Abstract

In Norway, the rationale for fleet adaptations has been subject to different interpretations and policies. While coastal settlement, a surplus fishing capacity and a negative resource rent were dominant adaptations until the end of the 1980's, market orientation and economic efficiency have gradually become the most central fisheries political goals. However, the rate of market-based transactions have affected the fleet structure, the distribution- and ownership of quota rights in a manner that challenge the legitimacy of the quota regime. Today, the ownership of the fish resources, a future resource tax and the legal status of being a fisherman are high on the political agenda.

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Hesitant reforms; The Norwegian approach towards ITQ's*

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Hesitant reforms: The Norwegian approach towards ITQ's

1. Introduction

Overcapacity and economic inefficiency has plagued the world´s fisheries for decades, and became particularly acute when the biological management of fish stocks improved [1]. While individual transferable quotas (ITQ's) may address this challenge [2], such management schemes are controversial due to the reduction in number of fishers and vessels and the impact on coastal communities. Costly alternatives such as buyback schemes as well as a cascade of command-and-control measures have thus been tried [3, 4], mostly with limited success [5]. Because of the challenges with other alternative management systems, individual vessel quotas (IVQs) with varying degrees of transferability are used in an increasing number of fisheries [6, 7]. However, while such regime models seem to be successful in protecting fish stocks [8] and expanding harvesting seasons [9], there remain a number of economic inefficiencies due to the various limitations and barriers in the systems [10, 11, 12].

In this paper, we look closer at the management system for whitefish fisheries in Norway. This is a case where the relationship between the fishing fleet and coastal communities carries substantial weight, and where the development of the management system is characterized by a number of compromises to such an extent that Hannesson [12] argues that the system indeed is an ITQ system.[1] As discussed by Hannesson [12], the Norwegian regulatory system has gradually developed from open access fisheries to the closing of the commons and the introduction of tradeable quotas with built in limitations. This is in strong contrast to e.g. Iceland, where a more radical change of regulations took place in the early 1990's [13]. As most ITQ systems contain various restrictions due to social concerns despite the fact that these restrictions reduce economic efficiency and dissipate economic rents [11,12], the gradual Norwegian transition provides a number of insights of general interest with respect to the trade-offs involved as each step of the process creates new incentives and dynamics. While Hannesson [12] provide a good discussion of the introduction of de facto ITQs in Norway and their impacts on number of vessels and profitability, this paper is complementary by providing more focus on the institutional context and the interaction between economics, policy and management.

In Norway, limited transferability of quotas in the whitefish fisheries was first introduced in the deep-sea fleet (trawlers and long-liners) in 1997. Since then, the amount of quotas that can be concentrated on a vessel have increased gradually in several steps. Transferability of quotas are introduced to smaller vessels, first for coastal vessels above 15 meters in 2004 and later for vessels above 11 meters in 2007. In addition, the time of ownership of purchased quotas are expanded [14].[2] The responsibility for capacity adaptations is thus transferred from

[1] It is worthwhile to note that in official Norwegian terminology, quotas are not transferable. According to the official terminology, the mechanisms that Hannesson [12] argues make the quotas transferable, are just capacity adjustment measures.

[2] Initially, a purchased quotas was valid for 13 years before it went back to the TAC for that vessel group. Currently, quotas are valid for 20 or 25 years depending on vessel group.

the public domain were scrapping schemes and buybacks program were used until the early 1990s, towards the market place, using tradeable quotas at the end of the 1990's and onwards. [12, 14, 15].

The introduction of a tradeable quota regime represented a radical change from the former non-transferable individual vessel quota model (IVQ), first introduced to the deep-sea trawlers at the end of the 1970's and to the coastal fleet in 1991 [16, 17]. The IVQ model integrated vessel size and quota size as a bundled system. Transactions of quotas among vessels and groups, and across regions were not allowed. By connecting rules for vessel size and quota size, the institutional design of the quota system was constructed to prevent concentration of quotas and maintain diverse employment systems in coastal areas. This was perceived as a far more "social" alternative than an ITQ system [18, 19]. Economic efficient capacity adaptations were not a vital part of the policies. Surplus capacity problems were addressed by using buy-back programs and public financial support.

While the closing of the commons and the introduction of the resource allocation regime among coastal- and deep-sea vessels and regions were controversial topics during the 1980's and the 1990s, the introduction of a tradeable system in 1997 was even more controversial. Many fishermen interpreted the introduction of a tradeable quota regime as a privatization of the fish resources, which are legally owned by the Norwegian society [20]. In order to describe the level of the divergent views in the public debate, the fisheries minister made the following statement about the legitimacy of the quota regime in 2005 [21]:

"There has recently been a debate on privatisation and rights granted in perpetuity to fish resources that have been guaranteed by the Norwegian Parliament to remain common property. Let me assure you that to date no public right has been turned in to private property and, furthermore, no one has gained rights in perpetuity to even one kilo fish. There is no difference in status between the rights of a small-scale fisher and the rights of offshore vessels… The right to fish is valid only as long as one fulfils the requirements set by society at that time. This applies to all vessel groups, large as well as small, no matter how large share each may have".

The introduction of the new system reflects the development of a modern fisheries management regime that started in 1977. In Norway, as in a number of other countries, fish resources came under national control with the extension of the 200 mile Exclusive Economic Zone (EEZ) in 1977. The introduction of total allowable quotas (TACs) was established to secure biological sustainability [22]. In order to provide for social sustainability, the construction of a legitimate resource allocation regime from TACs became the next pillar in the management regime [23, 24]. Within the frame of the fixed resource allocation regime among groups, transactions of quotas and vessels gradually became the most important management tool to reduce the numbers of vessels, and thus strengthen the resource base for the remaining vessels within each gear- and vessel group [25].

Intuitively, the market orientation of the quota system can be isolated to economic goals for the fisheries system. However, TACs, fixed resource allocation keys and transferable quotas, represent different functional units that are integrated to each other. Together, the units

constitute central pillars of the management regime. For example, lack of legitimacy to the allocation regime among fishermen may cause lack of compliance and a larger fishing mortality (F) than that set by the yearly TAC. At the same time the transferable quota regime rests on fixed and stable allocation keys among groups. Hence, if the transferable quota regime does not manage to both integrate technological efficiency gains and avoid capacity creep within the fixed resource allocation regime on a continuous basis, this may disturb the balance between the three subsystems.

However, the rate of tradability and the social effects are subject to strong divergent views about the legitimacy of the present management regime [26]. Also topics related to what extent the market orientation put pressure to the legal status of being a fisherman, and the implications from a future resource fee, imposed by the government, are central elements of the present debate [27]. In this debate, Holm and Henriksen [28] describe how Norwegian fisheries are to serve as an employment system in coastal Norway, an obligation represented by a "social contract" between fisheries and the society. The market orientation and increasing concentration of the society's resource base to the "privileged few", are thus perceived as a threat to fisheries as employment systems and resisted by fishers protected by the legislative framework built around the social contract; the Ocean Resources Act [20], which states that the living marine resources belongs to the Norwegian society and the Participation Act [29], which protects the legal status for being a fisherman.

This article outlines the development towards a tradeable quota regime, the rate of transactions and how the aggregate effects produce new input to the future direction of the management regime. The next section outlines major drivers for closing the commons and the introduction of a modern fisheries management regime. Section three describes how the quota regime has become a market orientated system. Using a unique dataset from the Norwegian Fisheries Directorate that includes each quota transaction within each regulatory group, the complete aggregate rate of quota transactions within different gear and vessel groups, the effects upon the numbers of vessels and sustainability attributes, such as indicators for fuel consumption and the economic performance are presented. The last section discusses the implications from market orientation of the quota regime with regard to a possible introduction of a resource tax and the future status of the Participation Act [29].

2. Background

After World War II, the Norwegian fishers could follow the general development of income in society by increased catch rates. However, by the end of the 1970s most commercial fish resources in the North-Atlantic were more or less fully exploited. Since then, further income improvement had to come through technical- and structural changes within the fleet. Since the 1970s, the need to reduce surplus catch capacity has thus been high on the political agenda [30].

From the 1960s until the late 1990s, Norwegian fisheries were characterised by overexploited fish resources and substantial inefficiency [31, 32, 33], low profitability and a negative resource rent [34, 35, 36]. As a reference to the development from open access fisheries

towards limited tradeable quotas, the fisheries economic literature considers fisheries resources as a cost free-input factor, which allows the fleet to achieve an economic rent above normal compensation for capital investment, labor and other relevant input [37]. When fisheries are open access, rational actors increase their fishing effort until income equals costs, leading to the tragedy of the commons [38]. To protect the stocks and achieve desirable management objectives e.g. maximum sustainable yield (MSY) or maximum economic yield (MEY), the collective fishing effort must be limited by a TAC. However, a TAC without further regulations would create a race to fish, as each fisher would try to maximize his own share of the TAC. Different attempts to reduce effort by limiting access to the fishery or regulating vessel size, or even by buy-back programs, do not change the incentives or final outcome in a radical manner [39]. Fundamental change can only be achieved by removing the incentives for the race to fish. Individual vessel quotas are the main tool available, as one has nothing to gain by spending excessive effort to obtain the allocated catch. This requires that the government impose restrictions on the fishing fleet.

By restricting access to the fisheries, e.g. by IVQs, income from fishing may be higher than costs, and economic rent is generated. The resource rent creates a demand and a willingness to pay for fish quotas, reflected in the anticipated profit for the most effective actors. Furthermore, if a market is created for transactions of quotas, over-capacity would be reduced as the most profitable vessels would buy quotas from the less profitable vessels, and the resource rent would be reflected in the quota value [40].

Also changes in the economic framework and the competitive status with regard to other industries have put pressure to increase economic efficiency within fisheries. Since 1965, the trend in real income for Norwegian employees and the real prices of fish have been different. While the average growth in real income for all industries is estimated to be 2% per year, the average growth of fish prices is estimated to 1% per year [41].[3] In particular, the increase in real income for all industries has been significantly higher after 1995 [41]. Consequently, as fisheries need to be competitive in relation to other industries to attract input factors and particularly labor, the limited fish resources had to be distributed to fewer vessels and fishers via increased technological efficiency. Gordon and Hannesson [42] and Kvamsdal [43] show that this has indeed been the case.

In a historical perspective, the fishing fleet has also been subject to large amounts of public financial support [44].[4] From 1980 to 1986 subsidies peaked at more than 1.2 billion NOK, which represented more than 20% of the fleets' total catch value per year [45]. However, due to the joint Norwegian - EFTA economic agreement, Norway committed to end subsidies to the fisheries sector from 1991 [46].[5] Thus, the steep decline in subsidies represented a radical

[3] The development of average fish prices, refers to all species fished by the Norwegian fleet [41].

[4] The arrangement for financial support was established in 1964 and named as the Main Agreement between the government and the Norwegian Fishermen's Association [44].

[5] EFTA: European Free Trade Association.

economic loss, which put further pressure to increase economic efficiency within the entire fleet.

3. From open access towards tradeable quotas

For the whitefish fisheries the reduction in public financial support coincided with a period of historical low Northeast Arctic (NEA) cod quotas. Hence, over-capacity and lack of economic performance within all aspects of the fleet became visible. This mismatch was first documented by a working group report from the Norwegian Fisheries Ministry in 1989, which documented a severe over capacity in both the deep sea- and coastal fleets [47]. The report [47] was the precursor to a white paper that gained a paradigmatic status within the principles of Norwegian fisheries management [48]. The white paper documented that the perceived social contract between fishers and coastal communities had been possible only due to subsidies. Furthermore, future fisheries without subsidies could only achieve sustainability if resource considerations and economic efficiency gained increased importance. In the new setting, employment and public financial support were of less importance.

Followed by the introduction of TACs and the closure of the coastal commons in 1989-1991, the need to create stable allocation keys of limited TACs among different gear- and vessel groups were put high on the agenda. After several rounds of conflicting debates between the deep-sea fleet and the coastal vessels, a solution was found in the so-called "trawl-ladder" in 1989, allocating 30-33% of the TAC to trawlers, 12.7% to long-liners and the rest to coastal vessel fleet from 0-28 meters [49].[6] The fixed allocation keys among groups, laid the foundation for the individual vessel quota system (IVQ). While a non-transferable IVQ system was already introduced to the pelagic purse seiners and the deep-sea trawler fleet in the late 1970's, the IVQ model was introduced for the coastal fleet in 1991. For the coastal fleet, also activity requirements for being awarded individual vessel quotas were also defined [48]. In this setting, the new order was especially designed to secure coastal fisheries as employment system and maintain a diverse ownership of the resource base, especially in the fisheries dependent communities in the northern regions [50].

The introduction of fixed vessel quotas and micro-management of fleet adaptations was a radical shift with earlier management policies, which changed the rationality for coastal fishers [51]. The Fishermen's Association (FA) resisted the IVQ model, but accepted to restrict fisheries as a provisional arrangement for the recovery of the NEA cod [52]. However, just a few years after the introduction of the new quota regime, it became clear that the IVQ model did not capture the huge diversity in catch efficiency among actors and vessels in the fleet, and particularly within the coastal fleet. In 1995, only 45% of the smallest vessels fished their allocated quotas, while larger vessels within the same group had the capacity to fish far more than their allocated quotas [25]. As the IVQ model was based on a rigid formula between the quota-size and vessel length, the regimes' lack of flexibility did not cope with the substantial variations in efficiencies among actors within the same groups [53, 15]. Hence, as

[6] Coastal vessels: 0 – 28 meters length.

poor profitability also led to a steadily older fleet, and fisheries was not able to compete with other sectors, the legitimacy of the IVQ regime decreased [26].

For the NEA cod fisheries a system of market transactions of vessels and quotas was first introduced to the cod trawler fleet in 1997 and to the coastal fleet between 15 – 28 meters length in 2003 [54]. Since 2005, the number of tradeable quotas that can be concentrated on each vessel within different separate groups increased and the regime was expanded to cover coastal vessels down to 11 meters of length in 2007. In addition, the time of ownership of purchased quotas was expanded from 13 or 18 years in 1997 to 20 or 25 years in 2007. Based on the fixed resource allocation keys among different gear- and vessel groups, separate markets were constructed for each group. Transactions across groups were not allowed, and transferability was also limited between regions. Each group's quota percentage shares of the national TAC were divided into a system of quota factors (QFs) (cod fisheries) and basis-tons (pelagic fisheries) subject to transactions. Rules for maximum numbers of QFs and basis-tons per vessel were introduced for each group. While coastal vessels were allowed a maximum of 3 to 6 QFs depending on the vessel size, a maximum of 3 QFs were allowed for cod trawlers and deep-sea longliners in 2005. The deep-sea purse seiners (herring and mackerel) were allowed to concentrate a maximum 650 basis-tons per vessel. In order to further expand the rate of quota transactions and thus strengthen the quota-base for the remaining vessels, the maximum amount of quota that a vessel could hold was increased in 2014. For cod trawlers the maximum number of QF's was increased to 4 QF's per vessel, 5 QF's per vessel for the longlining fleet and 850 basis tons for the deep sea pelagic fleet (purse seiners). Vessel size restrictions were also reduced [55].[7]

With reference to the increased tradability of the quota regime, a crucial question is how different gear- and vessel groups have responded in terms of amounts of quota transactions and the effect upon the numbers of vessels. Table 1 provides an overview of each group's relative quota-base (QF's for the white fisheries and basis tons for the pelagic fisheries) and the rate of transactions within each group respectively:[8]

Table 1 here

Hannsesson [12] shows that the number of vessels has been reduced in all the main vessel groups. Table 1 provides more detail, and documents that a large proportion of the quotas have been traded in most vessel groups. It also shows significant differences between vessel groups. Data provided in the annual economic surveys of the fishing fleet conducted by the Fisheries Directorate, allows comparison of the amounts of quota transactions and the economic performance for the vessels within different gear- and vessel groups. For example,

[7] For a detailed account of the legal conditions for transactions of vessels and quotas in Norway, see Standal and Sønvisen [56].

[8] The dataset for table 1 is based on information from each quota transaction at vessel level for each group for the period 2006 – 2014, and compiled as aggregate expressions for the total rate of quota transactions for each group.

the deep-sea long-lining fleet has been struggling with poor economic results for the last decade [58]. This can be seen in the strong reduction in capacity, as 68.9% and 70.6% of the group's total quota has been traded. Similarly, 61.6% of the cod trawler fleets' total quota has been traded. However, the pelagic deep-sea purse seiners, which have shown the strongest economic results for the last decade, only 19.2 % of the groups' total group quota (basis-tons) has been exchanged (sold) between vessels within the group.[9] For the coastal fleet fishing cod and other whitefish species, 30.1% of the total quota has been subject to transactions.

As the quota allocation among groups is fixed, the different rates of quota transactions have affected the numbers of vessels and the distribution of quotas per vessel within each group in a different manner. Table 2 provides a complete overview of how the different rates of quota transactions have affected the numbers of vessels within each vessel group. For the period 2006 – 2015, the total numbers of vessels within the fleet were reduced in a radical manner. Except for the deep-sea purse seine fleet, which was only reduced by 7%, the pelagic trawlers were reduced by 30%, the numbers of cod trawlers by 40% and the deep-sea long-liners by 45%. The coastal vessel group was reduced by 21 %. Nevertheless, the different rates of trading suggest that the maintenance of the different vessel groups contribute to substantial economic inefficiency, as described by Kroetz et al [11]. Hence, one can expect that the rules will continue changing and lead to more vessels leaving the fisheries in the future.

Table 2 here

The transferable quota regime has also affected other central attributes than numbers of vessels and the distribution of fish quotas.[10] For the group of cod trawlers, vessels smaller than 50 meters are almost out of the fleet while the number of vessels above 70 meters increase. Moreover, the reduction of capacity has led to improved profitability, allowing more investments [59]. Today, the trawler fleet constitutes the lowest average age of all vessel groups in the Norwegian fleet (15.5 years) [58].

Fuel consumption and thereby environmental impact has also been reduced. A study from Svorken et al [60] found that the cod trawler fleets' total fuel consumption was reduced by almost 50% from 2002 to 2012. While the estimated fuel consumption in 2002 was 0.7 liter fuel per kilo catch, it was reduced to 0.4 liter per kilo catch in 2012. This is explained by the reduction in the total numbers of operating days for the trawler fleet, from 25 000 days in

[9] For the deep-sea purse seine fleet, the restructuring processes goes back to the 1970s [12]. After the spring-spawning herring stock collapsed during the 1970s, a substantial reduction in the numbers of pelagic vessels and restructuring of the fleet took place. Buy-back programs and trading/merging of licenses reduced the numbers of purse from 269 vessels in 1977 to 105 vessels in 1990. In addition, a strong increase of the spring-spawning herring stocks and quota from the 1980's, and the 1990's led to an adjustment of the fish stock to the remaining fleet´s capacity, reducing the necessity of further capacity reduction in this vessel group.

[10] As the cod trawler fleets' total quota-base represent central part of the Norwegian TAC for NEA cod, haddock and saithe etc. (32%) and the fleet has been subject to a significant amount of quota transactions (61.6%), we use this group as a reference to investigate how quota transactions have affected the fleet structure and fuel consumption. However, economic performance indicator, such as development of short- and long-term debt is presented for all groups subject to the tradeable regime.

2002 to 12 000 days in 2012. However, the numbers of operative days per vessel increased from 260 to 320 days per vessel. Thus, the concentration of the trawler fleets' total quota base to fewer vessels have led to a more efficient utilization of the remaining fleet, which has simultaneously contributed to lower fuel costs and greenhouse gas emissions. In total, this is not surprising given the scale elasticity for this vessel group [35]. This finding also illustrates that before tradability, economic factors not only prevented fleet renewal but also the integration of updated technologies to vessels at a suitable size.

The transferable quota regime has also affected the financial status for the remaining vessels within the different groups. Economic surveys from the Fisheries Directorate [61] show that the average short- and long-term debt for the entire fleet have increased in the period 2004 – 2013, reflecting the monetization of the value of fish quotas. However, more of the fishing firms' total capital consists of fish quotas that have been purchased, reflecting the monetization of the value of fish quotas. The increased value of fish quotas reflects the profitability of market-based transactions and the economic effects derived from market-based capacity adaptations by concentrating the quota-base to fewer vessels. In a recent study, Hannesson [62] shows that, as expected, the rate of return on capital is now similar to what one find in other industries. A tradeable regime as privatized capacity adaptations, may thus represent a positive contribution to reduce surplus capacity, increased economic efficiency and a more environmental friendly fishing fleet.

4. Policy implications

The non-tradeable IVQ model was designed to secure social- and economic equity and maintain a diverse fleet structure in coastal areas. In addition, the quota regime should prevent unwanted distributional effects, such as quota concentration, derived from e.g. the Icelandic ITQ regime with limited boundaries [63, 19]. However, after almost ten years in operation during the 1990s, the IVQ model proved unable to secure a sufficient economic efficiency and avoid allocation conflicts within the fleet. Since the 1990's, the tradeable quota system has thus gradually become the main management tool to reduce surplus capacity, increase profit, stimulate fleet renewal and secure fisheries as a competitive workplace with regard to other ocean-based industries. Hence, as society was no longer willing to subsidize fisheries, a shift in the Norwegian fisheries management system occurred, from maintaining diverse employment systems, towards economic efficiency within the frame of a sustainable resource management.

Although a significant potential for increased profitability still remains, the rate of concentration of the quota-base to the "privileged few" has been significant, especially within the deep sea NEA cod fisheries. In addition, the resource rent is privatized by fishers who sell their quotas and exit fisheries in Norway, but there is no public resource tax to allow the larger society to benefit, as in New Zealand and Iceland [64]. In this context the tradeable Norwegian IVQ model hardly represents any particular "social alternative" to the effects derived from a traditional ITQ model with built-in boundaries.

The distributional effects and the privatization of the resource rent have launched a severe debate about the legitimacy of the entire quota system. As fish resources belong to the society, a resource tax from the fisheries to society is suggested. However, the proposal has met strong divergent views among stakeholders [63]. [11] Greaker et al [36] have estimated the potential maximum annual resource rent to 9.3 billion NOK for 2011, while the realized resource rent for 2011 was 2.3 billion NOK. Similarly, based on a total catch value of 16.3 billion NOK for 2011, Steinshamn [34] calculated the annual maximum resource rent in Norwegian fisheries to be between 5 and 10 billion NOK. However, in order to maximize the profit from Norwegian fisheries, the number of fishermen must be reduced by 40 - 60% from the 2011-level (c.f. 8300 fishermen). This approach also presupposes a reallocation of the fish resources from the less efficient actors/groups to the most efficient adaptations [34]. Consequently, if the society wants to transform the potential resource rent into maximum profit, future quota transactions and further concentration of the quota base to far fewer actors must be expected.

However, substantial numbers of quota transactions at market price under no resource tax have already occurred since 1997 for the deep-sea fleet and since 2003 for the coastal fleet. An important question is to what extent a potential resource tax may reduce the future value of already purchased quotas at a level that is more or less equivalent to the rate of the potential resource tax. Consequently, a tax may represent a potential loss for actors who already have bought quotas at full market prize. In order to secure the legitimacy of the system and equal treatment for actors, the introduction of a future resource tax may be difficult. On the other hand, Nøstbakken [66] argues that a future resource tax and lower quota prices, may reduce the entrance costs to the fisheries and counteract fisheries as domain for the "privileged few".

In a historical perspective, the institutionalization of the resource allocation regime, the IVQ model, the Participation Act [29] and the Ocean Resources Act [20] were constructed to protect the fishermen’s legal and economic status in the society. In order to increase economic efficiency, fishermen asked for deregulations and increased market orientation to solve efficiency problems within the fleet. However, the effects from the law of the markets are about to change the fisher's rationality with regard to their own institutions.
In this context the effects from the tradeable IVQ regime have triggered a debate about the legal status of the fish resources and who shall be allowed to fish in Norway.

Concerning the Ocean Resources Act [20] and the legal status of the fish resources, most fishers rejected a potential resource tax just a few years ago. However as fisheries have become more profitable, actors within the deep-sea fleet now consider a resource tax as a

[11] In 2015, the Ministry of Trade, Industry and Fisheries (NFD) appointed a committee with the mandate to examine the quota regime and the introduction of a resource tax [65]. The white paper from the committee was presented in December 2016, and proposes the introduction of a resource tax for Norwegian fisheries (NOU 2016:26). A resource tax is derived from the term resource rent or super profit when harvesting natural resources. In Norway, oil and gas companies operating on the Norwegian continental shelf are obliged to pay 78% tax (54% resource tax and 24% corporate tax).

strategic key to obtain a legal binding to the fish quotas and thus obtain a perpetual ownership to the fish resources. Some major quota-holders within the deep-sea fleet also suggest removing the Participation Act [29]. As the quota-base is concentrated on steadily fewer actors and a future resource tax represents a potential for further reduction, the amount of potential quota buyers within each regulatory group may be reduced beyond a critical mass. In this context, removing the Participation Act [29] is thought to open up and expand the number of potential buyers to increase the competition (values) for their own quota-shares.

The Norwegian experience shows how incompatible management objectives put pressure on central institutions, such as the resource allocation regime and the coupling to coastal community policy aims. A market oriented quota regime monetizes a number of values, also the objectives of different agents including the fishers. Subsequently, the effects of the market – beyond the specific problems intended to solve – must be considered, especially within industries that correspond to limited public resources and to a "social contract" with the society.

The sustainability of the “social contract” is also challenged if it can only be maintained by public subsidies. Compared to efficient fisheries management systems from an economic perspective, such as Iceland and New Zealand, Norway has a long way to go. There are still many restrictions on the transferability of both quotas and vessels, and across different gear- and vessel groups. As indicated by Kroetz et al [11], there is economic inefficiency associated with every restriction on quota trading. Nevertheless, during the last 15 years, the Norwegian system has gradually evolved allowing for more transferability and increased quotas to be allocated to a single vessel. While this process reduces the number of vessels, it also increases profitability and quota value while reducing economic inefficiency. It is therefore likely that the process will continue. There are also a number of lessons to be learned from Norway´s gradual approach relative to the more dramatic changes of management at e.g. Iceland and New Zealand. Depending on the perspective used, Norway´s gradual change provides for a softer transition or prolongs the transitional pain.

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Table legends

Table 1
Vessel groups, total amount of quota units, quotas exchanged and their percentage (%) within each vessel group, 2006-2015.[1]

Regulatory groups	Species	Total quota units	Quotas exchanged	Percentage exchanged
Purse seine >90 feet	Mackerel	45 800	8787	19.2
	Herring	41 768	8116	19.4
Pelagic trawl	Mackerel	10 934	7425	67.9
	Herring	11 505	7972	69.3
Cod trawl	NEA cod	87.9	54.2	61.6
	Haddock	87.9	54.2	61.6
	Saithe	103.1	64.4	62.5
Deep-sea long line	NEA cod	92.2	63.5	68.9
	Haddock	88.5	62.5	70.6
	Saithe	22.3	9.3	41.8
Coastal vessels	NEA cod	9080.0	2735.6	30.1
	Haddock	8589.5	2629.5	30.1
	Saithe	8709.4	2673.3	30.7

Source: Fisheries Directorate [57].

Table 2.
Regulatory groups and the numbers of vessels within each group, 2006 – 2015.

Groups	2006	2015
Purse seiners >90 feet	85	78
Pelagic trawlers	40	30
Cod trawlers	61	37
Deep-sea long liners	47	26
Coastal vessels	2354	1808

Source: Fisheries Directorate [57].

[1] For 2015 the deep-sea purse seiners are allocated 70% of the national TAC (278 868 tons) for mackerel and divided into 45 800 basis-tons. The same fleet are allocated 44% of the national TAC (255 277 tons) of the North Atlantic herring quota and divided into 41 768 basis-tons. The cod trawlers are allocated 31.6% of the Norwegian TAC (466 439 tons) for NEA cod and divided into 87.9 QFs. The deep sea long lining fleet are allocated 12.7 /% of the total TAC of NEA cod and divided into 92 QF's. The coastal cod fleet are allocated 57.3% of the TAC for NEA cod and divided into 9080.0 QF's [57].