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Ocean & Coastal Management, Vol. 28, Nos 1–3, pp. 117–146, 1995
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0964-5691(95)00041-0 0964-5691/95 $9·50 + 0·00

Figuring fish and measuring men: the individual transferable quota system in the Icelandic cod fishery

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ABSTRACT

This article discusses inequality in the Icelandic cod fishery, focusing on changes in the actual distribution of fishing quotas and the ways in which Icelanders currently talk about equity and ownership. The individual transferable quota (ITQ) system, introduced in 1984, *divided access to an important resource among those who happened to be boat owners at that time. Statistical findings with respect to the cod fishery – based on a database (the 'Quotabase') constructed using detailed information on all vessels that have been allotted ITQs from the onset of the system – show that ITQs have been increasingly concentrated in the hands of the biggest companies. Many of the small-scale boat owners that still hold ITQs are increasingly compelled to enter into contracts that involve fishing for larger ITQ holders. It is suggested that the distribution of ITQs, as well as their evaluation in social discourse, represents an important field of research. In Iceland, public discontent with the concentration of fishing rights and the ensuing social repercussions is increasingly articulated in terms of loaded metaphors, including 'profiteering', 'tenancy' and 'lords of the sea'. It is argued that the ultimate efficiency of management programs may be jeopardized if managers ignore the history and culture of the fisheries involved and the likely social and ecological consequences of their programs. Copyright* © 1996 *Elsevier Science Ltd.*

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1. INTRODUCTION

During the so-called 'cod wars' with Britain and West Germany in the 1970s, Iceland claimed national ownership of the depleting fishing stocks in its coastal waters, a highly valuable resource. In the following years the domestic fleet grew substantially, and catches, relative to effort, continued to decline. By 1982 politicians and interest groups were increasingly of the opinion that radical measures would be needed to prevent the collapse of the cod stock and make fishing more economical. An individual transferable quota (ITQ) system was introduced in 1984 to deal with the problem. This system divided access to the resource among those who happened to be boat owners when the system was introduced, largely on the basis of their fishing record during the preceding three years. Although the system was originally presented as a short-term experiment, with the fisheries laws passed by the Icelandic Parliament in 1990 it was reinforced and extended into the distant future.

This article discusses inequality in the Icelandic cod fishery, focusing on changes in the actual distribution of ITQs, before and after the changes of 1990, and the ways in which Icelanders currently talk about equity and ownership. We have constructed a database (the 'Quotabase') with detailed information on all vessels that have been allotted ITQs from the onset of the system. The data provide an invaluable opportunity to examine changes in the distribution of ITQs among boat owners, thereby shedding light on some of the social repercussions of resource management under the ITQ system. Our statistical findings show that fishing rights have been increasingly concentrated in the hands of the biggest companies. Moreover, following the full commoditization of fishing rights in 1990, the concentration of ITQs has escalated. Meanwhile, public discontent with the concentration of ITQs and the ensuing social repercussions of this process are increasingly articulated in terms of feudal metaphors, including 'tenancy' and 'lords of the sea'.

In the modern world, ITQ systems of the kind discussed in this article and similar market approaches are increasingly adopted in response to environmental problems. The arguments for such systems are seductive and powerful in the modern world and there is no need to reproduce them here. In several fisheries in different parts of the world fishing stocks are being turned into private property. First, the resource is appropriated by regional or national authorities and later the total allowable catch for a season (TAC) is divided among producers, usually the owners of boats. At a still later stage, such temporary privileges are

turned into a marketable commodity. Many scholars, however, have raised serious doubts and criticisms with respect to the theory of privatization and the so-called tragedy of the commons as it raises central questions of ethics, politics, and social theory.[1–4] Market approaches to resource management are often assumed to be incompatible with egalitarian sensibilities and communitarian notions of stewardship and responsibility. Social scientists – including anthropologists and economists – should attempt to examine what the rather loose reference to the 'market' entails.[5–7] Studies of ITQ systems in fisheries and their effects are still in their infancy.[8–10] Changes in the actual distribution of ITQs as well as the direct and indirect responses to such changes represent an important field of research.

With ITQ systems, fishing is subjected to stringent regulations and 'scientific' control. Generally, both marine scientists and economists have presented the coastal ecosystem as a predictable, domesticated domain. Other voices, however, are also heard at times. Knowledge of the ecosystem, it is argued, especially by fishermen, is too imperfect to make reliable forecasts. Since many marine ecosystems are chaotic and fluctuating regimes, those who are directly involved in resource use on a daily basis are likely to have the most reliable information as to what goes on in the system at any particular point in time. There may be good grounds for exploring more closely how fishermen's knowledge differs from the textual knowledge of professional biologists and to what extent the former could be brought more systematically into the process of resource management.[11–13]

2. THE ICELANDIC ITQ SYSTEM

When the ITQ system was first implemented in 1984, each fishing vessel over 10 tons was allotted a fixed proportion (*aflahlutdeild*) of future total allowable catches of cod and five other demersal fish species. Catch-quotas (*aflamark*) for each species, measured in tons, were allotted annually on the basis of this permanent ITQ-share. Thus, while a vessel's annual ITQ allotment would vary in size with the total allowable catch, its permanent ITQ-share remained constant. Moreover, a new licensing scheme stipulated that new vessels could only be introduced to the fisheries given that one or more existing vessels of equivalent size were eliminated in return.

This arrangement did not go uncontested, for there were heated debates about what to allocate and to whǒm. The issues involved illustrate the conflict between the assumptions and rationalities of the

discourse of different groups of 'producers'. Boat-owners argued for *catch*-quotas, to be allocated to their boats, claiming that they alone were entitled to the rents produced by the ITQ system. The traditional rights of boat owners, they argued, should be transferred into permanent 'ownership' of the fishing stocks in the form of a fixed share of the catch, a transferable quota. For them, the ITQ system was only a logical extension of the cod wars; a 'rational' use of resources could only be expected as long as those who used them were dependent upon them as owners. Some fishermen, on the other hand, advocated an *effort*-quota, to be allocated to skippers or crews. In fishing, they argued, value was created through the application of their expertise and labour power and not that of the equipment, the boat and the fishing gear. Under a system of effort-quotas successful skippers would be rewarded for their exceptional contribution to the economy by an extra catch. Fishermen often insisted that as the 'real' producers of wealth *they* were entitled to quotas. As one skipper put it:

> who has more rights concerning quota-payments. . ., the man who hires crew-men, the one who finds the fish and brings the catch ashore, or the boy who inherits the boat of his father but has never been at sea?

The allocation of quotas to skippers on the basis of their 'fishiness', some skippers argued, would be economical in the long run; costs and effort might be significantly reduced by making fishing the privilege of the most efficient skippers. The authorities partly conceded to such criticism when revising the regulatory framework of the ITQ system, and in 1985 it was decided that henceforth all vessels with fishing licences would be permitted to choose between the ITQ system and an effort-quota system. It turned out that quite a few were willing to bet on the effort-quota and the skipper. However, in 1988 in a subsequent revision of the fisheries management legislation, the effort-quota system was made a significantly less attractive option, and it was finally abolished in 1990.

Table 1 shows some important moments in the history of the ITQ system. One of the major changes relates to the transferability of ITQs. In order to achieve maximum efficiency, many economists assume that fishing rights must emulate private property rights to the fullest extent possible.[14–17] In effect, this requires them to be incorporated into the market system, where they need to be quantifiable, fully divisible and independently tradable rights, held by individuals and companies on a long-term basis. ITQ systems are generally thought to be a particularly suitable means of achieving these ends. To begin with, however, the

TABLE 1
Some important events in the history of the Icelandic cod fishery

Year	*Event*
1975	The Marine Research Institute issues a 'Black Report' predicting the collapse of the fishery. Fishing limits are extended to 200 miles.
1976	The end of the last cod war. The 200 mile jurisdiction is recognised. Sudden closures of fishing grounds to protect juvenile fishing stocks.
1977	A system of temporal closures is introduced (*skrapdagakerfi*).
1981	The TAC set to 430 000 tons.
1983	An ITQ system is proposed for one year for demersal fish species. The system of temporal closures is scrapped. TAC is set to 370 000 tons.
1984	The ITQ system takes effect. TAC is 220 000 tons. Boats over 10 tons allotted ITQs and boats under 10 tons subject to fleet-quotas.
1985	The ITQ system is extended for another year. Effort-quotas are introduced as an alternative to ITQs.
1986	New fisheries management legislation is passed and the ITQ system is extended for a further two years.
1988	New legislation is passed, extending the ITQ system for two more years. Fishing stocks in Icelandic fishing grounds are defined as 'the common property of the Icelandic nation'.
1990	New legislation is passed, stipulating the indefinite application of ITQ management. The system of effort-quotas is discontinued. All fishing vessels over 6 tons are allotted ITQs. The ITQ system is radically revised to enhance economic efficiency, ITQs become fully transferable and divisible.
1991	The full ITQ system takes effect. TAC is 245 000 tons.
1993	The 'Two-Headed Committee' issues a report recommending that ITQ management be continued indefinitely. TAC reduced to 165 000 tons.
1995	TAC reduced again, this time to 130 000 tons.

Icelandic ITQ system only partly conformed to the ideals of commoditization set out by resource economists. While ITQ-shares could be leased relatively freely, they could only be bought or sold *en masse* along with the fishing vessel to which they were originally allotted; that is, they were not fully divisible or independently tradable. Moreover, the ITQ system had not been permanently instated. Quotas did not, therefore, constitute true private property rights.[18] Nevertheless, the system introduced to the Icelandic fisheries in 1984 was an individual *transferable* quota (ITQ) system, albeit one which set restrictions on transferability.

Eventually, in 1990, several radical alterations were made to the existing ITQ system. The rationale for the new laws was a complex one,

incorporating, among other things, a marked shift in emphasis from the exclusively ecological objective of maximum sustainable yield (MSY) to the economic goal of maximum economic yield (MEY).[18] Firstly, the effort-quota system was abolished, and all the vessels previously fishing under that system were incorporated into the ITQ system proper. Secondly, the system was further extended by allocating ITQ-shares to approximately 900 smaller vessels (6–10 tons) that had been fishing under fleet-quota restrictions. As a result, the number of ITQ-holders increased by 156% (from 451 in 1990 to 1155 in 1991). Thirdly, the ITQ system was expanded to include the fisheries of five new species: herring, capelin, shrimp, lobster and scallop. Finally, and arguably most significantly, the ITQ system was extended indefinitely into the distant future and ITQs became fully divisible and independently transferable, making ITQs more akin to permanent property rights. These changes, in effect, marked the full institution of the ITQ system in the demersal fisheries, completing the process of enclosure and privatization initiated in 1984.

The following analysis, based on descriptive statistics, focuses on changes in the actual distribution of fishing rights from the onset of ITQ management in 1984. One event in the history of the ITQ system, however, makes temporal distributional comparisons of ITQs particularly problematic: that is, the aforementioned inclusion in 1991 of a large number of small-scale operators. While it is of great interest to examine the fate of these small-scale ITQ-holders, their addition precludes a meaningful comparison with distributions before this time. The solution we propose is to tackle these issues in two separate analyses. On the one hand, we examine and compare the distributions of ITQs before and after 1991, excluding all 6–10 ton boats in the latter period, and thereby making comparison with the earlier period more valid. On the other hand, we provide an exclusive analysis of the latter period, including *all* boats with ITQs. This will enable us to observe to a greater extent the impact of the 1990 fisheries management legislation on the operators of smaller vessels with ITQs. Our analysis is restricted to the demersal fish species (cod, haddock, redfish, saithe, Greenland halibut and plaice) that were originally subjected to ITQ management in 1984. These six species are of great economic significance to Icelanders, with cod being by far the single most important. In order to present our results in the clearest manner possible, a single measure is used to represent ITQ-holdings in these six species. This is the so-called 'cod-equivalent' (*þorskígildi*), a measure that is based on the relative market values of the different species; essentially, it is a means for converting the value of fish species into the 'currency' of cod.

3. THE DISTRIBUTION OF ITQs: THE WHOLE PERIOD

Despite restrictions on direct transactions with ITQs before 1990, boat owners could sell their ITQ-holdings *indirectly*. This was accomplished simply by selling the vessels to which the non-divisible ITQs were attached. It is difficult to estimate the amount of capital involved in such transactions, but there were reports of vessels having been sold at a price two or even three times that of their 'real' value. Thus, even though long-term fishing rights (the ITQ-shares themselves) could not be bought or sold separately, they nonetheless acquired an indirect exchange value that was added on to the value of a vessel when it changed hands. A preliminary analysis of such *indirect* transactions with ITQs reveals a substantial increase in vessels with ITQs changing hands from 1984 to 1990 (see Fig. 1). The proportion of ITQs (measured in cod-equivalents) that changed hands through the sale of vessels doubled in a six year period, from 6% to 12.5%. Notably, the number of vessel transactions dropped after 1990, when ITQs became divisible and independently transferable, and therefore no longer needed to be traded indirectly. Generally, though, the proportion of vessels changing hands is positively correlated to the accompanying proportion of ITQs (in other words, the lines are parallel).

While the general trend is clear, there are two irregularities that seem to distort the pattern. First there is a striking upswing in the number of ITQs changing hands in 1986, relative to a decrease in the number of

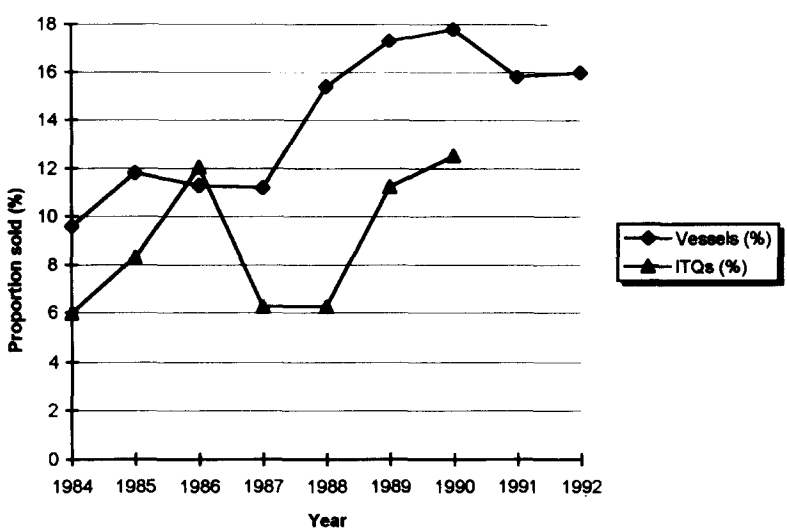

Fig. 1. Vessel and indirect ITQ transactions.

vessel transactions. This aberration is largely due to the privatization of a fishing company that formerly belonged to the City of Reykjavík and controlled the largest share of ITQs in the industry. The second apparent irregularity is the decline in the proportion of ITQs changing hands in 1987 and 1988. This is almost certainly due to the large number of vessels that were exploiting the effort-quota system at this time. The effort-quota system was, in part, introduced to the fisheries in order to appease boat owners who were dissatisfied with their initial ITQ allocation. This system only restricted the number of days that vessels had access to the fishing grounds, and thus provided boat owners with an opportunity to exceed the more stringent catch restrictions dictated by the ITQ system. Moreover, the effort-quota system offered boat owners a chance to procure a new enlarged fishing history. If successful, an operator could return his or her vessel to the ITQ system in the following fishing year, with an increased share of ITQs. As a result, many operators who required more ITQs joined the effort-quota system, instead of buying vessels with fishing rights.

So far we have mentioned two methods that boat owners were able use to alter their share of fishing rights in the ITQ system before 1991. The third method, direct transactions with ITQs, was made available after 1990 and soon became the most prevalent way of acquiring additional fishing rights. The Quotabase allows an analysis of the changing distribution of ITQs in greater detail. Figure 2 shows changes in the total number of ITQ-holders from 1984 (excluding 6–10 ton

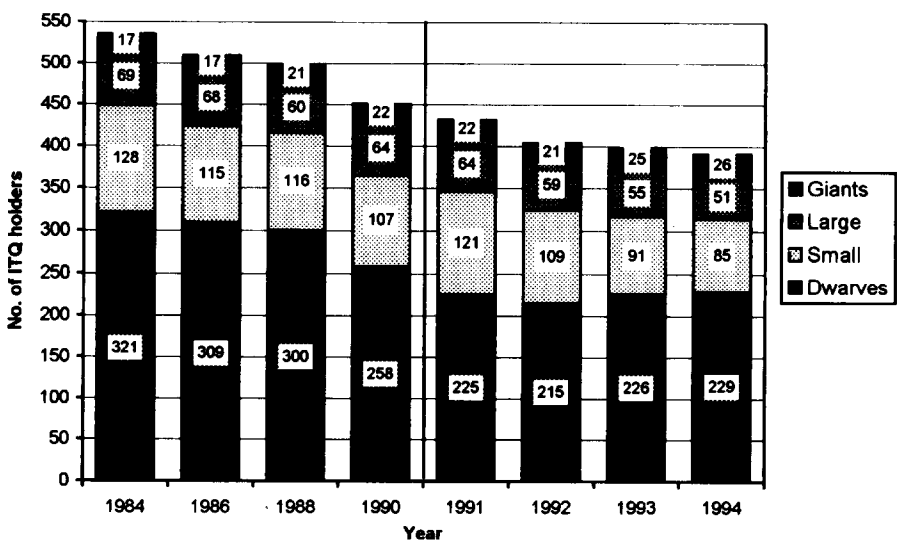

Fig. 2. Number of ITQ-holders, 1984–1994.

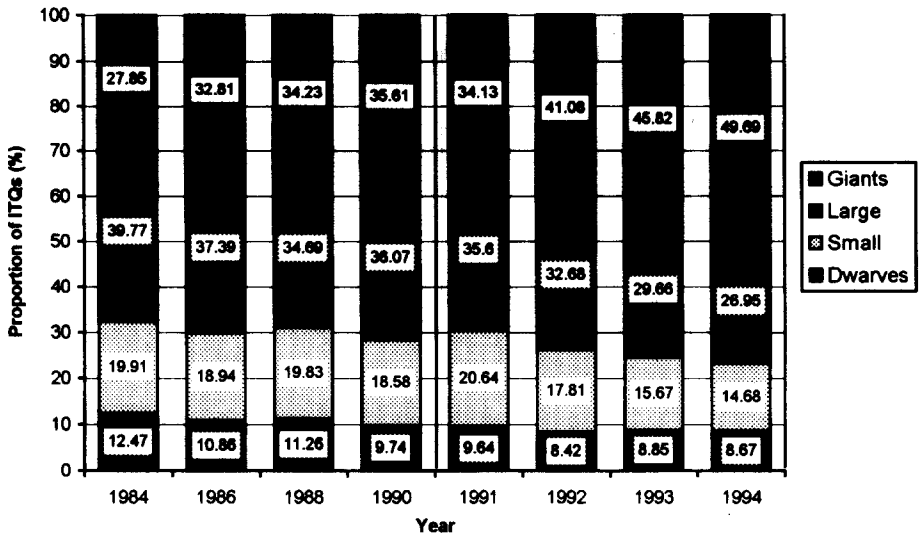

Fig. 3. Distribution of ITQs, 1984–1994.

boats for 1991–1994) and the relative size of four groups of ITQ-holders: 'giants', 'large' owners, 'small' owners and 'dwarf' (those who own more than 1% of the ITQs, 0.3–1%, 0.1–0.3%, and <0.1%, respectively). While being arbitrary, the demarcation of these groups provides a simple and effective way of discerning distributional changes of ITQs among boat owners, taking into account the fact that the distribution is positively skewed. What is perhaps most striking is the steady decrease in the total number of ITQ-holders, from 535 in 1984 to 391 in 1994 (a reduction of 26.9%). Also notable is the gradual increase in the number of 'giants' concurrent with the diminishing numbers of the other three groups.

A different way of examining these distributional changes is to compare the aggregate ITQ-shares of the same four groups. Figure 3 shows the relative distribution of ITQs between the four respective groups of ITQ-holders over the same eleven year period. What emerges is that the 'giants' have almost doubled their share of the overall ITQs, while the other groups all seem to be losing ITQs. In general, this seems to be in accordance with the changes in the numbers of the four groups depicted in Fig. 2. Thus, given the increase in the number of 'giants', one would expect a corresponding increase in their overall share of ITQs, and conversely, a decrease in the shares of the other groups, reflecting their diminishing numbers.

However, it is interesting to examine whether the respective increases and decreases depicted in Figs 2 and 3 are in just proportion to each

other. One way of ascertaining this is to calculate the average ITQ-shares for the four groups. As it turns out, only the 'giants' average shows a substantial increase, going from 1.64% in 1984 to 1.91% in 1994. The aggregate shares of all other groups remain relatively constant, apart from 'large' ITQ-holders, whose average share is slightly reduced from 0.58% in 1984 to 0.52% in 1994. Thus in addition to the concentration caused by the decrease in the number of ITQ-holders, the 'giant' companies seem to be accumulating a disproportionate share of the ITQs.

Another interesting point emerges from a comparison of Figs 2 and 3. It appears that the most conspicuous reduction in the total number of ITQ-holders occurs before 1991, after which this process slows down. In contrast, while there is only a gradual shift toward the concentration of ITQs before 1991, this process becomes somewhat more intensified after 1990. Significantly, this transitional point in time coincides with the radical transformation of the ITQ system brought about by the fisheries management legislation of 1990 when restrictions on the transferability of ITQs were lifted. This intensification of ITQ concentration may, in part, be attributed to the incorporation of 6–10 ton boats into the ITQ system in 1991. Although these boats are excluded from the analysis presented above, their ITQs nevertheless penetrate our data indirectly through the purchasing activities of the larger companies. Indeed, as we will see, these companies bought out many of the small operators that had recently become ITQ-holders.

4. THE DISTRIBUTION OF ITQs FROM 1991 TO 1994

The data presented in the previous section provide a clear indication of the changes taking place in the distribution of fishing rights from 1984. However, while they are conclusive for the period before 1991, they only relate a part of the story for the ensuing years. The fisheries management legislation of 1990 resulted in the inclusion of 704 new small-scale ITQ-holders not included in the analysis presented above. Figure 4 shows changes in the total number of ITQ-holders after 1990, using the same four groups as before, defined in the same way, but now including all ITQ-holders in the cod fishery. What is perhaps most striking here is the sizeable reduction (26%) during this four year period in the total number of ITQ-holders, from 1155 to 855. This drop is most marked in 1991, but appears to gradually slow down with each consecutive year. Moreover, while the number of 'giants' increases substantially, all other groups diminish in number – the most notable

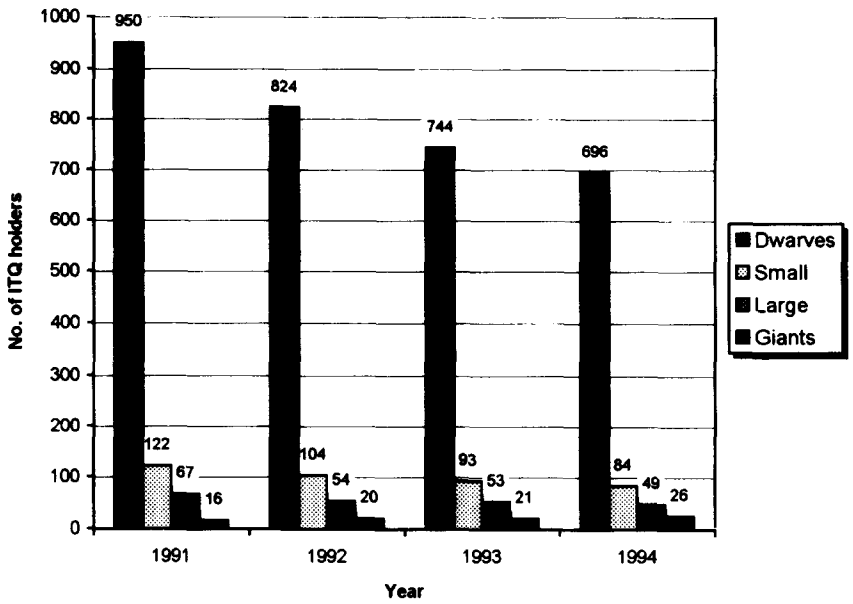

Fig. 4. Number of ITQ-holders after 1990 (including 6–10 ton boats).

case being that of the 'dwarfs', who fall by 254 in four years (a drop of 26.7%). These results seem to match the findings presented in the previous section. Notably, however, the rate of drop-outs during this period is significantly higher, especially among the 'dwarfs'. This would appear to substantiate our earlier interpretation of the changing form of the concentration of ITQs depicted in Figs 2 and 3. There we noted that the reduction in the number of ITQ-holders seemed to slow down after 1990. From Fig. 4, however, it is apparent that this trend really masked a much more marked decrease in the ranks of the *new* ITQ-holders that were excluded from the analysis in the previous section. The operators of 6–10 ton boats, then, appear to have been selling their newly commoditized fishing rights *en masse* as soon as 1991, something that is manifest in the growth of the 'giants' ITQ-shares in Fig. 3. Significantly, while the aggregate ITQ-share of the 6–10 ton boats amounted to approximately 9% of the total ITQs in 1991, it had decreased to 4.6% four years later in 1994.

As before, the reduction in the number of ITQ-holders indicates an increased concentration of fishing rights among those that remain. Figure 5 shows that the 'giants' almost double their share of the ITQs over the four year period. Conversely, the ITQ-shares of all other groups diminish. If we combine the data presented in Figs 4 and 5, it emerges that the 'giants' average share goes from 1.60% in 1991 to

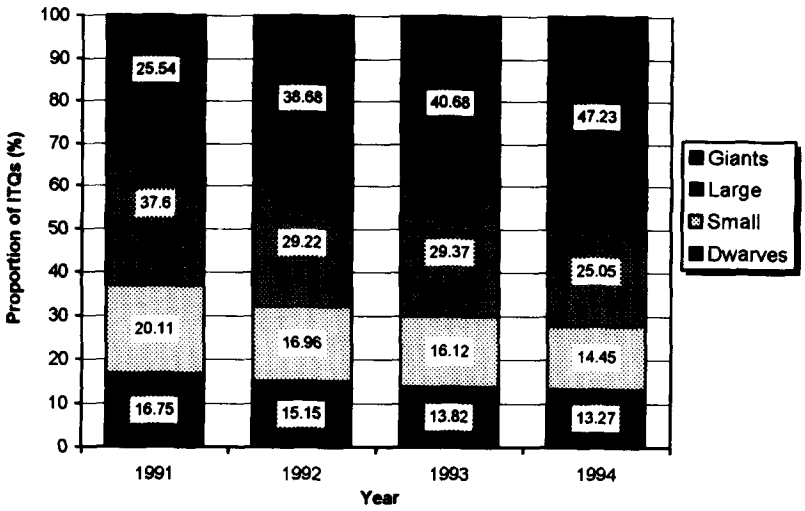

Fig. 5. Distribution of ITQs, 1991–1994 (including 6–10 ton boats).

1.82% in 1994, even though they are the only group to increase in number. However, the average ITQ-shares of 'dwarfs' and 'small' ITQ-holders remain almost constant, while that of the 'large' ITQ-holders decreases slightly, from 0.56% to 0.51%.

5. INEQUALITY AND THE DISTRIBUTION OF ITQs

Another method of distributional analysis that we employ is the so-called Lorenz curve and its numerical equivalent, the Gini-coefficient. These measures originate from the field of welfare economics, and are ordinarily used to measure and compare the levels of inequality manifest in specific distributions of wealth.[19–22] However, these measures seem to be particularly well suited to the study at hand, as they provide simple but accurate ways of presenting and comparing distributions for different times and contexts, both visually and numerically. Although Lorenz curves and the Gini-coefficient are not based on overly complex reasoning, they are nonetheless not as commonsensical as the methods employed in the foregoing sections. Consequently, a brief methodological discussion of these measures and their application to distributional data is appropriate before proceeding.

Conventional measures of distributional inequality invite a particular problem when employed to data such as those pertaining to the changing distribution of ITQs. Mostly, such measures are designed to

gauge distributions among relatively constant populations of individuals. Thus, it is presupposed that most distributional changes within a community will result from the movement of wealth, but not people. However, in the case of the Icelandic ITQ system, individuals who sell out or lose their ITQs disappear from the distributional data. Most measures of distributional inequality react directly to such changes by indicating a greater degree of equality, since fewer ITQ-holders generally means that less needs to be redistributed in order to attain perfect equality. This obviously misrepresents the situation, as Coulter points out for another somewhat different context: 'if nine equally large landowners seized the land of the remaining 100 very small farm owners and divided it equally among themselves, many inequality measures would indicate a change from gross inequality to virtually perfect equality'.[23] One way of making measures sensitive to increased distributional inequality caused by a reduction in the number of ITQ-holders is to include drop-outs as so-called 'null components' – in our case, former ITQ-holders that no longer possess ITQs. Such a procedure may have its drawbacks; the dropouts, it may be argued, are not dispossessed, they have simply sold their ITQs, presumably because they felt this would be more beneficial than using them. On the other hand, to exclude the null components in our analysis would obviously distort the measurements – indicating a greater level of distributional equality in spite of the obvious concentration of ITQs and thus ignoring the information conveyed by the reduction in the number of ITQ-holders. Coulter advises the following guidelines when faced with such problems: 'The investigator should include all null and near null components when the primary interest centers on the collective status of components but should exclude them when the interest centers primarily on the location of units'.[23] As we are primarily interested in the changing distribution of ITQs ('units', in Coulter's terminology) among boat owners ('components'), including former ITQ-holders ('null components') is the only logical and objective course of action. By including the dropouts as null components, the Lorenz curve and the Gini-coefficient provide an effective way of simultaneously displaying inequality and concentration in the distribution of ITQs in the Icelandic fisheries.

The Lorenz curve conveys a graphical representation of distributional inequality and concentration, while the Gini-coefficient corresponds to a Lorenz curve in the form of a numerical index. Operationally, these measures establish the level of distributional inequality in a system as the number or proportion of units that have to be redistributed in order to create uniform shares; in our case, the amount of (surplus) ITQs

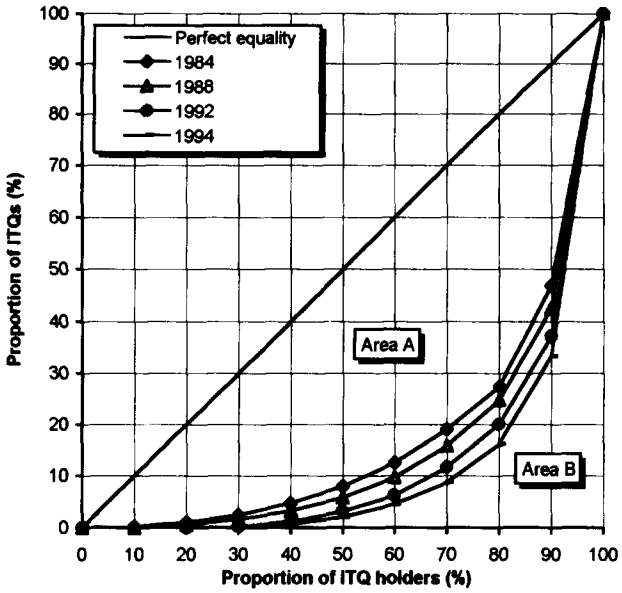

Fig. 6. Lorenz curves, 1984–1994.

needed to be redistributed to create a condition of perfect equality. In addition, the Lorenz curve reveals the concentration of ITQs – for example, the extent to which the surplus is located at the largest company, ten companies or fifty companies. Lorenz curves plotted for four years of the period 1984 to 1994 are shown in Fig. 6 (here, as before, we exclude the owners of 6–10 ton boats when comparing the periods before and after 1990). The horizontal axis represents ITQ-holders arrayed in ascending order, with the first interval being equivalent to the smallest 10% of ITQ-holders, and the last interval equivalent to the largest 10%. The vertical axis shows the proportional share of ITQs. For example, the line representing the distribution of ITQs shows that in 1984 70% of the smallest ITQ-holders own just under 20% of all ITQs, while in 1994 the same proportion of ITQ-holders own just under 10%. An increase in the area between the line of perfect equality and the curves representing the actual distribution (area *A* in Fig. 6) indicates a growth in the level of inequality. Moreover, the shape of this area represents the degree of concentration in the distribution of ITQs. Judging from Fig. 6, then, there is a continual increase in the level of inequality and a growing concentration of ITQs at the top.

The Gini-coefficient expresses the degree of inequality presented by a Lorenz curve as a numerical index. This coefficient represents the ratio

obtained by dividing the area between the line of perfect equality and a distributional curve (area *A*) by the total area under the line of perfect equality (the sum of areas *A* and *B*). Hence, a situation where one individual owns everything while others own nothing – in other words, absolute inequality – yields a Gini-coefficient of 1. Conversely, a situation of perfect equality, where the distributional curve equals the line of perfect equality, yields a Gini-coefficient of 0. The Gini-coefficients corresponding to the distributional curves in Fig. 6 indicate a substantial increase in the level of distributional inequality. Thus, the curve for 1984 yields a Gini-coefficient of 0.677, which rises to 0.715 in 1988, 0.769 in 1992 and, finally, 0.799 in 1994.

When the small-scale operators of 6–10 ton boats are included for the period after 1990, a similar general pattern emerges (see Fig. 7). Notably, the area under the distributional curves in Fig. 7 is smaller than in the previous Lorenz chart, thus indicating a greater degree of initial distributional inequality. This is because the larger number of small-scale ITQ-holders means that a greater amount of ITQs need to be redistributed to create a distribution of perfect equality. However, the *growth* of distributional inequality is just as evident in Fig. 7, being all the more striking because of the shorter four year period under analysis. The Gini-coefficient reflects these changes, growing steadily from 0.800 in 1991 to 0.874 in 1994. In general, then, the data indicate

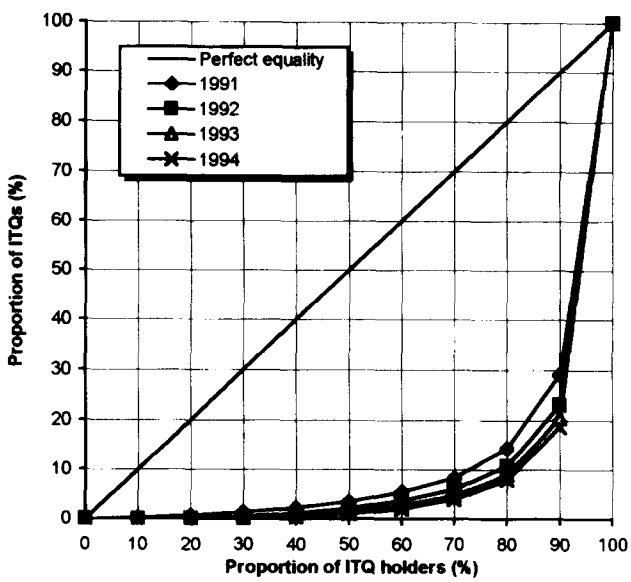

Fig. 7. Lorenz curves, 1991–1994 (including 6–10 ton boats).

a substantial increase in the level of distributional inequality and concentration of ITQs, a change which is even more marked when 6–10 ton boats are included for the period 1991–1994.

We need to keep in mind, though, that some, if not all, of the 'giant' companies are owned by a large number of share-holders. One could argue, therefore, that the concentration of ITQs described above really masks a more egalitarian distribution of access and ownership. However, this is not necessarily the case. Unfortunately, very little research appears to have been undertaken in this field. What data there are, indicate that the distribution of share-holdings in the public companies involved (*almenningshlutafélög*) is very positively skewed, with a few large shareholders controlling the majority of the shares and a large number of small shareholders with the rest.[18] Moreover, it seems that some of the biggest 'giant' ITQ-holders also own shares in other fishing companies. It is also probable that other individuals or companies simultaneously own shares in several different ITQ-holding companies (Icelandic banks and oil companies, in particular, seem to own shares in many different fishing companies). As a result, an analysis of the distribution of fishing rights at the level of shareholders might even reveal a *greater* degree of concentration and distributional inequality than is indicated by our present study, even though the total number of shareholders surpasses the total number of ITQ-holding operators. Finally, it is important to note that regardless of whether an analysis of shareholders will reveal a more egalitarian distribution of fishing rights, it is nonetheless true that through the ITQ system a relatively small group of company managers has acquired immense powers. They are the ones who control access to the resource, how the resource is used, what happens to the products, and how the benefits are distributed. These managers effectively control the fate of whole communities in Iceland that increasingly depend on one or two large ITQ-holding companies for employment and economic existence in general. This dependency has grown more acute with the ongoing concentration of fishing rights.

6. THE CONCENTRATION OF FISHING RIGHTS: DEVALUATION OF ITQ-SHARES

In the foregoing distributional analysis it may seem as if the increased concentration of ITQs in the hands of larger companies is somehow

intrinsic to the ITQ system itself. Thus, for example, the data seem to indicate that the rate of concentration and distributional inequality increases as a result of restrictions being lifted on permanent transactions with ITQs in 1990. However, although the ITQ system provides the framework and certainly some impetus for these changes, specific 'externalities' to the system have also played an important role in promoting the concentration of ITQs and the drop in the number of small operators.

Almost all of the major changes that have taken place in the distribution of ITQs, particularly after 1990, were the result of exchange – that is, the buying and selling of ITQs. According to orthodox economic theory, exchange is a mutually beneficial act undertaken by two (or more) autonomous agents. In this conception, the small operators who sell their ITQs and leave the system do this willingly because they perceive such a move to be profitable to them. However, invariably the matter is not so simple. Markets do not exist in a social vacuum, and as a result there are a great many external factors that influence and direct the motives and nature of exchange in any situation. With regard to the radical decrease in the numbers of small operators in the Icelandic ITQ system, we have been told of cases where owners of small boats sold their ITQs for a windfall profit and left the system (such practice is generally castigated by fishermen and cited by the opponents of the ITQ system as indicative of its inherent immorality). It is much more common, however, to hear of cases where smaller operators considered themselves to be forced into selling their ITQs. The reasons given by these former ITQ-holders, many of whom cite the devaluation of their ITQ-shares as the source of their predicament, are significant to any explanation of the distributional trends we have observed in the foregoing sections.

In the Icelandic ITQ system the actual amount of fish a boat owner is allowed to catch each year (the catch-quota), depends both on the size of the ITQ-share and on the size of the total allowable catch set by the Ministry of Fisheries for that particular year. Consequently, if the total allowable catch is reduced, ITQ-shares effectively become devalued – that is, all operators in the industry suffer cuts to the amount of fish they are permitted to catch, even though their actual ITQ-share remains constant. This aspect of the ITQ system is highly relevant for the distributional developments described above. Following bleak estimates of the fish stocks in Icelandic waters by marine biologists, the Ministry of Fisheries has made recurrent cuts to the total allowable catch since 1988 (particularly in cod, the most economically important

species subject to ITQ management; see Table 1). As a result, many small companies found themselves increasingly left with insufficient catch-quotas to keep their boats active throughout the fishing year. To give some indication of the extent of these devaluations, a boat owner who controlled an ITQ-share in cod of 0.1% (the upper limit of a 'dwarf') was entitled to approximately 254 tons of cod in 1987, 200 tons in 1991 but only 106 tons in 1994.

Obviously, larger companies were also affected by these cuts, but such operators seem to have had more success in adapting to the situation. Indeed, as we have seen, while many small companies were forced to sell their ITQ-shares and leave the system as ITQ-holders, the larger companies reacted by buying up this new supply of permanent fishing rights. From their point of view this is money well spent, given that the stocks will eventually recover, resulting in higher total allowable catches. In that event ITQ-shares would engender much higher catch-quotas, and would consequently become significantly more valuable. A major factor in the apparent success of the larger companies in accumulating fishing rights is their ready access to capital through the Icelandic banking system, something that is less available to the smaller operators. The larger operators are generally vertically integrated businesses that own two or more vessels. Their approach to 'business' and ITQs is very different to that of the smaller operators. To the owners of the larger companies, the system provides new opportunities to maximize profits and, consequently, they tend to support ITQ management. In contrast, the smaller operators tend to perceive the ITQ system as an irritation and obstacle to their traditional way of fishing. These producers attempt to adjust the system to *their* way of doing things, fishing their ITQs whilst waiting for the system to be abolished and something more akin to the 'old way' to be reinstated. As it has turned out, however, with the ITQ system legally entrenched for an indefinite term, this seems unlikely to occur. Moreover, because of the recent devaluation of ITQ-shares, it has been increasingly difficult for the small-scale operators to continue fishing as they used to – their ITQ-shares simply do not yield enough tons any more to sustain the fishing operation throughout the year. This situation is concurrent with a growing trend whereby the larger companies have increasingly been sending their trawlers to fish in international waters. In these cases, the larger companies do not 'need' all of their ITQ-shares, as they can keep their vessels in action without them. This state of affairs has given rise to radically new relations of production in the Icelandic fisheries.

7. FISHING FOR OTHERS: NEW RELATIONS OF PRODUCTION

With some companies holding more than they are able or willing to fish and others with less than they actually need, ITQs would appear to be 'inefficiently' distributed. A characteristic market solution to such a problem, perhaps, and one that is increasingly prevalent in the Icelandic ITQ system, is that of leasing. Boat owners have been permitted to lease their ITQs from the onset of the system in 1984. ITQ-leasing was originally proposed by administrators as a way for boat owners to fine-tune their operation to meet short-term needs arising from unexpected 'devaluations' of ITQ-shares, fluctuations in local, regional and national markets, and by-catch problems (for example, by trading haddock-ITQs for cod-ITQs).

At first, ITQ-leasing does not seem to have been a particularly common practice and it was probably mainly undertaken on a small scale by operators who needed extra ITQs after a particularly successful fishing season or for the purposes outlined above. The lessors in most of these cases were operations actively engaged in using their own ITQs. In time, however, some ITQ-holders came to discern that considerable profits could be made through leasing ITQs on a larger scale, particularly with many fishing operations suffering from the 'devaluation' of ITQ-shares resulting from recurrent reductions to the TAC for cod after 1988. The emergence of profit-oriented ITQ-leasing is indicative of a shift in the conceptualization of fishing rights; a shift that coincided with a growing perception within the industry that ITQs were not just use-rights but, in effect, property rights that could be leased to others for profit.

The original form of leasing, which we have chosen to call 'direct ITQ-leasing', is still practised today for the same reasons as before. For example, it is not uncommon for boats that have finished their cod-ITQs to accidentally catch a few tons of cod while fishing haddock or another demersal species, and if they land the cod, they must get hold of an equivalent amount of cod-ITQs to cover their catch, or else they stand to lose their fishing licenses. The price of ITQs leased in this way tends to fluctuate considerably in relation to supply and demand. Thus, at the end of the fishing year when cod-ITQs are scarce, lease prices have been known to rise to 70–80% of the market value of the catch, hardly covering the expenses of fishing and thus making such transactions particularly unattractive. According to many fishermen, this results in considerable amounts of fish being thrown back dead

into the sea, especially towards the end of the fishing year when ITQs are scarce and the lease price is inordinately high.

In the past few years, however, new and more formalized modes of ITQ-leasing have begun to emerge. These transactions involve long-term contracts between large ITQ-holders and smaller operators, where the former provide the latter with ITQs in return for the catch and a proportion of the proceeds. One such arrangement, habitually referred to as 'fishing for others' (*veiða fyrir aðra*), is becoming increasingly widespread within the industry, according to fishermen and boat owners interviewed. Typically, in such transactions, the supplier of the ITQs is a large vertically-integrated company that controls two or more trawlers and a processing plant. Increasingly, such companies have been sending their trawlers to exploit new opportunities in international waters – a manoeuvre that enables them to put their ITQs to other uses. This is where the smaller operator comes into the picture. A contract is arranged, whereby the large ITQ-holder transfers ITQs to the smaller operator's boat. The latter then fishes the ITQs and delivers the catch to the suppliers' processing plant. In return, the smaller operator receives payment, which usually amounts to about 50–60% of the market value of the catch.

Strictly speaking, then, there is no lease price paid up front for the ITQs. However, the small-scale operator is effectively paying a lease price of up to half of the value of the catch. Understandably, the lessee boat owners cannot make the same level of profits when fishing for others in comparison to fishing their own ITQs. In both cases their outlay is identical, but when fishing for others their income is cut by 40–50%. As a result, they try to compensate for their losses by reducing the shares of fishermen. By law, fishermen receive a fixed share of the value of the catch. Before the fishermen's shares are calculated, however, the boat owner is permitted to deduct maintenance costs from the proceeds of the catch. Increasingly, the lessee boat owners have resorted to reckoning the fishermen's shares from the amount left *after* the lease price has been subtracted from the value of the catch – that is, from the fixed price that is paid by the supplier of the ITQs. The result is that fishermen working for lessee companies may suffer up to 50% wage-cuts, an arrangement that has, not surprisingly, caused much discontent in their ranks.

The typical lessee operator is an owner of a relatively small vessel that has either finished its own annual supply of ITQs, or the owner of a boat that has virtually no ITQs of its own and is solely operated on leased ITQs. Through ITQ-leasing boat owners with small ITQ-holdings manage to prolong their fishing operations throughout the

year. Moreover, by lowering the shares of their crews, they are just about able to make such practice economically feasible. For the suppliers of ITQs, however, participation in these new relations of production represents a rather lucrative business. By leasing its ITQ-shares, a company can free itself from the expenses of actually catching the fish, while still procuring up to half of the market value of the resulting catch. Moreover, it keeps the company's processing facilities well supplied, while allowing its vessels to pursue other assignments in international waters, bringing even more fish to be processed.

The foregoing descriptions of ITQ-leasing in the Icelandic fisheries are primarily based on information obtained from interviews and through an extensive analysis of public discourse. According to these sources, the new relations of production associated with ITQ-leasing have become particularly pronounced in the last five years. This would seem to suggest that there is a relationship between the devaluation of ITQ-shares and concentration of ITQs in the hands of larger companies on the one hand, and the new practices of ITQ-leasing on the other. It is possible to use the Quotabase to explore whether such a relationship in fact exists, as it contains relatively detailed data pertaining to the leasing of ITQs from 1991 to 1993.

Table 2 summarizes the overall movement of leased ITQs for the three years in question. The first column shows the overall movement of leased ITQs. However, because these figures include intra-company transferrals of ITQs, they overestimate the actual magnitude of ITQs being leased. The second column shows overall net movement of leased ITQs. The drawback here is that these figures do not include cases where ITQs are leased both to and from the same vessel in transactions between unrelated operators. Bearing in mind that the first set of figures in Table 2 overestimates the magnitude of ITQs being leased, while the second underestimates this amount, it is noteworthy that

TABLE 2
The extent of ITQ-leasing in the fishing industry, 1991–1993

Year	*Overall movement of ITQs* (%)	*Minimum level of ITQ-leasing (net %)*
1991	32.64	9.19
1992	49.18	12.04
1993	68.96	16.35

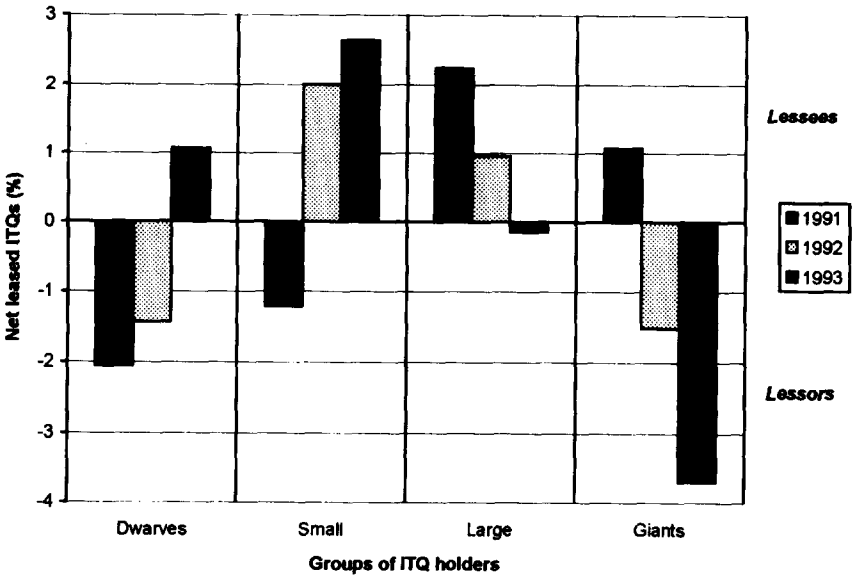

Fig. 8. Leased ITQ-shares, 1991–1993 (net cod-equivalents).

both columns show a similar pattern of increase, attesting to an increase in ITQ-leasing activities.

It is even more illuminating to examine the *directional* flow of these transactions between the four ordinal groups of ITQ-holders previously defined. Figure 8 depicts the net movement of leased ITQs between these groups (it is important to remember that these data do not accurately represent the magnitude of ITQ-shares being leased). The data presented reveal a clear pattern. In 1991 'dwarfs' and 'small' ITQ-holders supplied the other two groups with leased ITQs. This would appear to corroborate the assertions made by fishermen and boat owners during interviews and in public discourse that many of the new small-scale operators incorporated into the ITQ system in 1991 resorted to leasing their ITQs to larger companies.

According to our calculations, 74 of the 126 'dwarfs' that left the system in 1992 (see Fig. 4) were leasing large proportions of their newly allocated ITQs in 1991. Apparently, these operators did not feel they could sustain their business on the quantity of fishing rights allotted to them, and so instead decided to meet the demand of larger companies for extra ITQs – first by leasing and then by selling. In contrast, the larger ITQ-holders, responding to the same devaluations of ITQ-shares that caused such problems for the smaller operators, accumulated ITQ-shares, buying them from the smaller operators who were leaving the system. Moreover, it appears that these larger operators also

temporarily augmented their ITQ-shares by leasing from the 'dwarfs' and 'small' ITQ-holders in 1991. Over the next two years, however, this situation appears to have reversed dramatically, with the 'giants' being almost the sole suppliers of net leased ITQs while 'dwarfs' and 'small' ITQ-holders have now become lessees. Significantly, this shift in the directional flow of net leased ITQs would seem to reflect on the one hand the distributional changes described earlier, and on the other the emergence of the new relations of production associated with 'fishing for others'.

Another way of examining the nature of the relationship between the size of ITQ holdings and ITQ-leasing activities for the years in question, that is perhaps more statistically appropriate, is to correlate ITQ-shares of boat owners with net transactions of leased ITQs (a positive value for the latter variable would indicate that a boat owner is a lessee, while a negative value would signify lessor status). The Pearson correlations (r) calculated for this relationship for cod-ITQs indicate the same transition that is depicted in Fig. 8, going from 0.291 in 1991 ($N = 900$), to -0.159 in 1992 ($N = 951$), and finally -0.386 in 1993 ($N = 927$) (with $p < 0.001$ in all cases). While the relationships for individual years are not particularly strong, there is a clear temporal shift that is both highly significant and conclusive for the supposed association between the concentration of ITQs and the directional flow of ITQ-leasing. What these figures denote, then, is that while large ITQ-holders tended to be lessees in 1991 (and small ITQ-holders tended to be lessors), the reverse was true in 1993.

Evidently, then, the Icelandic fishing industry is undergoing an extensive restructuring process, where large vertically-integrated companies have strengthened their position while smaller operators are being marginalized or forced out of business. It appears that with access to the fishing stocks now mediated by the possession of ITQs, the size of an operator's ITQ-share has become the single most important measure of success within the industry. Some of the small operators seem to be persevering, despite the onerous effects of recurrent ITQ-share devaluations. Although they do not have recourse to the same sort of financial reserves used by the larger companies to finance their accumulation of ITQs, many of the small-scale boat owners endure by entering into contracts fishing for larger ITQ-holders. Such contracts, while quite lucrative for the lessors, result in reduced profits for lessee boat owners and lower wages for their employees. All told, this attests to a growing rift between larger and smaller operators – effectively, between those who own fishing rights and those who do not.

8. PUBLIC DISCONTENT: THE MORALITY OF EXCHANGE

The vast majority of fishermen and the Icelandic public seem to emphatically oppose the privatization and commoditization of fishing rights entailed by ITQ management. To their minds, fishing rights are very much intertwined with the symbolic notions of national sovereignty, personal autonomy and equity.[18,24] In a national survey in 1991 no less than 95% of those who responded were against changing the common property nature of the fisheries.[25] Another survey established that 60% of boat owners believed that the buying and selling of ITQs was morally wrong.[26] As one boat owner, who was fiercely opposed to such transactions, put it: 'If it is efficient to steal from one and sell to another, then I reject such economic policy. . . . [i]t just will not do that the common property of the nation, like the fishing grounds, are being bought and sold by a few chosen individuals'.[27]

The issue of ownership is confused by the fact that although ITQs are in effect the private property of boat owners, they remain in name, according to the first clause of the fisheries management legislation, the public property of the nation. During debates on the fisheries laws enacted in 1990, some members of Parliament raised doubts about the 'legality' of the ITQ system, arguing that proposed privileges of access might imply permanent, private ownership which contradicted some of the basic tenets of Icelandic law regarding public access to resources. Lawyers concluded that the kind of ITQ system under discussion in Parliament was in full agreement with the law and that ITQs did not represent permanent, private property.[28,29] The laws which were eventually passed reinforced such a conclusion by stating quite categorically that the aim of the authorities was *not* to establish private, government-protected ownership. It seems clear, however, that boat owners have become *de facto* owners of the fishing stocks. The Icelandic tax authorities have decided, one may note, that ITQs are to be reported as 'property' on tax forms and that the selling of ITQs involves a form of 'income'. Recently, the Supreme Court resolved, in a case between a fishing company and the Minister of Finance, that accumulated ITQs represented private property liable to taxation. Thus, fishing rights in Iceland have an anomalous and ambiguous status as ITQs – a situation that has, perhaps, helped to prolong the existence of the system in the face of firm opposition to its fundamental principles.

Nevertheless, many have begun to realise the new private property nature of fishing rights, particularly with the increase in profit-oriented monetary exchange with ITQs. Fishermen and small-scale boat owners are deeply concerned with this aspect of the system, complaining that

this was not the fisheries management system that they consented to in 1984. Through a vigorous public discourse that erects and affirms close moral boundaries around permissible economic behaviour with ITQs, fishermen attempt to resist and contest profit-oriented exchange with fishing rights. Boat owners who transgress these boundaries are labelled 'quota-profiteers'. Frustrated fishermen look on, as businessmen prosper from trading these new fishing rights back and forth, picturing 'quota-kings' spending hours in front of computer screens profiteering with ITQs. One skipper, commenting on this situation, claimed: 'For the chosen few who can lease quotas to others and buy more quotas for the profits, [the quota system] is like a snowball effect. . . There is no stockbroker in Reykjavík that can invest your money more effectively, that is if you have any'. Such claims along with direct industrial action challenge the underlying morality of privatization advocated by the Boat Owners' Union, administrators, and many economists, in an attempt to return fishing rights back to a more traditional state.

Many Icelanders are also wary of the concentration of ITQs in the hands of the large vertically-integrated companies and the emergence of the new relations of production associated with fishing for others, using heavily loaded feudal metaphors to describe this state of affairs. Voicing these concerns for fishermen in general, the editor of the Icelandic fishermen's journal (*Víkingur*) put it this way:

> Before you know it the whole national fleet will be in the hands of 10 to 15 individuals who will then also 'own' all the fish in the waters around Iceland. Thus a new aristocracy will have emerged, an aristocracy that decides where fishermen and employees of the fishing plants will live, what they earn, and what rights they are to have.[30]

In public discourse, the large firms that have been accumulating ITQs are habitually referred to as 'quota-kings' or 'lords of the sea'. Such explicit accounts of structural inequalities in the Icelandic fishing industry represent a significant shift from earlier discourses, which euphemistically projected structural differences onto individual differences.[3]

These references to images of exploitation and domination are further augmented by descriptions of ITQ-leasing associated with 'fishing for others' as a 'tenancy' system, where the lessor 'quota-kings' are likened to medieval landlords and, conversely, small-scale lessees become 'tenants' or 'serfs' (*leiguliðar*). One skipper described the 'tenant' situation in the following way during an interview:

> they fish vigorously while fishing their own quotas, after that they end up in the tenancy-system. . . . a system which gives them no

earnings; all the profit goes to those who own the quota, the quota-kings.

In the 'tenancy' system it is the 'quota-kings' who make the rules; not only do they own most of the ITQs, they also control many of the plants that buy the catch. Thus, quoting the same skipper again: 'one must give in to almost every demand, because the quota-king makes all the rules, sets the price and everything'. The 'quota-kings' themselves view the matter from a totally different perspective, maintaining that most of the so-called 'lords of the sea' are really on the verge of bankruptcy, and citing envy as the source of the feudal metaphors.

In January 1994 fishermen went on a national strike, protesting against the ITQ system, especially the effects of the so-called 'tenancy system'. The leading slogan they employed was 'No More Profiteering!' (*Braskið burt!*). To many of them this was a battle aimed at getting rid of the ITQ system. As it turned out, the strike resulted in a two week stand-still in the fishing industry. Ultimately, the strike was terminated by temporary laws which forced fishermen back to work. Not content with this turn of events, fishermen went on strike again in May 1995. This time an agreement was reached with boat owners, involving some concessions on both sides.

9. CONCLUSIONS

Our analysis of the Icelandic cod fishery, focusing on changes in the actual distribution of ITQs, indicates a growing inequality. Fishing rights have been increasingly concentrated in the hands of the biggest companies. With ITQs becoming fully divisible and independently transferable, their concentration has escalated. The Icelandic fishing industry thus appears to be undergoing an extensive restructuring process, where large vertically-integrated companies have strengthened their position while smaller operators are being marginalized or forced out of business. In 1994, only 26 companies (the 'giants') owned about half of the national ITQs in the cod fishery. Many of the smaller operators that still hold ITQs are increasingly entering into contracts with larger ITQ holders – 'fishing for others' – arrangements that are profitable for the lessors but entail a significant loss of profits for the lessee boat owners and a reduction in the wages of their crews. Our analysis seems to indicate that the increased concentration of ITQs in the hands of larger companies is to some extent intrinsic to the ITQ system; thus the rate of concentration and distributional inequality

increased as a result of restrictions being lifted on transactions with ITQs in 1990. However, while the ITQ system supplies the framework for such changes, certain 'externalities' to the system – in particular, the devaluation of ITQ shares – have also played an important role.

The current scholarly fascination with privatization is sometimes challenged on practical grounds. Some 'commons' regimes function rather well and, conversely, some privatized regimes are obvious failures.[2] In some African pastoralist economies, for example, the thesis about the tragedy of the commons has been used by governments and companies when pressing for privatization of communal grazing areas and, in the process, earlier mechanisms for regulating access have sometimes been eliminated, with serious ecological consequences. Environmental degradation was not the consequence of the absence of property rights, but rather the result of the *imposition* of a privatized regime. There is some evidence for an erosion of responsibility in fisheries as a result of ITQ management. Discarding of small and immature fish during fishing operations and the 'high-grading' of the catch (the dumping of species of relatively low economic value) seem to be major problems in many fisheries, including the Icelandic one.

In addition, privatization sometimes leads to severe social inequalities and ethical problems, which may escalate the problem of irresponsible resource-use rather than reduce it. To many economists and managers, the social organization of production is a strictly technical, rational and largely non-debatable business of accomplishing maximum economic yield – an organizational manoeuvre that should be left to the 'invisible' but efficient forces of the market. This study has indicated that many of the participants within the Icelandic fishing industry do not assent to such a viewpoint. Moreover, Icelanders in general do seem to be concerned with how production in the fisheries is organized and how access to the fishing stocks is defined and regulated. Economists and administrators must take heed of such considerations when implementing a system with such far-reaching transformational effects as the Icelandic ITQ system. The efficiency of such a system is likely to be jeopardized in the long run in the absence of public acceptance.

As we have shown, in Iceland public discontent with the privatization and concentration of ITQs, and the social and political repercussions thereof, is increasingly articulated in terms of heavily loaded metaphors such as 'profiteering', 'tenancy', 'quota kings' and 'lords of the sea'. While the distribution of ITQs and its moral evaluation by the people involved represent an important field of research, such concerns tend to be ignored in scholarly discourse on resource management.[31] Before instituting programs of privatization and quota allocation, managers

should be careful to examine the particularities of history and culture and the likely social and ecological consequences of their schemes.

ACKNOWLEDGEMENT

The authors thank the Icelandic Ministry of Fisheries for providing much of the raw data used in constructing the 'Quotabase'. The present study is part of two larger, collaborative research projects, 'Common Property and Environmental Policy in Comparative Perspective', initiated by the Nordic Environmental Research Programme (NERP), and 'Building Resilience, Equity, and Stewardship into Market Approaches to the Resolution of Common Property Problems', funded by the Beijer Institute of the Swedish Academy of Science in Stockholm, coordinated by Susan Hanna. The research on which the article is based has been supported by several other programmes and institutions, including the Nordic Committee for Social Science Research (NOS-S), the University of Iceland, the Icelandic Science Foundation, and the Post-Graduate Research Fund of the Icelandic Ministry of Education. Some of the data and conclusions presented in this article are also discussed in 'Property rights and practical knowledge: The Icelandic quota system', published in *Fisheries Management in Crisis: A Social Science Perspective*, ed. D. Symes & K. Crean, Blackwell Scientific Publications, 1995. A brief version of the article was presented at the Annual Science Conference of The International Council for the Exploration of the Sea in St. John's, Newfoundland, 22–30 September 1994. The authors thank anonymous reviewers for useful suggestions and comments on an earlier version of the article.

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