Iceland's ITQ system creates new wealth

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Introduction

Many commercial fish stocks are potentially highly valuable. Empirical studies indicate that on average they may be able to generate net economic benefits or profits amounting to some 50% of the value of landings (FAO 1992, Newton and Garcia 1997, Arnason *et al*. 2004). This is comparable to the net profits obtainable from fairly typical oil reserves. An added bonus is that fish stocks are renewable, so profits from fisheries can be sustained indefinitely. On a global level, the attainable, sustainable profits from global fisheries have been estimated to amount to some US$50 billion per year (FAO 1992, Arnason 2006).

The problem is that because of an inappropriate institutional structure, namely lacking private property rights in the fishery customarily referred to as the common property[1] (or common pool) arrangement, the potential profits of fisheries are often not realized. Under the common property arrangement, fishermen are effectively forced to engage in wasteful competition with each other for shares in the obtainable catch. The waste manifests itself as excessive fishing capital, excessive fishing effort and depressed stocks of fish. Fishermen suffer low and decreasing incomes (Gordon 1954). The general population suffers rising fish prices, and environmental degradation. For governments, it is a source of seemingly endless trouble.

One result is that, with a few exceptions, the world's fisheries are not making a profit. If anything, they are losing a great deal of money and can only continue to exist through public subsidies (Garcia and Newton 1997). The economic waste in global fisheries, in the form of lost profits, probably amounts to about US$50 billion annually (Arnason 2006). This unnecessary waste is just under the total amount given in development aid world-wide (Addison *et al*. 2005).

It should be emphasized that the problem is man-made. It stems from a particular social arrangement stipulating that everyone, at least everyone belonging to a defined group, can harvest from the fish stocks. The obvious remedy, therefore, is to replace this social arrangement with one stipulating that only those with well-defined harvesting rights can fish. These rights, obviously, amount to private property rights which have been well-established as being efficient in other areas of economic production (Smith 1776, Demsetz 1967, Arnason 2000). There are several possible types of private property rights in fisheries, of which individual transferable quotas (ITQs) are the most common.

Under the ITQ system, the basic property right held by individuals is a right to harvest. These harvesting rights are defined as shares in the total allowable catch (TAC). The TAC is set by the fisheries authorities or the fishermen themselves for each fishing season. Once the TAC has been set, the harvesting shares, or quota shares as they are often called, define the annual quota, i.e., the amount of harvest each fisher may take during fishing season. In a well designed ITQ system, both quota shares and annual quotas are perfectly divisible and tradable. Thus, if otherwise properly specified, i.e. permanent and secure and appropriately enforced, ITQs constitute high quality private property rights in harvesting. Since the harvesting is a major determinant of the size of the fish stocks, ITQs also constitute certain, albeit limited, form of property rights in the fish stocks.

So, ITQs go a substantial way toward eliminating the common property problem in fisheries. As a result, ITQ-managed fisheries are generally found to be much more economically efficient than the traditional common property arrangement (Arnason 2001). This increased efficiency has been found to derive (in proportions which depend on the initial position of each fishery) from (i) reduced fishing effort, (ii) reduced fishing capital, (iii) larger fish stocks, (iv) higher quality of landed catch and (v) better co-ordination between supply of landings and market demand. These outcomes are seen virtually everywhere that ITQs have been introduced, as shown in study after study (e.g. Shotton 2000 and references therein, Arnason 2001, Homans and Wilen 2003).

ITQs generally become valuable in the market place, often very valuable. This represents new wealth because, prior to the introduction of the ITQs, the fisheries typically generated no, or negligible, net profits. Moreover, to the extent that the ITQs are sufficiently secure and long lasting, they are bankable, i.e. they may be used as collateral to obtain financial capital. Thus, by virtue of the ITQ system, zero-value fisheries are turned into fisheries with a positive value. This represents the first step of wealth creation. On the basis of the property rights embedded in the ITQs, and their transferability, this new wealth is turned into living capital in the sense defined by de Soto (de Soto 2003). The newly created wealth in the fisheries can be used to raise more capital and, thus can act as a springboard to a higher path of economic growth. This represents the second stage of wealth creation.

Iceland, a moderately large fishing nation, was one of the first to adopt the ITQ system in its fisheries. Therefore, considerable experience of the system's impact along the dimensions discussed above has been accumulated. Clearly, reviewing Iceland's experience is of considerable interest, and is the purpose of this paper. In particular, the paper seeks to assess the extent of wealth creation within the ITQ system, and how that wealth may have propagated throughout the Icelandic economy.

It turns out that the new wealth created by the ITQ system in the fisheries themselves (the first stage) is quite substantial relative to the national capital and the GDP of Iceland. Therefore, the economic growth effects (the second stage of wealth creation) might be expected to be correspondingly large. Indeed, the introduction of the ITQ system (in a fairly complete form) was followed by a substantial spurt in economic growth, the longest such period in Iceland's modern history. Although this economic growth primarily occurred in sectors of the economy other than the fisheries sector, most importantly the financial services sector, there is evidence that it was significantly assisted by the wealth initially generated by the ITQ system.

I. The introduction and evolution of the Icelandic ITQ system

Iceland is one of the most fisheries-dependent nations in the world. In recent years catches have amounted to about 1.7 million metric tonnes annually, some 2% of the global marine harvest. About 40% of export earnings have been generated by fish products. The fishing industry has directly accounted for over 10% of the gross domestic product and, according to a recent estimate, directly and indirectly for up to 25% (Agnarsson and Arnason 2007).

Prior to the introduction of its ITQ system, Iceland experimented with a wide range of alternative fisheries management systems. These included access licenses, fishing effort restrictions, investment controls and vessel buy-back programs, all of which were found to be unsatisfactory. The earliest ITQ systems were initiated in a few comparatively unimportant fisheries during the latter half of the 1970s, following the extension of the fisheries jurisdiction to 200 miles. Since then, the ITQ system has been extended in several steps and now comprises practically all Icelandic fisheries. The most important steps in this evolution were taken in 1984, 1991 and 2004. In 1984, a limited form of ITQs was introduced in the demersal fisheries, which are by far Iceland's most important fisheries. In 1991, a uniform and fairly complete ITQ system was adopted in all Icelandic fisheries, applying to all vessels above a certain minimum size. In 2004, the system was expanded to cover all commercial fishing vessels.

The chronology of the development in Icelandic fisheries management is summarized in Table 1.

Table 1: **Key steps in the evolution of the Icelandic ITQ system – a chronological overview**

1976	The herring fishery: Individual vessel quotas introduced
1979	The herring fishery: Vessel quotas made transferable
1980	The capelin fishery: Individual vessel quotas introduced
1984	The demersal fisheries: Individual transferable vessel quotas introduced for larger fishing vessels. Small vessels (under 10 GRT (gross registered tonnes)) exempted
1985	The demersal fisheries: An option to adopt effort restriction instead of quota restriction introduced
1986	The capelin fishery: Vessel quotas made transferable
1991	A fairly complete, uniform ITQ system adopted for all fisheries. Small vessels (under 6 GRT) exemption retained.
2004	Small vessels incorporated in the ITQ system

Source: Ministry of Fisheries: Fisheries laws and regulations

Note that before 1991, the ITQ systems in place were limited both in terms of fisheries and fleet coverage, and in the quality of the property rights they defined. Several fisheries and fishing fleet classes were not covered by the ITQ system. The continuation of the ITQ system was uncertain and long term transfers of quota rights were problematic. As a result, quota-holdings were generally not accepted as collateral by financial institutions. All this changed in 1991. The system was formally established as the permanent cornerstone of Icelandic fisheries management. Its coverage was greatly increased, and its legal and property rights attributes were clarified and strengthened. Thus, in spite of the small vessel exemption (abolished in 2004), from 1991 onwards a high quality ITQ system may be said to have applied in the Icelandic fisheries. However, the system is still some distance from establishing perfect harvesting property rights. Most importantly, there is a certain uncertainty about the system's permanence. Also, quotas are subject to special taxation, which reduces the value of the property right.

II. Value of quotas

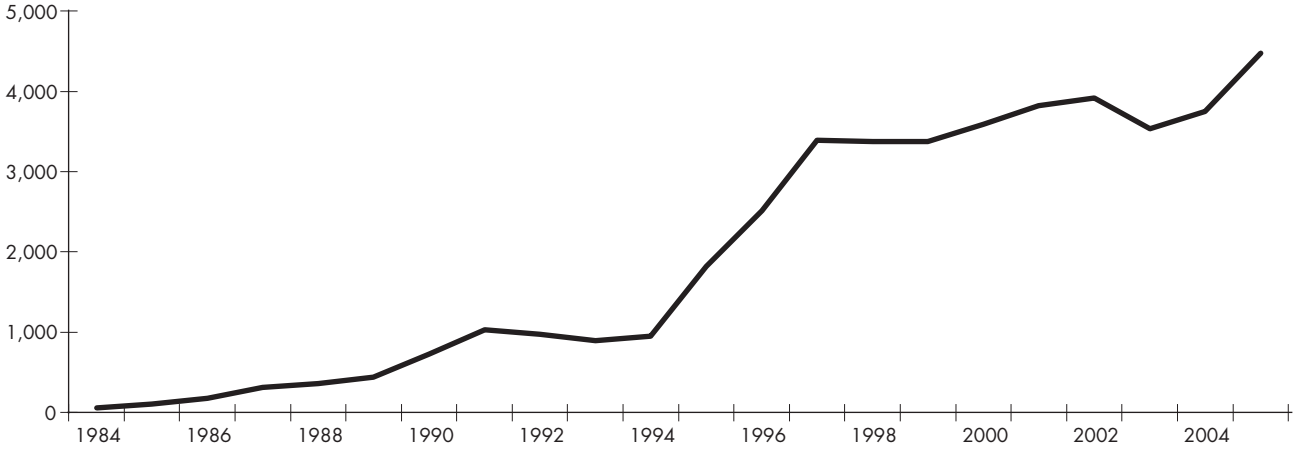
The Icelandic ITQ system comprises two basic assets: (i) the permanent quota share, i.e., the share in current and future TACs held by the quota owner, and (ii) the annual quota, i.e., the permitted annual catch, defined as the multiple of the TAC and the quota share. Both assets are transferable. Therefore, not surprisingly, a market for trading these quotas has spontaneously arisen. In this market, both types of quota assets are intensively traded and equilibrium prices established. The quota shares are much like a share in a limited company. Their market price reflects the present value of expected profits from holding these shares (Arnason 1990). Since the market is quite efficient and quota traders are risking their own money, the share quota price is almost certainly the best available predictor of future profitability and, hence, the true economic value of the Icelandic fisheries. At the same time, due to the nature of the ITQs as marketable property rights, this quota value reflects the value of the ITQ asset.

Since 1984, an increasing number of fisheries have been included in the Icelandic ITQ system. Currently, the system comprises about 35 different fisheries. The overall quota value of the Icelandic fisheries is the sum of the quota values in each of these fisheries. The evolution of this quota value since 1984 is illustrated in Figure 1.

As can be seen in Figure 1, quota- or ITQ-values of the Icelandic fisheries have risen quite dramatically since 1984. Especially big percentage jumps occurred in 1990–1 and 1995–7 following strengthenings in the property rights quality of the quotas. In 1984, the ITQ-value was about US$25 million. Since 1998, it has hovered between US$3.5 and 4.5 billion.

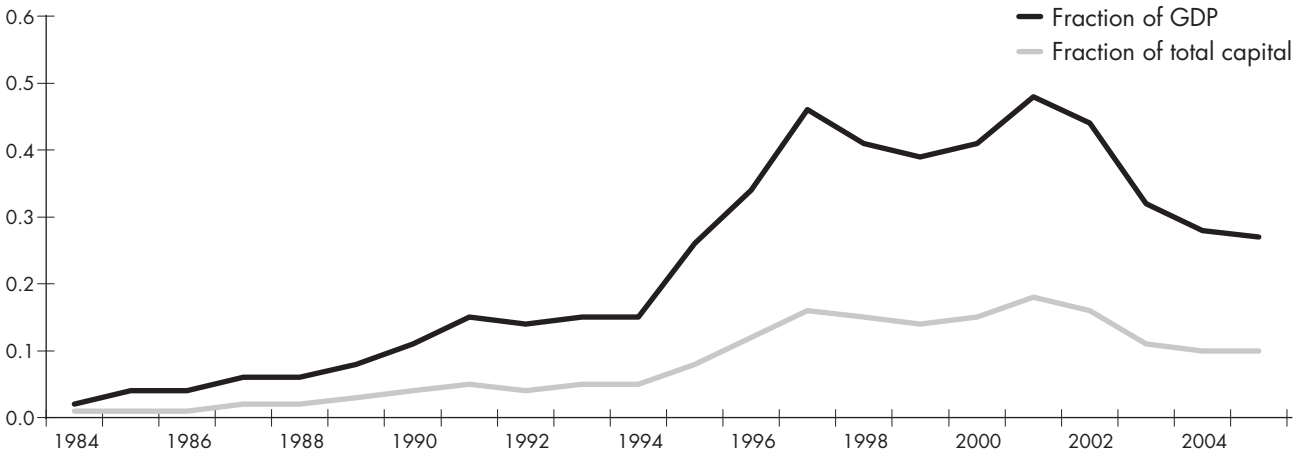
The significance of these ITQ-values for the Icelandic economy is better appreciated when compared to other important measures of the economy. Figure 2 depicts the ITQ-values as fractions of (a) Iceland's GDP and (b)

Figure 1 **Permanent quota values in Iceland: estimates**
M, US$



Source: quota market prices and TACs

Figure 2 **Permanent quota values in Iceland as fractions of GDP and total capital: estimates**



Source: Statistics Iceland and permanent quota values in Figure 1

total national capital as it is conventionally measured (i.e. the market value of physical capital). Figure 2 shows that since 1991 the ITQ-values have constituted a very substantial fraction of both Iceland's GDP and its total capital base. This has been especially pronounced from 1994 onwards. Thus, between 1997 and 2002 ITQ values amounted to over 40% of the annual GDP and up to 20% of national capital. Since 2002, these percentages have declined somewhat. This, however, is not because of a decline in the quota values (as made clear by Figure 1), but because other sectors of the Icelandic economy have expanded even faster.

From the perspective of this paper, however, the key point is not that ITQ-values have increased and now constitute a very substantial fraction of traditional macro-economic measures. The crucial point is that these ITQ-values represent new wealth that did not exist before. Of course, the underlying natural resource existed before the ITQs. But, because of an inefficient institutional structure, i.e., the common property arrangement, it yielded little or no net economic benefits. ITQs changed this situation in two ways. First, they led to a rationalization of the fisheries; they reduced fishing effort and fishing fleets, increased fish stocks and improved co-ordination between supply and demand of catches, which greatly increased the net economic benefits flowing from the fisheries. Second, the ITQs created marketable assets which turned out to be valuable in the market. In other words, the value of the fishery gained a market representation. The property rights content of the ITQs was of course responsible for both impacts.

Even more important is the fact that ITQ-wealth is living capital (de Soto 2003). It can be used as a foundation to raise financial capital and thus contribute to other spheres of economic activity. This has, in fact, taken place to a great extent in Iceland. One way to see this is to observe that most of the original quota shares have changed hands, often more than once. Thus, many of the initial and subsequent recipients of share quotas have realized their gain in value by selling them and moving the equivalent financial capital out of the fishery and into new industries. Another way to substantiate this secondary capital generation of the ITQ system is to note that in spite of much improved profits and reduced fishing fleets, the level of indebtedness in the Icelandic fishing industry has increased substantially. Thus, between 1997 and 2007, this indebtedness more than doubled. This shows that, with the help of the financial system, ITQs have been used to generate financial capital to be used in other industries.

III. Impact on economic growth

Since the establishment of perfectly transferable, durable ITQ property rights in 1991, the Icelandic economy has experienced a prolonged period of high economic growth. Annual growth rates from 1985 to 2006 are illustrated in Figure 3.

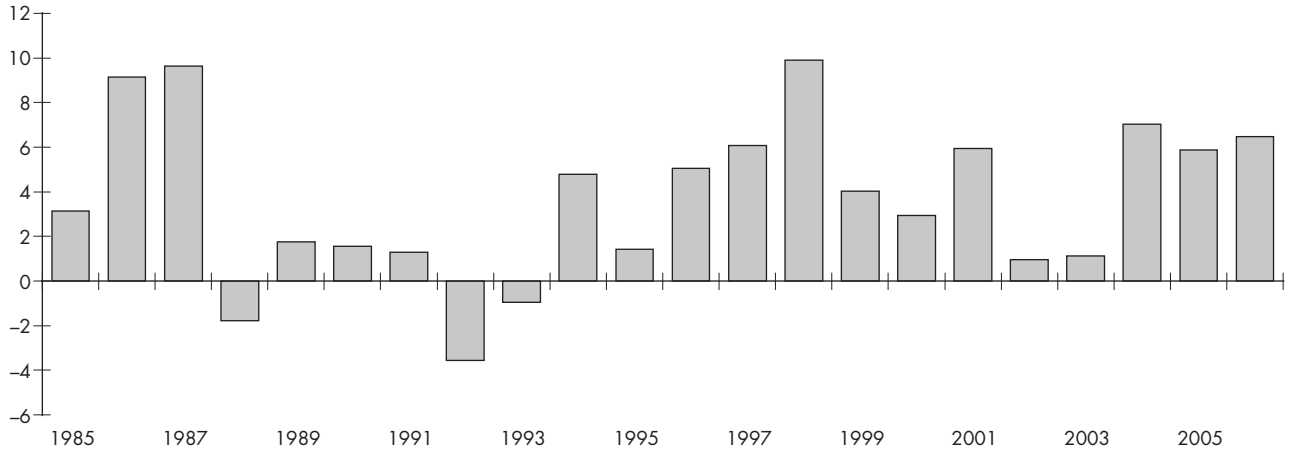
During the 15-year period from 1991 to 2006, real economic growth in Iceland has averaged 3.8%. This far exceeds average European Union (EU-15) growth rates as well as those of the UK during the same period, which were respectively 2.0 and 2.4%. From 1994, when ITQ-values increased dramatically, Iceland's economic growth increased still further. The average growth rate was 4.6% per annum, while the corresponding figures for the EU and Britain are 2.3 and 3.0%, respectively. The period since 1994 has also been longest period of sustained economic growth in Iceland's modern economic history. These high economic growth rates cannot be explained by Iceland starting with a low per capita income. Iceland ranked 8th in the world in terms of per capita income in 1994, and 5th in 2005 (UNDP 2007).

This record does not of course prove the existence of a causal relationship between the wealth generated by the ITQ system and economic growth in Iceland. The circumstantial evidence, however, is quite suggestive. First, economic theory on the market economy and sources of economic growth predict an effect of this nature. Second, the correlations in timing and extent are strong. Thus, a simple correlation between real ITQ-values and real GDP is very high (over 0.9), especially in the period up to 2001, when the other sectors of the economy really started to take off. A simple regression analysis suggests a similar explanatory power. Third, alterations in the structure of the economy, especially the great expansion of certain new sectors of the economy (particularly that of financial intermediation) strongly indicate that the increased availability of financial capital, which the ITQ-system was instrumental in creating, has much to do with the recent high rates of economic growth.

Of course, the ITQ system was not the only driver of this comparatively high rate of economic growth in Iceland over the past 13 years. Large scale privatizations and general liberalization of the economy in the early 1990s and subsequent reductions of corporate taxation probably also played an important role in the process. However, to the extent that the growth was fuelled by new investments, a substantial part of the financial capital derived from the new wealth represented by ITQs.

An important component of economic growth in Iceland during the past 10 years has been the dramatic expansion of the country's financial sector. This sector, which consists primarily of banks and investment companies, expanded from less than 1% of GDP in the early 1990s to about 8% in 2006. Thus, it is directly accountable for a substantial portion of the economic growth during the period. In a recent publication by the Icelandic Chamber of Commerce, Portes and Baldursson (2007) attempt to provide an explanation for this expansion. In a section titled "Where does the money come from?" they claim that the equity used to sustain this expansion originally came from two sources: (i) privatization of the previously state-owned Icelandic banks in the early 1990s, and (ii) the new wealth created in the fisheries though the ITQ-system.

Figure 3 **Real GDP growth rates in Iceland**
%, 1985–2006



Source: Statistics Iceland

Conclusions

Icelandic ITQs have become very valuable compared to other measures of the Icelandic economy. This value predominantly represents new wealth for the Icelandic economy. Before the introduction of the ITQ-system, the profitability of the fisheries was poor. Even more importantly, future profits of the fishery could not be captured in a marketable asset. The evidence strongly indicates that the new capital embedded in ITQs has, via financial intermediation, been multiplied and found its way into other industries. Many of these industries have been extremely successful, thus greatly adding to the initial economic impact of ITQs on the fisheries themselves.

The new wealth embedded in the ITQs was created by the relatively simple expedient of defining private property rights in the extraction from common pool fish stocks. In other words, the introduction of the ITQ system constituted a certain, albeit limited, shift from collective to private ownership in fish resources. By creating a new form of capital, the ITQ-system in Iceland has greatly increased marketable wealth and, thus, seems to have contributed substantially to the country's rapid economic growth.

Notes

1. In this paper, common property refers to a resource to which a group of people hold utilization rights and possibly other rights. The group must contain at least two persons but it can be much larger: it may, for instance, include all people living in a certain area, all nationals, or even the global population. In many cases it is useful to talk about the common property of some given group, e.g. the common property of all village inhabitants. The common property rights may be weak or strong. This definition of common property is in accordance with classical one as forwarded by e.g. Ciriacy-Wantrup and Bishop (1975) and Eggertsson (1990). It includes open access, the so-called common pool resources (Ostrom 1990) and community held resources as special cases. It is useful to define common property this widely (see Ostrom 1990 for a narrower definition) as all common property resources that fall under this definition are subject to the well-known common property problem (Gordon 1954, Demsetz 1967, Hardin 1968, Cyriacy-Wantrup and Bishop 1975). The antonym to common property is private property, under which the common property problem does not arise, although other problems of resource utilization may.

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