors of the economy. It is reason to belive, partly because of the former mentioned problems of establishing new industries in the fishing areas, partly because of higher return on investmenst in central areas, that most of the discounted resource rent will not only leave the fishing industry, but the fishing areas as well. These areas will be worse off, even the society as a whole is better off because of a more efficient resource allocation.

The total production the fishing areas will remain constant, but using less manpower and capital. The repercussions of this excess manpower and capital that has been allocated to other areas, will often be of significant magnitude and of great importance for the subsitance of many fishing communities (McCay et.al., 1990, Boyd et.al. 1991).

The second main argument against ITQs in Norway has been the effect on the geografical fleet structure of a free quota market.

There are big regional disparities between the northern and the western regions with respect to initial fleet structure, financial strength and business training. In a free quota market this would probably lead to concentrations of quotas to the western areas. In more restricted markets for instance by establishing one northern and one western market, the same arguments on disparities can be used within each region.

The support to an ITQ-system in Norway have of these reasons been utmost limited.

THE PROBLEM OF REGIONAL DISPARITIES

The regional dimension of fishery politics is extremely important in Norway, though it is not always clearly expressed by the central authorities. The fishing and processing industry are however the basic sources of income and employment in most coastal areas. Especially in Northern-Norway the fishing sector is the most dominating economic sector. Therefore the regional allocation of quotas and licences has the recent years been a critical issue.

The present management system causes many problems to regional planning in areas where the fishing industry is an important part of the economy. The government can only influence regional allocation when it issues a new fishing licence. The actual management of licence allocation is to a certain extent controlled by the financial institutions because it is established a practice that the licence follow the vessels if they are sold second hand. Incidentally this has established a market for licences with quotas. The value of a vessel with a licence is substantially higher than for a vessel without a licence and quotas. This has increased the importance of financial strength of the fishing companies as a main factor which explain the distribution of control. Financial strength is not distributed randomly along the coast. Some locations provide better possibilities for the

accumulation of profit and for the establishment of risk-taking banks. In some companies and fishing communities financial strength has therefore developed as a main factor which in fact decide the regional allocation of the fleet.

In addition to financial strength there are to be taken into account other socio-economic factors, like public infrastructure, location of processing industry, local culture and competence, and fishermen's skill at sea.

When the quotas have been distributed among the licenced vessels, the regional distribution of fish resources and landings will follow the basic fleet structure. During the past decade Northern-Norway has been the big loser in the quota allocation due to structural change in the fleet. As an example the fleet from Northern Norway reduced its part of the total landings from 37% to 23% in the period 1977-1989 (Hersoug and Hoel 1991). One of the main reasons was that the long-liner fleet from the western part of Norway could expand outside the coast of North-Norway and in the Barents Sea without any licence or quota restriction. At the same time the trawler fleet and the coastal fleet, which is dominating in the groundfish fisheries outside North-Norway both had strong restrictions on their operations.

When the quota allocation system based on the past 3 years historic catch data was introduced, the regions with a fishing fleet which for the previous years had its fleet temporarily reduced due to low catch rates, also lost the future legal rights to the resources. The overcapacity in parts of the fleet, has also resulted in enterprises which are run only on a break-even basis. Without profits, the economic strength decreases and reinvestment in value added activities are at a minimum level.

Norway is therefore in the same situation as most of the fishing regions as described by Copes (1987) and Davidson (1990). This negative economic change has taken place in the same period as when the governments policy was to secure employment and

settlement in Northern Norway. Facing this background and that ITQs as a system is of no present interest, there is need for the search for a new management system.

5. THE REGIONAL ENTERPRICE QUOTA SYSTEM

The management system should have two main objectives: First, the system must provide incentives which give a cost efficient fleet. Second, the system must contribute through a regional allocations policy to a sustainable development in the most fishery dependent coastal areas.

The regional Authority of Northern Norway, which is a cooperative body of the four northernmost counties, has put great effort to develop an allocation system of fishing rights and quotas which aims to realise these objectives.

The new management regime can be described in the following terms:

1. The initial allocation must consider the location of the existing fishing fleet and the past and present allocation of licences and quotas. The licences issued to the vessel should be separated from the vessels and issued to the enterprise or the vessel owner as a future licence holder.
2. The regional enterprise share quota (RESQ) constitute long term user rights based on a legal contract (licence) between the owner (regional or national authorities) and the user (licence holder).
3. The licence-holders options regarding limitation of quotas, bycatch, exchange of quotas with other user etc., should be regulated in the contract (licence). The licence itself is in principle not transferable.
4. The licence holder is free to choose what kind of and how many vessels and the type of gear he will use to catch the quota. Up to a certain percentage, he should be allowed to change quotas with other licence holders or use the same

vessel to take different quotas.

5. When new fisheries are regulated by individual quotas, the RESQ should be allocated according til the vessels catch record.
6. Each region i.e. county, community etc. will on the basis of all individual licences get a regional share quota. The regional authorities are responsible for management and must reallocate licences which are not used (bankruptcy, retirement, withdrawal from profession etc.). The licence (RESQ) must be renewed according to the enterprice conditions.
7. The Central government can allocate a share of the total quota in order to recruit new enterprices i.e. young fishermen in specific regions.

6. IMPACTS

By this system the government can allocate stable quotas to each region. Even if it is no limitations on catching areas, the system will make it possible to integrate the seafood industry into the regional sector planning system.

One of the main objectives for a new quota allocation system, is to secure a sustainable regional development especially in those regions which mainly base the regional economy on fishing and processing.

Regarding the fact that for the enterprises it is the access to the resources and the legal right to fish which are of most importance it must be stated that the RESQs can not be moved from enterprises in one region to enterprises in another region if the vessel is sold. The regional share quota must be stable in long terms of view in order to retain a stable allocation of quota in the different areas.

The RESQ system will give the enterprises the opportunities to get rid of economic overcapacity and adapt to changing business cycles in different fisheries. The enterprises will also have incentives to cooperate in order to minimize effort costs. When an enterprise is free to choose what vessel it wants, the catch pr. unit of effort will increase even if the total costs will remain at the same level or should be reduced in the long run.

Other impacts could be:

- Each company can develop specialized operations in relation to the catch availability of fish, the region, gear, products and markets which preferably would yield the best profitability.
- It will be economically wise for the licenceholder to use

exactly as much capacity and costs that will yield highest profit. The government can save economic resources which today are used to reduce the capacity.

- The companies can buy and sell vessel without any significant interference from the Government. The price of the vessel will reflect the present value of the ship itself and not the value of the quota.
- Before introducing the new management system it is necessary for the enterprises to negotiate with their banks and financial partners, in order to set the real price of the vessel.
- The entry costs will be lower compared to a system based on ITQ, because the RESQ itself can not be sold.
- In order to sustain local ownership of the enterprises, the government must decide that the share holders in a company which have a licence should consist of active fishermen.

Compared with the ITQ system there is a need for some more bureaucracy in each county/region to manage the RESQ system. In the norwegian case, this staff is already employed in the regional advisory service. The need for bureaucracy should however be less than with the present norwegian management system, where governmental agents have to decide every transaction of new and second hand vessels and allocation of all quota every year.

Summarized we can assume that the RESQ system will:

- provide incentives to reduce the total costs and to increase profitability and economic growth in resource based regions.
- Secure a fair regional allocation, both between present fishermen and between generations.

- Provide the incentive for optimal resource management with low administrative cost.

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