Towards Demand-Oriented Value Chain: Challenges For Norwegian Cod Fishery

Mot en Markedsorientert Verdikjede: Utfordringer i Norsk Torskefiske

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Abstract

Analysis of the market shows that Norwegian cod industry is influenced by regulatory framework based on tradition. The data presents increased volumes of cod exported as whole frozen for further processing, and decreasing number of production facilities and industry employees. Examination of export destinations in terms of volume and value shows that the countries that receive the largest quantities pay the lowest price per unit of fish. We also noted limited variety of products exported from Norway. Norwegian cod industry is not demand oriented.

Review of the theory of market-oriented fisheries, vertical integration, management systems of total allowable catch and requirements for production of high quality products necessary for satisfying different markets, allowed us to specify features of the industry responsible for harvest-driven production We conducted semi-structured interviews with respondents from companies in different parts of the cod value chain and they recognized the same features. Most of the processing companies in Norway are not upstream vertically integrated, thus they cannot control time, volume and quality of the raw material. A large share of the raw material is sold on auction, which limits the possibility of vertical coordination and communication with the fishermen. The quality of raw material varies, which makes it difficult to produce standardized products with maximal utilization of the fish. Most of the deliveries are accumulated within a few months of the year, which is disturbing in terms of maintaining stable business relations and high profitability of processing plants.

Sammendrag (Norwegian)

Våre analyser av markedet viser at norsk torskefiske blir støttet av regelverk som ofte er bygget på tradisjon. Innsamlet data viser økt eksport av hel, frossen torsk for videreforedling, og et kraftig redusert antall produksjonsanlegg og ansatte i industrien, selv om regjeringens ønsker er mer verdiskapning av fersk fisk i Norge. Videre fant vi at Norge stadig eksporterer mer torsk og torskeprodukter til land der den (hel og foredlet) oppnår lav pris. I tillegg produserer og eksporterer Norge et lite utvalg produkter noe som gjør industrien sårbar for markedsendringer. Norsk torskeindustrien er i dag ikke markedsorientert.

En gjennomgang av teorien om markedsorientert fiskeri, vertikal integrasjon, reguleringer av total allowable catch (TAC) og nødvendige kvalitetskrav til produkter for å tilfredsstille ulike markeder, gjorde det mulig å stadfeste egenskaper i industrien som er grunnen til fangstdrevet produksjon. Vi gjennomførte semi-strukturerte intervjuer med aktører fra forskjellige ledd i verdikjeden for torsk der de samme egenskapene ble gjenkjent.

De fleste av foredlingsbedriftene i Norge er ikke oppstrøms vertikalt integrert, og kan dermed ikke kan kontrollere tid, kvantitet og kvalitet på råstoffet. En stor andel av råstoffet blir solgt på auksjon, noe som begrenser muligheten for både vertikal koordinering og god kommunikasjon med fiskerne. Kvaliteten på råstoffet er ofte dårlig og gjør det vanskelig å fremstille standardiserte produkter med maksimal utnyttelse av fisken. Mesteparten av kvotene er fisket de fire første månedene i året, noe som gjør det utfordrende for ferskfiskprodusenter å skaffe seg gode, langvarige forretningsforbindelser og få god lønnsomhet i bedriften.

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1. Introduction

Fishing is one of the oldest professions in the world. Adam Smith *(1904)* emphasized its traditional character in a following way:

"Hunting and fishing, the most important employments of mankind in the rude state of society, become in its advanced state their most agreeable amusements, and they pursue for pleasure what they once followed from necessity. In the advanced state of society, therefore, they are all very poor people who follow as a trade, what other people pursue as a pastime. Fishermen have been so since the time of Theocritus."

The perception of fishing profession has not changed very much ever since this was written. However, the character of fishing industry has changed a lot. Management of natural resources, faster and cheaper transportation, increased demand for fish and the possibility to supply any place in the world gave it a more commercial character.

The demand for fish and fishery products has been growing rapidly. The global trade of fish for human consumption was estimated to grow by 25% between 2012-2021. 10% of the value of total fish export in 2010 was represented by groundfish species (FAO 2012). Increasing demand for these types of fish is followed by increased supply, especially from countries with good management of wild stocks. Norway has access to almost half of Northeast Arctic cod stock. Proper management of the natural resource gives Norway the possibility of satisfying increasing demand in the world market. However, high volumes of the raw material landed in Norway do not seem to be used to target consumer preferences in the most profitable way. Export volumes of frozen whole fish are increasing, which implies that the industry is focusing on supplying other processing countries, rather than increasing value added of fish by producing products ready for consumption.

The overview of Norwegian cod industry and analysis of the data regarding catch volumes, values, export destinations and profitability of the industry highlighted problematic features. The theory and research allowed identifying what causes non-market oriented production. Small level of coordination and integration in the value chain resulted in harvest-driven production of cod products, which created problems for processors, who cannot control time, volume and quality of the deliveries of fish.

Hopefully, the analysis of the industry, theoretical framework, as well as the research will help us to draw the conclusion of possibilities for Norwegian cod industry.

1.1 Objectives

To meet market demand it is necessary to have the ability of supplying steady deliveries of homogenous products on contracted time. As for now, wild fisheries struggle to compete with aquaculture's low production costs (salmon). Another major advantage of the aquaculture is its ability of market-orientated production and flexibility accordingly to consumer preferences. This is obtained by changing the range of products and restructuring the value chains easily, depending on the market situation. This kind of market adaptation is more difficult to obtain for wild fisheries due to seasonality and uncertainty regarding the catch and its quality.

This thesis is written as a part of the project: "Norwegian Fish in the European Market: Market Development, Environmental Labeling and Changing Consumer Preferences (NORFISH)" financed by the Research Council of Norway. The objectives of this thesis are therefore closely related to the objectives of one of the work packages of this project. The main objective of this thesis is to examine how the Norwegian fishery management system may promote market orientation of the cod fishing industry. As a part of this analysis, changes that could be economically beneficial while maintaining other societal interests are discussed.

Our objectives are:

- To investigate structural changes that may promote a demand-oriented value chain for Norwegian cod.
- To investigate which countries and products are the most profitable to target for Norwegian cod exporters.
- To investigate how the variety of the products can be increased to satisfy these markets.

1.2 Outline of the Thesis

Chapter 2 of the thesis will describe the most important characteristics of cod industry in Norway. We will provide historical overview of wild fisheries, which will be followed by the description of management system and regulatory framework. This chapter will also include presentation of the data related to Norwegian fishing industry as a whole, and cod sector in particular.

Chapter 3 will present theory important for analyzing the research accordingly to the objectives. It will cover theory of management systems for wild fisheries, vertical integration of the value chain, quality requirements for flexible production and theory of market-oriented fisheries.

Chapter 4 will describe the chosen form of methodology. We will present how the respondents were approached, the structure of the questionnaire and how the research was conducted as well as the difficulties we experienced.

Chapter 5 will be a presentation of our study and analysis.

Chapter 6 will confront theoretical framework from chapter 3 with findings based on our research. We will also discuss possible changes for Norwegian cod fisheries. It will be followed by our policy recommendations.

Chapter 7 will sum up our findings and present the conclusion.

2. The Norwegian Fishery Sector

Fisheries in Norway are important in both economical and social sense. The industry has a long tradition and we will start with a historical overview, which will be followed by a description of different cod stocks managed by Norway and the way they are managed. This chapter will also include analysis of statistical data regarding employment, number of fishing vessels, catch volume and value, fluctuations of prices of cod and cod products over time as well as the main markets for Norwegian cod products.

2.1 The History of Fisheries

Fishing has been an important economic factor and source of food for Norway ever since the first settlers arrived. Ever since then, it has been a significant resource and income source for the coastal population, and later, for Norway's exports for almost one thousand years. In the 16th century, the Hanseatics had established themselves in Bergen and started to trade stockfish through Germany to the rest of the world. In return Norway imported flour. This was a good trade-off until the 17th century when the terms of trade changed negatively for the stockfish. In the 18th century the growth of fish processing began, and at the same time, the fishermen became more specialized (SNL 2011).

During the next hundred years investments in fishing equipment, like nets and shore seines, were necessary. The increase in capital input made everybody, who was affected by this economically, dependent of fishing. On the other hand, the amount of fish harvested increased and between 1840-1880 the value of fish export tripled. The rights to trade the catches were granted to merchants at important harbors to control the first hand sale of fish. The Crown, in fact, gave these rights and the merchants were the sole demanders of fish as they traded fish both in the first hand market and in the end markets. Given this monopsonistic power, the fishermen were completely dependent on the merchant in the village, who also controlled a large share of the labor force. At the end of the 19th century the fisheries experienced a downturn, resulting in reduced prices, too many fishermen and low individual catches. This resulted in restructuring of the fishing fleet into larger vessels with extended range of operation. This was the beginning of the diversification of fisheries, leaving larger vessels to be able to follow the stock further

from the shore and the smaller vessels with alternative methods, like shore seine, for costal fishing (SNL 2011) .

The power of merchants continued until the middle of the 20th century when the industrialization finally caught up in the fishing industry and the fishermen became more mobile thanks to motorized fleet. Up until then, the fishing fleet consisted of smaller boats and sailboats powered only by oars and sails with rather limited possibilities. Nevertheless, the fishermen managed to participate in fishing seasons both in Lofoten and in Finnmark, which secures their income. They were catching mainly cod (SNL 2011).

In the interwar years the fishermen got more influence and new laws were established to enhance their position in the value chain. In 1938 the Raw Fish Act (Råfiskloven) was legislated, and thus secured the fishermen's catch distribution and cash settlement throughout the whole country. This happened through the establishment of sales organizations (SOs), which were owned by the fishermen. The SOs were obligated to secure high and stabile prices and reliable payments from buyer to the fishermen. There have been numerous SOs throughout the years, while only six remain today[1] (Ibid).

2.1.1 Subsidies and Public Transfers

In 1946 Norway established The Ministry of Fisheries and Costal Affairs (Fiskeri og Kystdepartementet, FKD). Up until then, all matters regarding the fisheries had been handled by the Ministry of Trade and Industry, but it had its own division, namely Directorate of Fisheries (Fiskeridirektoratet), since 1900. In the post-war period, the demand for fish and fish products was high in the international market and the increase in prices affected the domestic consumption. To prevent the decrease in consumption, the government, together with the sales organizations, established maximum prices on both: raw fish and fish export. The world market prices were often higher than the maximum prices and this "premium" was transferred into reserve funds. As the world market changed, so did the prices and the costs exceeded the income (Hersoug et al. 2011). These funds were working as a non-governmental income support to level the differences. When the market situation did not improve, the funds were exhausted. In 1959 the maximum prices were removed and changed into the system with minimum prices. However, to be able to ensure the income to the fishermen and to keep the production costs of to the

[1] It was seven SOs until recently when the sales organization for farmed fish went bankrupt.

plants at a low level, the sales organizations had to receive governmental support given through negotiations (Isaksen 2007).

In 1964 the Norwegian Fisherman Association was recognized as the representative for the fishing industry negotiating with the government. Considering the fisheries as a very important industry, both in economic sense and in regards to settlement in local communities, large amount of support was transferred so that the fishing industry could keep a revenue and income as high as other industries. The level of subsidy varied according to the state of the fishery and consisted of different types of subsidies including income earning measures[2], social programs[3], miscellaneous support[4] and structural and efficiency support[5]. There was also another subsidy-like measure affecting the industry that was offered outside the negotiations of the Fishermen Association. This was through loan arrangements to the (Northern) fisheries and to the fish processing firms given by the National Fisheries Bank, and later in the 1990s, by the Norwegian Industrial and Regional Development Fund.

Grants and loan guaranties were also given to a large extent. Moreover, fishermen benefitted from reduced income taxes, value added taxes and fuel taxes. One can also argue that providing transportation and education for small fishing communities in the north is also a subsidy for the general settlement and the fishing industry in those areas. During the period of industrialization of the fleet, the government introduced buyback-programs (began in 1969). This meant that they bought old, outdated vessels encouraging the fishermen to renew the fleet with more efficient ones, though this was not initially intended to reduce the number of vessels. It was not until 1984 that a new buyback-program was initiated to reduce overcapacity of the fishing fleet (Schrank 2003).

After 1981, when the overall transfers and subsidies peaked with a total of nearly 1.5 billion NOK (nominal), the government acknowledged the necessity to reduce the transfers as a way of improving the profitability of the industry. The subsidies did lead to overcapacity, both in fisheries and in on land production. Moreover, the overcapacity led to a misallocation of work force and capital harming the national economy as a whole. There was also a growing agreement that a better use of public funds could be found.

[2] Such as price support, insurance subsidies, operating subsidies.
[3] Minimum income guarantees, vacation support and unemployment insurance.
[4] Bait subsidies, gear subsidies and damage compensation.
[5] Buyback schemes, experimental fisheries and market support.

Norway's EEA/EFTA[6] membership also forced Norway to reduce the subsidies, and all of the direct support was to be removed during the 1990s. Even though the subsidies were, as mentioned, an important income source for the fisheries, the industry understood that they could not receive this kind of support in the future. However, the income and profit from the fisheries increased in the same period as the support was faded out, making it easier to accept the changes (as seen in Figure 1) (Ministry of Fisheries and Coastal Affairs 2003). Still, there are some subsidies on fuel[7], income tax-relieve and depreciation rate on assets (Finansdepartementet 2011).

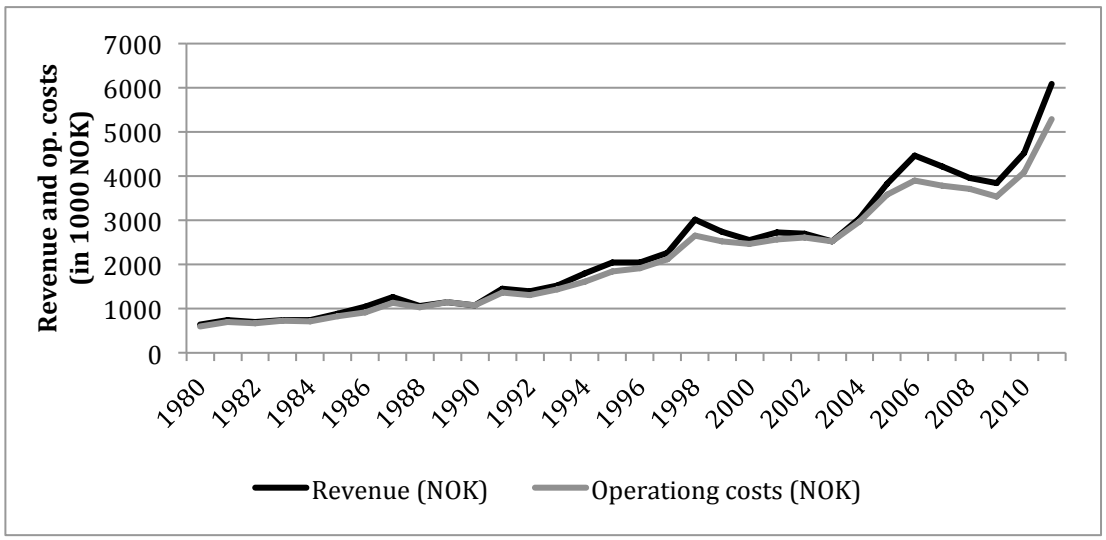

Figure 1 – Nominal value of weighted average operating cost and revenue (in 1000 NOK) for Norwegian demersal fishing vessels (1980-2010)
Source: Fiskeridirektoratet.

2.2 Cod As a Natural Resource

Cod (Gadus Morhua) of Northern Norway is divided into the North East Artic cod (NEA cod) and costal cod. The first one migrates southwards from its feeding area in the Barents Sea and Svalbard to Lofoten, which is its main spawning area from February to April. It can weight up to about 50 kg and measure approximately 170 cm (Bogstad 2009). The costal cod does not migrate long distances and is distributed along the Norwegian coastline. It is smaller than the NEA cod and can be about 40 kg and measure

[6] European Economic Area (EEA), European Free Trade Association (EFTA)
[7] CO_2 and NO_X fee relieve

up to 130 cm. Both of them are demersal fish species and they feed on zooplankton and fish[8] (Berg 2005).

Norway administrates sea of the area six to seven times larger than its land. To regulate this territory, three economic zones of 200 nautical miles (NM) from baseline were established: around mainland, Svalbard and Jan Mayen. The area around mainland is the Norwegian Exclusive Economic Zone (EEZ) that was established January 1st 1977. The EEZ was imposed as a measure to provide legal regulations as a protection of marine resources, environment research and as a ban to vessels with foreign flag (Ministry of Fisheries and Coastal Affairs 2011). In the EEZ Norway has access to three different cod stocks: coastal cod[9], North Sea cod, and North East Arctic cod (NEA cod) in the Barents Sea (Ministry of Fisheries and Coastal Affairs 2013).

NEA cod is the biggest cod stock in the world. It migrates between foreign and Norwegian waters (Figure 2) and has to be managed together with Russia through The Joint Norwegian-Russian Fisheries Commission (JNRFC)[10] (Armstrong et al. 2012). On Russian territory the cod is very young, so there is a need to set minimum size of fish to ensure a certain amount of the stock to reach Norwegian waters where it spawns. They also agree on which equipment is allowed to use for catching. Moreover, JNRFC sets annual Total Allowable Catch (TAC). The TAC is based on population estimation of fish. The calculation is done by researchers cooperating with the International Council for the Exploration of the Sea (ICES), which is an independent organization specializing in sustainability of the oceans. Its special unit, the Advisory Committee on Fisheries Management gathers scientific material from each country[11] and releases advice on the sustainable catch of major fish species (Ministry of Fisheries and Coastal Affairs 2007).

The TAC in 2013 for NEA cod was agreed in Trondheim on October 11th 2012 to be 1 000 000 tons. That was an increase of 33% from 2012. Norway's share of the total quota this year is 446 740 tons (Joint Norwegian-Russian Fisheries Commission 2012). Norway and Russia share equally 90% of the TAC and remaining 10% is divided between Faroe Islands, Greenland, Iceland and EU countries[12]. Stocks in the North Sea

[8] Sometimes they also eat their own species.
[9] It is managed together with NEA cod, since these two stocks overlap in the spawning season
[10] The commission was established in 1975 as a Joint Soviet-Norwegian Fisheries Commission.
[11] Institute of Marine Research is responsible for research in Norway
[12] For details: http://assets.panda.org/downloads/iuu_report_version_1_3_30apr08.pdf

are managed through bilateral fisheries agreements with European Union. These stocks are in critical condition and they are not economically important for Norway today (Seafish 2012).

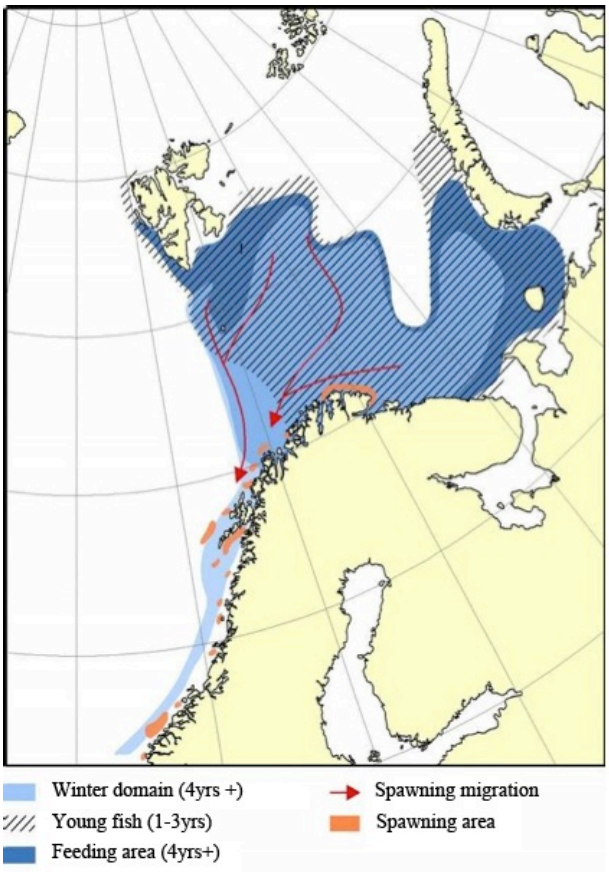

Figure 2 - The distribution of NEA cod stock
Source: The Marine Institute, Bergen, Norway

The fishing industry in Norway has changed drastically during the last 35 years. The access to fisheries developed from being almost open to being highly regulated by the Ministry of Fisheries and Coastal Affairs. Advisory and executive body of the ministry is the Fisheries Directorate (Fiskeridirektoratet). Monitoring and enforcing the fishing activity is executed in a joint venture of the coast guard, Directorate of Fisheries and the sales organizations. The government's general objectives regarding the industry are (Ministry of Fisheries and Coastal Affairs 2003):

- Ensuring that the fish resource is a common property
- Making sure that the fleet is active along the entire coastline, and
- Ensuring that fleet that is modern, diverse and profitable.

There are several law acts that regulate harvest of wild cod. First of them is the Raw Fish Act from 1938, according to which, the Ministry has the right to set total allowable cministryatch, prohibitions and seasons on harvesting, minimum sizes of fish, regulations regarding catching methods and equipment, and many more. It also gives the exclusive right of first hand sales to the sales organizations (Ministry of Fisheries and Coastal Affairs 2005).

There are 5 regional sales organizations in Norway handling sale of codfish, shellfish and mollusks: Skagerrakfisk, Rogaland Fiskesalgslag, Vest-Norges Fiskesalgslag, Sunnmøre og Romsdal Fiskesalgslag, Norges Råfisklag. Norges Sildesalgslag is the national sales organization for herring. They are owned by the fishermen and they have the right to set market-based minimum prices. The prices are set by a negotiation between Norges Råfisklag, Norwegian Seafood Federation (Fiskeri- og havbruksnæringen, FHL) and Norwegian Seafood Association (Norges sjømatbedrifters landsforending, NSL), where FHL and NSL represent the fish processing industry. However, the final decision regardin minimum prices ultimately lies with Råfisklaget. Sales organizations track all the landings of fish and control the trade transactions of all the catches. This is done through online open auctions or contracts between a fisherman and a buyer[13]. The buyers have to be registered as first hand buyers of the raw fish to be able to purchase the fish. Sales organizations are also responsible for payments and they ensure it to the fishermen within 14 days after the transaction. They control the quality of the fish making sure that it is sellable and that the waste of the natural resource is as small as possible. The catch can be directed to a specific buyer and region. Sales organizations also keep track of all landings making sure that they are within quota limits. Sales organizations are financed by the fishermen through a 0.08% provision of the value of catch (Ibid).

Access to the natural resources of Norwegian waters is very preserved by the Fishing Participation Act of March 26th 1999 (Deltakerloven). The registration of a fishing vessel for commercial purposes is possible only if more than 50% of the ownership of the vessel belongs to the active fisherman of Norwegian citizenship (or equivalent to Norwegian citizenship). The general requirement is that the acquisition permit can only be granted to those who have been doing commercial fishing on, or with, a Norwegian vessel at least three out of the five following years and are still attached to the fishing profession.

[13] Still, by contracts the price can not be less than minimum price.

However, for vessels less than 15 meters it is sufficient that the applicant is considered as an active fisherman at the time of the decision about acquiring permit and continues being so. This document also states that any change in the ownership shares of the company owning fishing vessel has to be approved by the government (Fiskeridirektoratet 2013).

The Food Act (Matloven) regulates activities of fish processing. It contains all the rules regarding production, sale and export of fish. Its main goal is to ensure safe and environmentally friendly production of healthy and high quality seafood (Ministry of Fisheries and Coastal Affairs 2005).

2.3 Fishing Fleet and Quota System

Total annual quotas for Norwegian fishermen are divided among the fleet, which in 2012 consisted of more than 6 200 registered vessels[14]. Each of them owns permanent share of TAC for different species. The size of annual quotas for a particular vessel is calculated by multiplying TAC by TAC-share for that vessel and fishery (Arnason 1993). The main differentiation in the quota system is between three groups: (i) the ocean fleet, (ii) coastal vessels, and (iii) other (recreational fishing, bonus quotas, monitoring and research). Most of the quotas (60-70%) belong to the coastal fleet that operates no further than 12 nautical miles from the coastline.

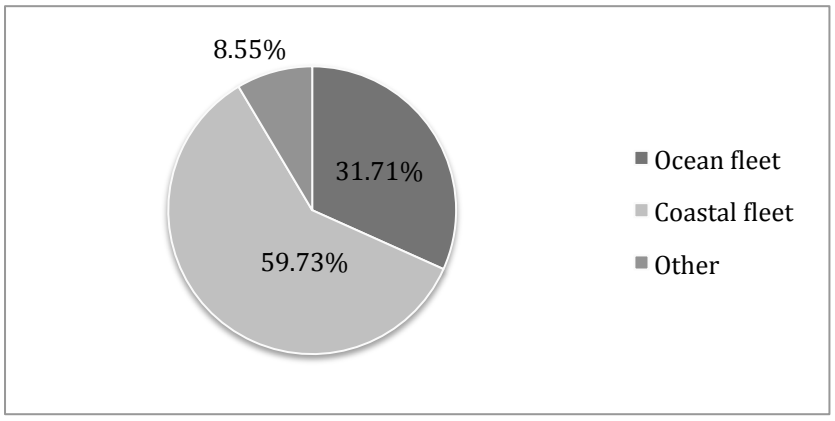

Figure 3 - Redistribution of cod quotas in 2013.
Source: Fiskeridirektoratet

[14] Source: Fiskeridirektoratet

The ocean fleet consists of vessels bigger than 28 meters that operate outside of the 12 nautical mile limit. They use gears like trawls, seines or hook-and-line. They are made to travel long distances and deliver different types of products: fresh/chilled or frozen fish. Some of these vessels can also handle processing of the raw material on board and even deal with packaging. This, however, requires an additional license (Aker Seafoods 2012).

The first time ocean fleet was limited by quotas was in 1978. This was due to overfishing in the 1960s and 1970s. In this period, the landing of cod had reached over 800 000 tons because of the increased efficiency of the unregulated ocean fleet[15]. Establishment of the EEZ in 1977 allowed controlling the NEA cod stock. The coastal vessels could operate freely until 1989. The change was needed because of the crisis of the fish stock. The resource was very damaged and needed protection (Armstrong et al. 2012). This influenced the entire industry and in 1989 it had a negative operating margin (see Figure 1).

The first differentiation between conventional vessels and trawl ladder (ocean fleet), when dividing total cod quotas, was done in 1990 when the Government introduced individual vessel quota system (IVQ). The requirements to enter the system regarding historical catches were very strict and only 2 800 vessels were allowed to participate. That caused a lot of protests among fishermen, arguing that the new system was too strict and that the quotas were not fairly distributed amongst regions. Thus, the number of quotas was increased and divided between vessels from Møre and Romsdal to Finnmark, giving the total of 3 468 vessels participating in cod fishery within the IVQ system in the first year (Ministry of Fisheries and Coastal Affairs 2003).

The new plan introduced a system of dividing the quotas between ocean going and coastal fleet. Out of all the quotas that belong to these tw o groups, the percentage of quotas for trawl ladder group increases with the increase of TAC (Ministry of Fisheries and Coastal Affairs 2003). This rule is applied until today (Aker Seafoods 2012).

[15] In the beginning of the 1960s the landings were at about 200 000 tons a year.

Norwegian TAC	Under 100' tons	100-150' tons	150-200' tons	200-300' tons	Over 300' tons
Coastal fleet	80%	75%	72%	69%	65%
Trawler fleet	20%	25%	28%	31%	35%

Table 1 – Share of quotas belonging to coastal and trawl ladder group depending of the size of Norwegian TAC
Source: Norwegian Ministry of Fisheries and Coastal Affairs

Some of the companies that own ocean vessels have delivery obligations attached to their licenses. They have to offer some part of their catch to certain plants in Norway. This is to ensure domestic production of certain amount of fish products in different areas of the country. This is further explained in section 2.3.1.

Coastal vessels are defined as vessels using conventional fishing tools, such as nets, longlines, seines and hand lines. In 2002 quotas among this group were further divided into 4 categories, depending on the size of the vessel (Finnmark model) (Ministry of Fisheries and Coastal Affairs 2003):

(i) Under 10 meters
(ii) 10-14.99 meters
(iii) 15-20.99 meters
(iv) 21-27.99 meters

This division prevents the transfer of quotas from small vessels to the larger ones in the coastal fleet and keeps the structure of the industry focused on small and medium businesses spread geographically (Ibid).

Vessels larger than 15 meters could also operate far from the coast. Coastal fleet that is larger than 20 meters can technically go even further from the coast and could participate in the ocean fleet's operations This, however, is not possible due to regulations (Aker Seafoods 2012).

The most common in Norwegian fleet are coastal vessels up to 14.99m, out of which 2 200 were in the (ii) category in 2012 and 3 400 in (i) one. For simplicity, these two groups were joined in Figure 4[16]. Moreover, it is worth noticing that the number of vessels smaller than 10m has declined the most in the period 2001-2012. Amount of

[16] The real number of these vessels was divided by 10 to show the changes in numbers of all vessel types in one figure

vessels of the size 10-14.99m has been quite stable over that time. The dotted line in Figure 4 shows very small numbers regarding average catch per vessel in (i) and (ii) group. It has been increasing from less than 10 to almost 22 tons annually, which is the effect of increase in the quota share of each vessel after decommissioning of other vessels in a group, which is further explained below. It also depends on the size of TAC.

The number of vessels in (iii) and (iv) category has also been declining and in 2012 there was around 50% less registered vessels of this size comparing to 2001. They are much more efficient than the vessels below 15m and harvested, on average, almost 200 tons of cod in 2012. Due to decommissioning and increase of TAC, this number was more than doubled since 2001. The most efficient is the ocean going fleet with vessels bigger than 28m. Their number has been quite stable in the shown period. However, we observed a big increase in an average catch per vessel, which is related to the size of TAC and the increase of its share for ocean going fleet explained in Table 1.

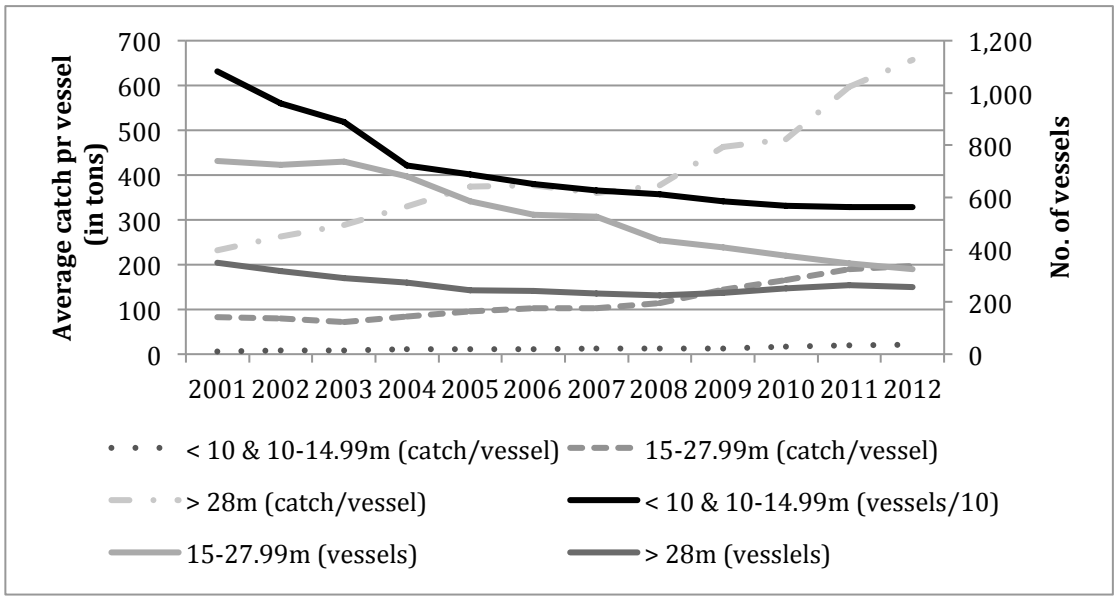

Figure 4 – Number of vessels (for these up to 14.99m divided by 10) and average catch per vessel in Norwegian fleet (2001-2012).
Source: Fiskeridirektoratet

It is possible for the quotas to be temporarily exchanged within the same vessel group through operating agreements. All the coastal vessels under 28 meters are allowed to use that type of agreements within their size group, if they get permission form the authorities. The quotas can be exchanged in the maximum period of three out of five

following years in the same geographical area. The quotas cannot be permanently taken from the vessel that they are assigned to (Ministry of Fisheries and Coastal Affairs 2003).

Quota transfers between vessels can be arranged in different ways. First, two fishermen can decide to cooperate and use both quotas on one vessel. Second, quotas can be transferred from one vessel to another that is owned by the same fisherman when there are technical problems that would exclude one of his vessels from regular activity. Third, fishermen that have quotas for two different species and two vessels can harvest one type of fish on each vessel by using the quotas from both vessels. Fourth, there is a possibility to transfer a maximum of 80% of quotas from one vessel to another when the fisherman buys a second boat and wants to take one boat permanently out of fishing. In this case, the remaining 20% of the quotas will be shared among all the other vessels in that group (Ibid).

When a fisherman wants to retire from fishing, he can either sell the vessel with its quotas on an approved fish market or sell it to the Structural Fund, which was established as a part of decommissioning program of the government. The first option means that the fisherman, who buys the vessel, can merge the quotas from the new and old vessels and take one of them out of fishing to increase his capacity on the remaining vessel. When he decides to do this, he has to give away 20% of the quotas from his new vessel, and they are divided equally between all other vessels in the size group. In the second case, the Structural Fund "buys" the vessel and divides all its quotas between remaining vessels in that group. The vessel is taken out of service. The government prefers this option since it fulfills the objective of its policy regarding equal distribution of power within the category (Ibid). From 2003 until 2008 the government also implemented tax on harvest to redirect the costs of decommissioning to the industry, but that was only 50% (Armstrong et al. 2012).

Due to decommissioning the total number of fishing vessels in Norway started decreasing rapidly from 1960. From over 40 000 only 6 214 were left in 2012. The number of fishermen started decreasing much earlier. In 1940s there were more than 120 000 registered fishermen and by 2012 the number is not even 13 000 (Figure 5).

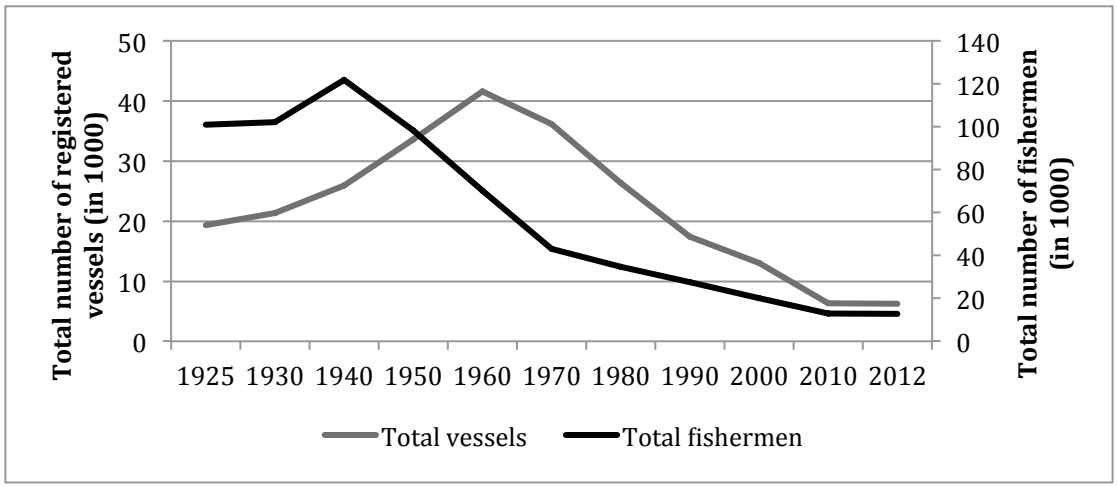

Figure 5 - Amount of registered vessels and fishermen (full and part-time) in Norway (1925-2012)
Source: Fiskeridirektoratet

Transferring the quotas is allowed, but very restricted. In order to fulfill management objectives regarding diversified fleet and broad costal settlement such limitations are, according to the present fisheries management in Norway, necessary (Ibid). These restrictions keep most of the fishing activities in the Northern Norway: Finnmark, Troms and Nordland, as seen in Figure 6, under the control of Råfisklaget.

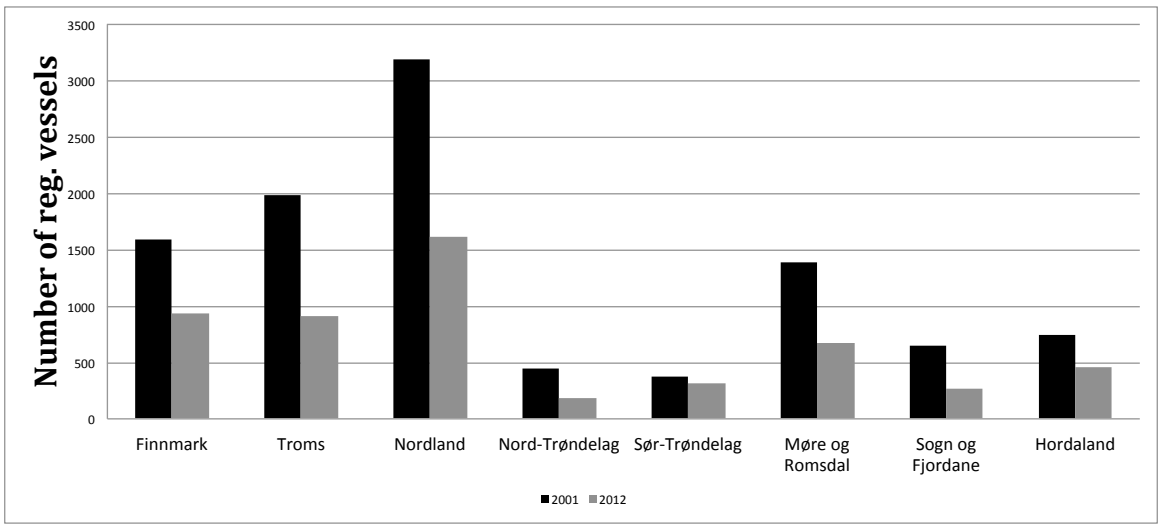

Figure 6 – Regional distribution of vessels in Norway (2001 and 2012)
Source: Fiskeridirektoratet

Most of the owners of larger vessels are members of the Fiskebåt association. It is an interest and employer organization for the Norwegian fishing fleet. About 90% of all owners of fishing vessels over 27.5 meters are members. Fiskebåt was founded in 1946 and is now also an association for ship-owners in the fishing fleet. Some of its key areas

of operations are bi- and multilateral fishery agreements, recruitment and education, renewal of the fishing fleet and stability in the regulatory framework for the fishermen (Fiskebåt 2013b).

2.3.1 Delivery Obligations and Processing Facilities

In the post-war period there was little work for people in the North of Norway. A part of the solution was to build up the fishing industry with large subsidies from the government. The problem was that the industry had limited and unstable access to raw material. To solve this problem the filleting facilities[17] got trawler licenses with obligation to supply the facilities. This was done in the 1950s. In this way, they were excluded from the rules of the Participation Act (Anonymous 2005).

There are still trawl-companies with delivery obligations. Havfisk ASA (former Aker Seafoods AS) has the majority (61.6%) and Nergård has the second largest obligations (5%). Several smaller companies and fishermen are affected by these obligations, like Skarfisk and Bø Fiskeindustri[18].

The license holders[19] for these quotas are obliged to offer 80% of all cod catch and 60% of all haddock catch to certain landing facilities, or municipalities. Out of all cod trawl licenses approximately 52% are affected by delivery obligations[20] (Fiskebåt 2013a).

However, to try to prevent the trend of closing down facilities due to operating deficit, the government issued a hearing[21] in which they suggested tightening of the regulations. Some of the suggestions are:

- 100% of all cod and haddock must be offered to the respective facility
- 70% of the offered catch must be bought[22]
- 90% of bought raw material must be processed at primary facility

Furthermore, if there are several interested buyers for the same catch, the sales organization can prioritize the facility that has the most labor-intensive processing method (Ministry of Fisheries and Coastal Affairs 2012).

[17] North of 62°N
[18] Statistical data from Fiskeridirektoratet
[19] Shipping companies, facility owners with own trawlers and some fishermen
[20] 46'5282 quota factors out of total 87'9265 quota factors
[21] Issued November 7th 2012. The hearing is still pending.
[22] Only in the case of vessel and facility is owned by same company

In the last 40 years the number of fillet production facilities in Norway has been reduced from over 100 to 10. This is related to the competition in the market, reduction in subsidies, changes in delivery obligations for trawlers, globalization and high production costs (Finstad et al. 2012). There is still a high expectation for the fillet industry to be a substantial contributor to social welfare, employment and settlement along the coast of Northern Norway. However, the demand for efficiency and competitiveness in international market is being constantly strengthened (Henriksen 2012a).

The number of employees in filleting industry working on land in Norway was reduced from 3950 in 1980 to 720 in 2010. In the period between 1987 and 2010, the industry experienced profit only in three of those years (Finstad et al. 2012).

The trawlers, which were granted their licenses to ensure stable supply of raw materials to the facilities, achieve a higher profit by freezing and exporting the fish than delivering it fresh to the plants for further processing. The filleting industry is now much more dependent on the coastal fleet than ever, see Table 2 (ibid).

	Facilities		Employment	
	Finnmark, Troms, Nordland & N-Trøndelag	Total	Finnmark, Troms, Nordland & N-Trøndelag	Total
1995	147	364	2035	6670
1996	143	354	1836	6061
1997	133	334	1817	6371
1998	132	339	1757	6277
1999	128	323	1671	5654
2000	128	314	1573	5174
2001	130	311	1585	4947
2002	123	296	1488	4494
2003	118	280	1375	4040
2004	111	267	1341	3837
2005	110	261	1226	3527
2006	99	248	1183	3455
2007	98	246	1227	3454
1995-2007	-49	-118	-808	-3216
1995-2007	-33 %	-32 %	-40 %	-48 %

Table 2 - Production facilities and number of employees in whitefish sector in Norway (1995-2007).
Source: Nofima

In 1996 the government tightened the regulations regarding the quality standards of the production facilities. Many had been given exemptions regarding these standards many

years before. When the exemptions were not further renewed, many plants did not see the economic benefit in new investments and were shut down (Bendiksen 2009).

After a high TAC for cod in 1998, the number of facilities was reduced by 25% in 1999. At the same time, Russian landings in Northern Norway declined heavily due to structural changes in Russian fleet[23]. A lower supply of raw material affected the fillet production in particular. In 2002 the Norwegian currency experienced an appreciation that resulted in lower profitability amongst fishermen and the industry. Over the next few years, one out of ten whitefish companies was going bankrupt annually (Bendiksen 2009).

Factory trawlers in Norway, with on-board processing facilities, date back to the 1960s. They are able to produce fillets and freeze them only a few hours after harvesting. That was considered as a great innovation, thus more vessels of this type were built. However, the trawler fleet was initially given their fishing licenses to supply the land-based production, and this development was not politically welcomed[24] (Standal 2007). By 2013, there are only four factory trawlers left in Norway (NFAS 2013).

2.4 Cod in the Economy

Previous sections expressed the importance of Norwegian wild fisheries from a social point of view. However, when elaborating on management of the resource, tradition is not the only aspect one should look at. Norwegian wild fisheries are one of the biggest in the world, but they are experiencing pressure from many competitors.

In 2010 Norway was the second biggest exporter of fish and aquaculture products in the world, after China. It was followed by Thailand, Vietnam and the United States (FAO 2012).

In 2012 export of fish and aquaculture[25] products was 4.34% of the total value of Norwegian export and 1.77% of its GDP. The prices in 2012 declined[26] causing a decrease of the value of export, even though the volume exported was larger than in 2011.

[23] It transformed into ocean-going, mainly freezing on board
[24] Even though this is a contradictional behavior from the policy stating secure employment and increased profit in whitefish sector
[25] Aquaculture accounts for over 50% of it
[26] Salmon prices dropped by almost 9NOK in 2012, cod prices also dropped due to higher TAC in 2012 and the announcement of further increase in TAC for 2013

Almost 11% of the value of export of fish and fishery products came from cod products. That is 0.47% of total export and 0.19% of total GDP. Ex-vessel values and volumes in Table 3 and Table 4 express the amount and value of cod landed[27].

	2011	2012
Export of Fish and Fishery Products	53 384	51 597
Cod Export	6 129	5 632
Ex-vessel Cod	3 959	3 766

Table 3 - Nominal values of fish export (in mill. NOK) in 2011 and 2012
Source: SSB and Norwegian Seafood Council

	2 011	2012
Ex-vessel Cod	340 135	349 628
Cod Export Volume	165 725	168 697

Table 4 – Cod export volumes (in tons) in 2011 and 2012
Source: SSB and Norwegian Seafood Council

2.4.1 Cod Products, Their Main Producers and Export Destinations

The most exported cod products in Norway are still the ones produced in a traditional way: clipfish[28] and salted fish. There is also a significant export volume of frozen and fresh whole fish, as seen in Figure 7. The main market for clipfish and salted fish is Portugal, which makes it a leading importer for Norwegian cod both in volume and value terms.

[27] Calculations based on data from SSB and Norwegian Seafood Council
[28] Salted and dried fish

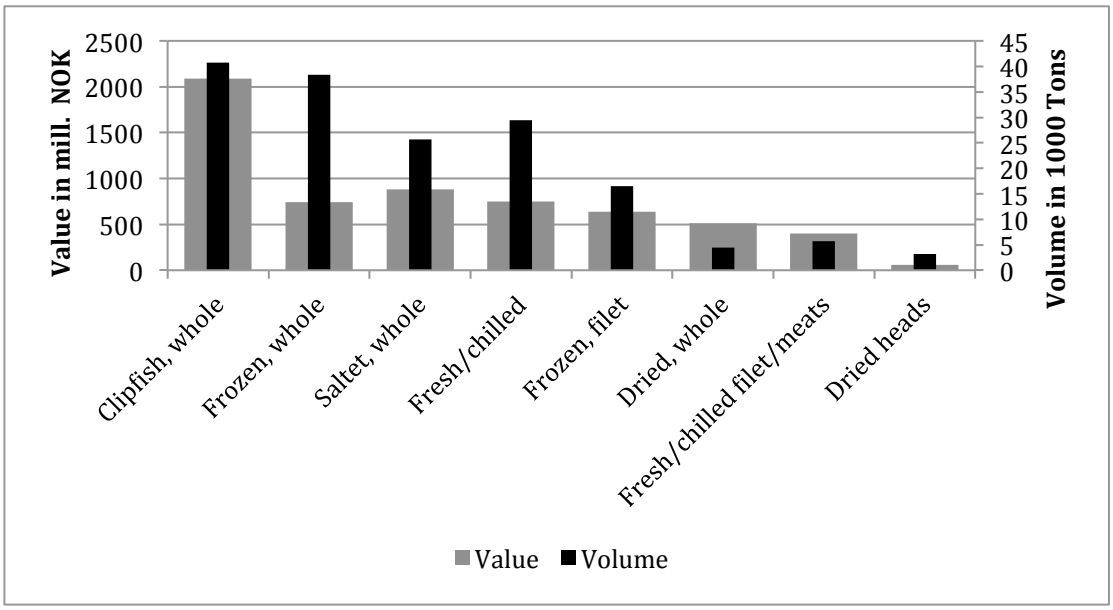

Figure 7 - Volume of processed cod (in 1000 tons) and processed cod export value (in mill. NOK) in 2011.
Source: Norwegian Seafood Council

The major recipients of clipfish and salted fish products, apart from Portugal, are Spain and Brazil. Other than Norway, production of clipfish and salted fish is done mainly by Iceland and Faroe Islands. They are the biggest competitors of Norway on the Spanish market, which is more demanding with regards to commercial quality of the end product. The Spanish consumers want white, thick and juicy fish, which they are willing to pay a higher price for (Rapp 2010). Norwegian products often do not fulfill these requirements because of different techniques used to harvest and process fish (Þórarinsdóttir et al. 2010). In 1998, 24% of Norwegian export volume of cod products was salted fish. By loosing a big part of the Spanish market we observe a drastic drop by 52% in export of this product by the year 2000. Ever since then, export volume of salted cod has been fairly stable and now covers about 15% of the total cod export volume (Figure 8).

Norway is trying to regain its former share of the Spanish market for salted cod. Norwegian Seafood Export Council and Innovation Norway introduced the project "IN2Spain - Norsk Saltfisk til Spania" to promote Norwegian salted fish. Iceland is considered as a quality supplier. One of the reasons for that is the use of phosphate in the production process. This makes the fish whiter and thicker (Þórarinsdóttir et al. 2010). The use of phosphate is illegal in the process of salting fish by international legislations. However, polyphosphate is permitted in this process due to its drip loss reduction while defrosting. This gives a chance for some countries (like Iceland and Faroe Islands) to

avoid the international ban. Norwegian producers are not allowed by the government to use this technique (Bjørkevoll et al. 2012).

	2000			2012	
	Volume (1000 tons)	Value (€ 1000)		Volume (1000 tons)	Value (€ 1000)
Frozen, whole					
Portugal	5 298	13 747	China	24 913	56 522
UK	4 524	11 855	Lithuania	4 971	11 914
Denmark	3 094	7 523	Poland	4 879	11 089
Clipfish, whole					
Portugal	18 799	123 734	Portugal	24 757	142 703
Brazil	5 702	44 043	Brazil	9 074	64 350
Italy	2 190	14 305	Denmark	2 537	13 772
Fresh/Chilled, whole					
Denmark	10 220	25 068	Denmark	14 983	44 011
France	3 917	10 379	Sweden	3 121	9 268
Netherlands	2 741	7 383	France	2 216	7 789
Salted conventional, whole					
Portugal	13 848	62 293	Portugal	14 154	59 673
Spain	4 811	19 909	Spain	5 879	24 150
Greece	3 175	13 638	Greece	1 433	6 186
Frozen, fillets					
UK	18 721	94 352	UK	6 338	28 950
U S A	5 891	37 391	France	2 960	20 560
Sewden	3 379	18 672	Sweden	2 267	16 161
Salted conventional, fillets					
Italy	630	4 006	Spain	108	523
Portugal	406	1 893	Portugal	86	410
Spain	346	2 233	Luxemburg	84	562
Dried fish, whole					
Italy	2 776	49 811	Italy	2 443	44 636
Croatia	119	1 716	Nigeria	1 424	12 922
U S A	114	1 977	U S A	205	3 033
Fresh/chilled fillets/meat					
UK	429	3 012	France	2 387	20 416
Denmark	158	718	Denmark	1 905	15 001
Sweeden	38	217	Germany	531	4 384

Table 5 - Main export destinations of Norwegian cod products in 2012 (volume in tons and nominal values in 1000NOK)
Source: Norwegian Seafood Council

In Table 5 we can see big changes regarding export destinations. The same countries are importing the conventional products. Not surprisingly, Portugal is the leading importer of clipfish and salted fish, with approximately 56% of all clipfish export and 65% of all salted whole fish in 2012 (59% and 55% respectively in 2000). In 2000, Portugal was also the single largest market for cod products. However, in 2012 we can see that China has entered the market and in 2012 imported large quantities of frozen whole fish for further

processing and export (more that 50% of the total frozen whole). Moreover, seeing Lithuania and Poland following China on the list underpins our speculations on low cost European countries entering the market as producers of fish for re-export. They are close to the European market, which gives them a competitive advantage over China. However, for Norwegian exporters, the frozen whole business is not very profitable in comparison with, for example, clipfish. In Portugal and Brazil, these products achieve more than 2-2.5 times the profit per kilogram[29].

One thing worth noticing is that the price per kilogram of almost all cod products has declined in the period from 2000 to 2012 except for the price of frozen fillets and fresh and chilled products. Price of clipfish exported to Portugal declined by 12.4% (-10.6% in total export average), and the price of salted fillets was, in total, reduced by 9%. By further calculations we found out that fresh/chilled fillets had, in total average, an increase by 34.4% in this period, whereas fresh/chilled whole had increased in prices by 16.6%.

The products with the largest increase in volume appear to be among the ones suffering from the highest price reduction. On the other hand, there has been a large increase of fresh products. France and Denmark stands out and in 2012 they accounted for 63% of the total fresh/chilled export value alone[30]. We also found that the price for frozen fillets sold to the US market has increased by 26.3%. The export volume, however, has decreased by 97%, expressing a possible growth market for the Norwegian cod fillet.

The European Union (EU) is the biggest fish-consuming market in the world. Even though it has access to large stocks, it still needs fish from other suppliers. Approximately 70% of the demand for fresh, gutted fish originates from EU itself. However, they need large deliveries of frozen cod fillets. Here, main suppliers are China, Iceland and Russia. Norway has only 10% of this market. Another market importing big quantities of frozen cod products is the US. It is mainly supplied by China and Russia (Kontali 2009).

On the European market, the main competitor to Norwegian cod products is Iceland. The main characteristic of Icelandic cod export is a big variety of products. It is primary targeting preferences of European consumers and produces fresh and frozen portions and

[29] Even when considering ready-to-eat watered out clipfish that weigh 100% more than export volume, it still achieves a higher price.
[30] We suspect that some of the volume sold to Denmark is further sold to France

fillets, in contrary to Norway. Another characteristic differentiating Icelandic production from the Norwegian one is the lack of frozen whole fish as a part of export. In Norway, this production was only 12% of the export volume in 1998 and increased up to 29% by 2012. During the same time period export of frozen filets decreased by 18% (Figure 8) (Ásgeirsson 2012).

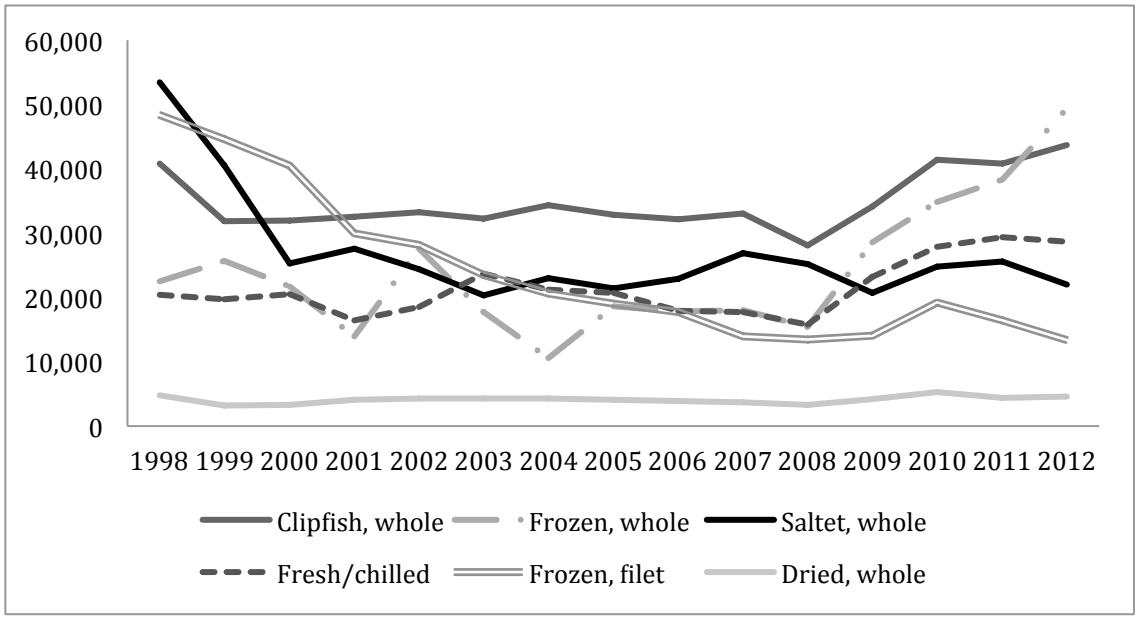

Figure 8 - Export volume of different cod products from 1998-2012 (in tons).
Source: Norwegian Seafood Council

Norway is more oriented on supplying frozen whole fish to processing markets, whereas Iceland is focused on producing high-quality end products destined to Western Europe (Ásgeirsson 2012). Apart from Europe, potential markets for Norwegian cod products are the US, Japan and the Republic of Korea. These markets demand highly processed products that are not offered by Norwegian producers today.

China does not have access to cod stocks. They are listed as one of the biggest exporters of cod products, because they developed cheap and fast processing industry during the last decade, which allowed them to increase the production massively. Nowadays, they can provide constant deliveries of ready fishery products. Chinese industry is expanding even more and they are now growing in production of clipfish and dried fish, which makes them potential competition to Norwegian main export products. China is mainly supplied by Russia with frozen Atlantic and Pacific cod. Another important supplier of

Pacific cod is the US, and NEA cod is also delivered from the EU and Norway (Trondsen 2009). However, the dominance of China as a cheap processing country may experience competition by other Asian countries, like Vietnam or Singapore, because of the increase of labor cost in China (Gao 2012).

2.4.2 Yearly Landings of Cod

Norwegian cod market is highly dependent on monthly distribution of catches. Approximately 90% of the fish is harvested during the first six months of the year. It is related to the spawning season of cod and its accessibility for the coastal fleet that is operating within the 12 nautical mile limit. However, Norwegian regulations only allow ocean-going vessels above 28 meters outside the 12 nautical mile limit. These vessels are the minority in the total fleet, and have approximately 30-35% (depending on the annual size of TAC) of the overall quotas (mainly trawlers). These restrictions are the main reasons to seasonal pattern of landings.

On the other hand, Norwegian government has been trying to introduce several regulations aiming at changing the pattern of landings of fish and encouraging fishermen to increase fishing effort in the second part of the year instead of using all the quotas in the "high season". This is, according to Henriksen (2011):

- Production on board: Allowing processing onboard by ocean-going fleet to modernize the vessels. It also aims to draw the attention of trawler-owners to the demand of the market, thus secure employment in the fishing sector.
- Distribution of quotas: Allocation of quotas between coastal vessels and ocean-going fleet and the increase of proportion towards trawls with the increase of TAC.
- Bycatch: If the fishermen have remaining quotas for other species than cod in the second half of the year, an additional quota for bycatch of cod is given.
- Regional quota scheme: A special quota[31] distributed by demand of processing plants in the North of Norway. This is a bonus quota for fishermen who commit themselves to deliver to these facilities.

[31] 3% of the group quota of cod north of 62°N for coastal vessels (15-21 and 21-28 meters) and cod trawlers were detained in the annual quota allocation.

- Quota bonus: If catch is delivered live at shore, the remaining quotas assigned to the vessel are decreased by only 80% of amount landed. The purpose is to store live fish until periods of low supplies of raw materials. Quota bonuses were introduced in 2008 and had a trial period for three years, until 2010. Since it gave positive effect it was extended for 2011. The scheme was introduced as a part of the governments "fresh fish strategy" (Hermansen 2011).

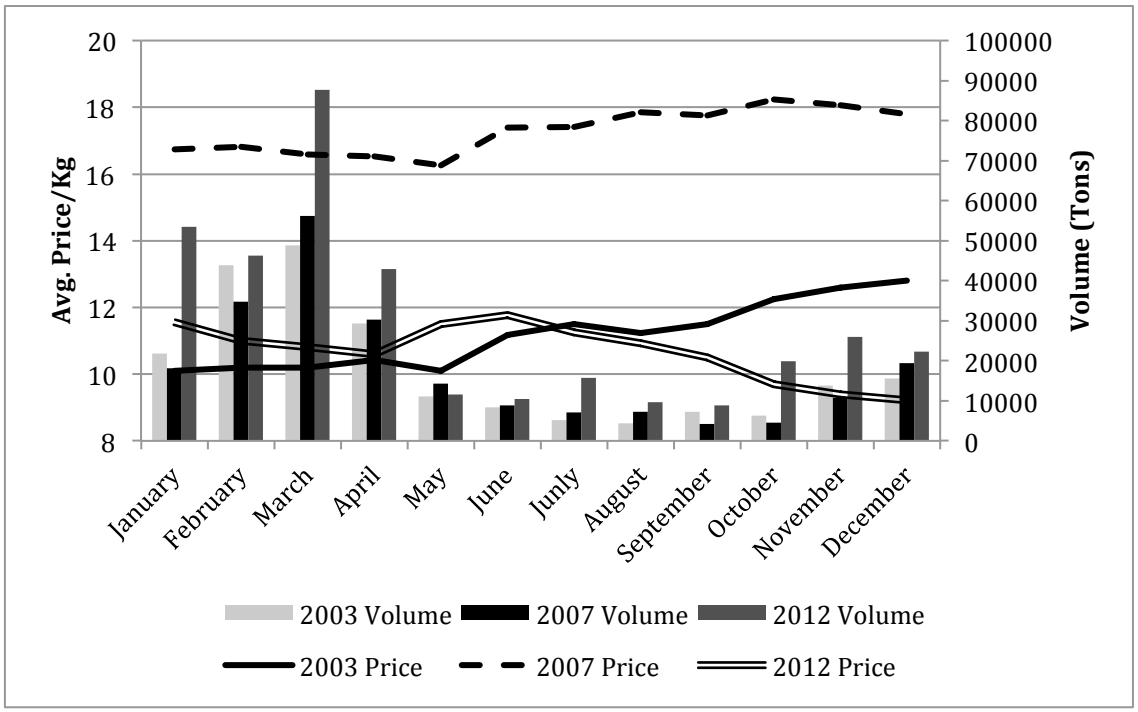

Figure 9 - Average price (ex-vessel) in NOK pr/kg and monthly landings of round fish (in tons) in 2003, 2007 and 2012.
Source: Fiskeridirektoratet

2.4.3 Prices of Cod Products

First hand sales of all catches of cod are through the sales organizations. They are obligated to set minimum prices, which is done two times a year. The minimum prices are supposed to be market based. However, as presented in Figure 9, price of cod does not fluctuate accordingly to the monthly supply of fish. In the second part of 2012 price of cod dropped, even though the landings of fish were low[32]. Information about upcoming increase of TAC in 2013 caused speculations on retailers market about lower prices in the near future. That forced processing companies to decrease prices of their products before

[32] Explained more thoroughly in our findings in chapter 5.

the minimum price of raw material dropped (Havforskingsinstituttet 2012). There are several minimum price categories regarding cod, depending on the size (1-2.5kg, 2.5-5kg and <5kg) of the fish and whether it is fresh or frozen. There are possibilities of variations in prices due to poor or exceptionally good quality, but it has been proven that these variations are not sufficient for the fishermen to have incentives for being quality-oriented when handling the fish. Sales organizations do not differentiate cod by catching methods or quality. Many byers are not able to reduce the price when they receive bad quality fish. Because of this system, long-term relationships between suppliers and byers are not common. It is not possible to buy cod below the minimum price unless poor quality is proven, or due to lack of demand. Seller can receive a higher price than the minimum price if the fishermen negotiate directly with buyers or when it is the outcome of the auction (Henriksen 2012b).

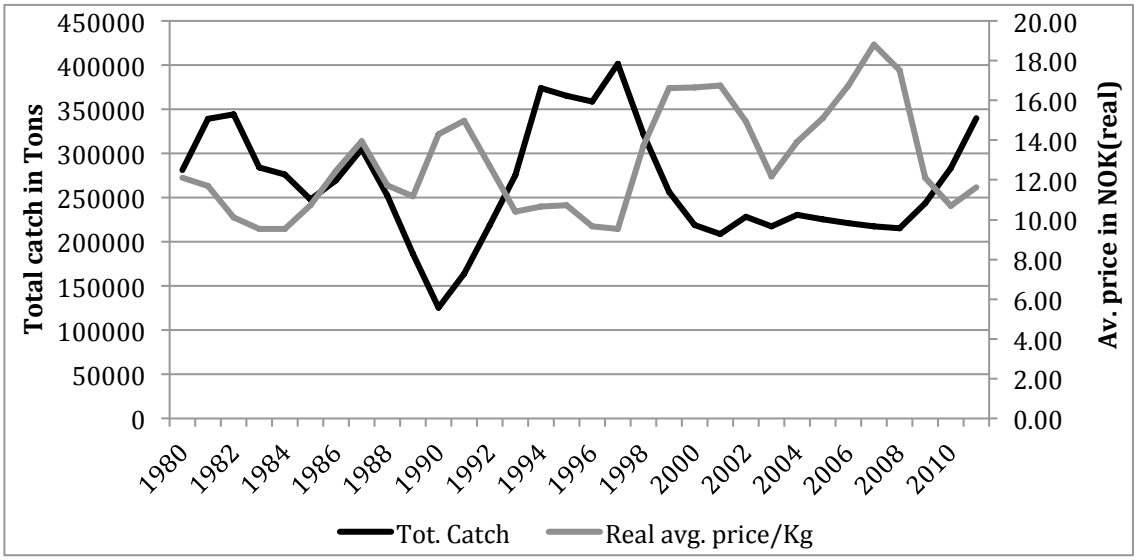

Figure 10 - Total catch of cod and real (2012) average ex-vessel price of round cod (1980-2010).
Source: Fiskeridirektoratet

From 1990, after the introduction of individual vessel quota system, there was a tendency for the price of cod to increase when the total catch[33] decreases, as seen in Figure 10. In 1987 the price of fish was very high, as was the total catch. The market was not regulated and it caused overexploitation of the resource and the crisis in 1989. In 2003 the price was relatively low comparing to the total catch. It resulted in second negative marginal

[33] According to Råfisklaget all the vessels harvest all of their cod quotas. Differences still occur due to bycatch and other externalities.

operating profit after the 1989 crisis, but this time it was due to the market situation (Armstrong et al. 2012).

The raw fish act gives the buyer the right to a price discount when there is an agreement of bad quality (up to 40%). However, that does not occur very often. Discounts are known to be done as a "bonus catch" that is delivered to the buyer. This practice, called storhundra[34], is obviously illegal and can only be achieved by an informal agreement between the fisherman and the buyer. The consequence of such agreement is that the catch seems to obtain minimum price. In reality, a higher volume than reported is landed, lowering the average price of unit of fish (Kyst og Fjord 2013).

There have already been more cases of storhundra reported in 2013 than in previous years due to this year's large TAC. Fishermen in remote regions are experiencing difficulties selling their fish to the local buyers because of the large volume of cod landed. Some facilities do not have capacity to handle that much fish so either they have to reject offer from fishermen or they become selective when it comes to quality of the raw material. Some fishermen offer the storhundra solution to be competitive and sell fish below the minimum price (Ibid).

This makes it obvious that the minimum price today[35] does not reflect the real market price.

2.4.4 Profitability in Cod Fishery

The profitability in the demersal fishing industry in Norway has been unstable over the last decades. When access to the resource was open, the profit was oscillating around zero, and was most of the time negative. Within the last twelve years the situation has been much better and we only observed negative values of ordinary operating profit[36] in 2000, 2003 and 2008 (Figure 11). When we look at the profitability of separate vessel groups in 2010, trawlers above 28 meters have high average profitability per vessel (more than 5.2 Mill NOK), whereas this value is negative for vessels smaller than 11 meters (-26 400 NOK) and 11-27.99 meters (-37 400 NOK) (SSB 2012).

[34] Stems from the old Norse number Storhundra (big hundred), equivalent to the number 120. Thus, the fisherman delivers e.g. 20% more catch than reported.
[35] Spring 2013
[36] Profit after investment cost, before TAX

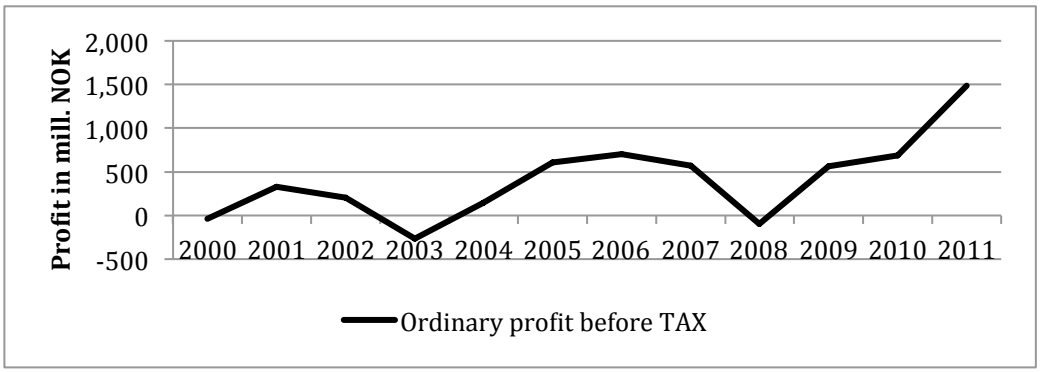

Figure 11 - Ordinary profit before tax (in mill. NOK, nominal) of demersal fishing fleet (2000-2011).
Source: Fiskeridirektoratet

White fish processing industry has been experiencing changes since 2000. Production of frozen on board whole fish increased rapidly and by 2010 trawlers were freezing 90% of their catches (increase from 50% in the year 2000). Fillet production is the least profitable, for both fishermen vessels and for the processing companies. The value of this product dropped by 55% in the first decade of the 21st century. During the same time the employment has decreased by 65% and the volume of production by 60%, leaving this sector of the industry with an accumulated deficit of 650 Mill. NOK (Deyer & Bendiksen 2012).

The most profitable in Norway, when processing whitefish, is the production of clipfish and dried fish, since they have low production cost and a high market price. Producing one kilogram of clipfish requires purchasing two kilograms of raw material, which is 80% of the total production cost. Production process is highly industrialized; only 11% is labor cost and 5-9% is the usage of energy (Hellevik et al. 2008).

2.4.5 Norwegian Seafood Council[37]

Norwegian Seafood Council (NSC) is the world's biggest joint marketing organization and its goal is to make the whole world eat more seafood. It works in collaboration with the industry and the government. It has three key areas of activity:

[37] Section based on Sivertsen and Lauritzen (2012)

Joint marketing:

NSC promotes all Norwegian seafood products chosen by the industry. The promotion from NSC has a supportive character to the marketing done by the industry itself. NSC has their own workgroup focusing solely on whitefish, and another one focusing on conventional products (i.e. clipfish and salted fish).

Market information:

They collect and distribute statistical data about development of seafood export and other seafood related trade. Information about rival countries is gathered, analyzed and shared. The goal is to give the industry, the government and the NSC a solid basis for decision-making.

Communication:

They try to secure the Norwegian seafood's good reputation internationally and convey their information through their webpage and their global offices, targeted to exporters, media and consumers.

Ministry of Fishery and Coastal Affairs owns the Norwegian Seafood Council. It is financed through the industry by a fee of 0.75% of the value of exported whole fish and 0.20% of the value of all exported processed seafood. It has offices in 12 major countries. Its budget in 2012 was 414mill. NOK. NSC has over 500 projects annually in over 25 countries (Sivertsen & Lauritzen 2012).

2.5 Recap

- Norway shares the NEA cod stock together with Russia and a few other countries (10%). In 2013 the Norwegian share of TAC is 446 000 tons. There are many regulations in Norwegian cod fisheries restricting who, where, how and (in some cases) when it is allowed to fish.
- The quota is divided into three main categories, whereas the coastal fleet (vessels less than 28 meters) and the ocean fleet (28 meters and above) are the largest quota holders. The higher the TAC, the larger the share of quotas for the ocean fleet.

- The number of vessels and fishermen has been heavily reduced since the 1970s.
- Settlement policy is important for the Norwegian government. Quota transfers are allowed, but very restricted. The Northern regions Nordland, Troms and Finnmark have the most vessels.
- As a part of the settlement policy, some production facilities are allowed to own trawling vessels, but they have delivery obligations for their catch.
- Main products are clipfish and whole frozen fish. Salted cod and fresh/chilled are also a large part of export value.
- Main export countries are China (frozen whole) and Portugal (clipfish). Other large markets are Brazil and countries in Western Europe such as Spain and France.
- The vast majority of catch is landed in February-April due to spawning season, when the stock is accessible for the small coastal vessels.
- Sales organizations sets minimum prices and controls all first hand sales of cod in Norway. Cod is categorized by size and whether it is frozen or not. There are quality standards but lack of traceability. A price premium can be obtained on auction or by direct negotiations between fisherman and buyer, but is, in most cases, not sufficient for the fisherman to focus on quality. The storhundra phenomenon, where volume landed and volume reported deviates, occurs in the industry.
- The demersal fishing fleet is very profitable in total, but most of it stems from the ocean fleet.
- Producers struggle with profitability, especially in the filleting industry. Clipfish is the most profitable sector.

2.6 Implications of Regulations

Numbers that were showed in the previous section suggest that there are some issues in the industry, which have room for improvement. The volume of fish harvested every year expresses great potential for the cod fishery. However, looking at the profitability of the processing industry, one can get disappointed.

Up to this point, it appears that the rules on fisheries were created with consideration of the interest of fishermen and not so much for the best of processing industry. Based on the data from the Norwegian wild fisheries, there seems to be a discrepancy between the primary goal of the government and economically optimal industry. Regulations supporting a strong, land-based industry, which help to fulfill settlement objectives of the authorities[38], seem to be in a contradiction with the ones that would cause increase of profitability of the entire industry[39].

The Raw Fish Act and Råfisklaget have great power and influence, which is used to support the interest of the fishermen. Responsibility of setting minimum prices and monopolistic character of sales organizations regarding all first hand sales of fish are basic instruments to do so. Furthermore, the individual vessel quota system eliminates the race to fish. More importantly, because of this system, there seems to be no real incentives for the fishermen to focus on high quality catches, or to increase their effort to fish during the second half of the year.

The minimum price, with its limited emphasis on quality, secures the income of the fishermen, who make a minimum effort to harvest maximum amount of fish in the shortest time possible. Those who deliver high quality fish can obtain a small price premium, but this is not always the case. The premium is more often paid in transactions based on long-term contracts than in auctions. From a highly economical point of view, fishing should be done at a minimum level of effort, but also in a way that yields the highest profit. This should imply that fishermen who are willing to pay the most for the quotas are best suited to maximize the profit (Hermansen & Svorken 2012).

[38] Stated in i.e. Regjeringen. (2012). *Landbruks- og matpolitikken*. Oslo: Regjeringen. Available at: http://www.regjeringen.no/nb/dep/lmd/dok/regpubl/stmeld/2011-2012/meld-st-9-20112012/2.html?id=664982 (accessed: 2.4. 2013).
[39] Stated in Regjeringen. (2007). *Regjeringens ferskfiskstrategi*. Ministry of Fisheries and Coastal Affairs. Oslo: Regjeringen.

In the last years, particularly in 2013, it seems difficult for the fishermen with small vessels to be able to sell their catches of fish for minimum price (Johansen 2013). To set the average price per kilogram of fish below the minimum price, phenomenon of storhundra takes place. This creates incorrect landing information, and the probability of overfishing increases.

At the same time, the fresh fish industry struggles to get hold of raw material of good quality. Fishermen prefer to deliver frozen headed and gutted (h/g) round fish, which achieves a higher price, and reduce the landings of fresh fish to the producers in Norway. Additionally, the coastal fleet fishes large volumes in a short period of time that are almost impossible for them to handle in a satisfying way. As a result, the processing facilities are forced to turn down deliveries due to limited capacity or quality issues (Heide & Henriksen 2013).

As discussed, preferred quality and catch methods depend on the purpose of raw material. If one produces blocks of whole fish for ready meals or minced products, frozen material is suitable. The fisherman has low costs and high revenue with a minimum level of effort. However, in order to make a fillet, which is also desired by the government, the industry needs high quality fresh fish to be able to make any real profit. Furthermore, fillet production requires high quality fish in order to be as flexible as possible in meeting market demands and maximizing the utilization of raw material to obtain value added production (Heide & Henriksen 2013). Norwegian cod industry has a relatively limited range of cod products in its offer. It tends to be more oriented towards frozen whole fish and clipfish production, where the quality is not a priority.

The overall conclusion that can be made about all the implications of quality issues present in cod fishery is that it causes supply driven production. Processors are not able to consider demand and market situation in the production process since they have little control over fishermen. Certain products are made because it is possible to make them out of the fish that have been delivered, not because there is a high demand for them. There is a tendency to look for a buyer that will accept the product instead of focusing on production of goods that are demanded on specific markets.

Strong seasonal pattern of landings is negative for some companies in the value chain. It seems that, in today's regulatory framework, the only rule facilitating this is the increase of bycatch quota. Producers can also have delivery contracts directly with local

fishermen, but, as long as the fishermen do not want or have to fish in the second half of the year, this is not helping much.

There are, on the other hand, many regulations indirectly responsible for seasonal pattern of landings. Requirements regarding ownership of a fishing vessel stop other actors in the industry from harvesting themselves, which would give bigger control over time, size and features of the raw material delivered. Distribution of quotas among vessel types that gives majority of TAC to the coastal fleet can be the reason for the deliveries mainly in the first part of the year. Non-transferable quotas make most of the fishermen fish their entire share when it is possible for them (instead of selling some part) and not when it is best for the industry. Minimum prices cause little variation of the prices of raw material within the year, which gives little incentives for the fishermen to use their quotas in different periods of the year (Trondsen 2010a).

Processing companies have difficulties dealing with seasonality. They have to adjust all the other inputs to the amount of raw material that is available. Outside of the high season, the processing facilities and employees are not as efficient as they could be and their maintenance is costly. Seasonality causes a lot of problems for the producers to keep stable and long lasting business relations (Heide & Henriksen 2013). The buyers of the products appreciate deliveries that can be adjusted to the demand on the market. The producers of fresh cod products in Norway cannot provide this. Cod seems to be harvested without (or with little) attention to the market situation.

There has also been a change in the use of raw materials in the last 25 years. As the fillet industry has been constantly decreasing production, the proportion of the type of raw material used in the production also changed[40]:

- From 60% frozen and fresh fillets to 15%
- From 30% conventional products to 60%
- From 5% h/g to 25% (most of it frozen at sea)

Some have tried to even out the seasonality by storing live caught cod from the winter season to be slaughtered in the second part of the year (Grønnevet & Sigurdsson 2012). This, however, is still in early stage and has been proven difficult to justify economically.

[40] Source: Nofima

2.6.1 Potential Problems

Based on the historical overview, regulatory framework and the presented data we can distinguish some potential problems in the cod fishery. On the basis of the theory and our interviews, we will in the following chapters investigate whether these are real problems or not. The potential problems are:

- There are great seasonal differences in landings. Does this affect the production and profitability of the industry?
- There is little profitability in the processing industry, whereas the fishing fleet is highly profitable. Is there a regulatory problem? Is there a problem with the distribution of power?
- The raw fish act focuses on the fishermen, not so much on the processing industry. In a historical perspective this has been justified, but is it now? Does the raw fish act give the fishermen the most power in the value chain?
- Is the Norwegian cod industry forsaking all value adding in production to other countries?
- Is quality from both the coastal and ocean fleet good enough to ensure the facilities flexibility and opportunity for value adding?
- Is the communication throughout the value chain good enough?

3. Theory

Fishing industry needs to be regulated to maintain sustainable development of marine resources. In this chapter will start with a short overview of open access fisheries and the effect of imposing TAC. We will also introduce an alternative management system to the one in Norway. Furthermore, we will discus vertical integration theory and review studies done on this topic in Norway, Iceland and New Zealand. Finally, we will point out the most important features of market-oriented fisheries.

3.1 Market Access

To present a simple model of an open access market we assume that price of fish is constant[41] and that all vessels are homogenous. They use the same inputs for a certain amount of catch. The size of harvest depends on the fishing effort. Effort can express hours of labor, used equipment or skills of fishermen. The size of harvest with given effort level is a function called sustainable yield curve (SY). The harvest will be increasing as long as it does not exceed natural growth rate of the biomass. This level of harvest (E_{MSY}) is called the maximum sustainable yield (MSY). With the decrease of the stock the harvest will also decrease and catching certain amount of fish will now require additional effort.

We can transform the SY curve into a total revenue curve (*TR*) by expressing harvest in terms of money value. Total Revenue Curve for a given period of time (i.e. season) allows us to determine the economic equilibrium of open access market. The *TR* curve has the same shape as the SY curve. By including a linear total cost (*TC*) function we can determine the profitability ($\pi = TR - TC$) (Flåten 2011).

[41] Though, in reality the price of the fish might vary due to different circumstances.

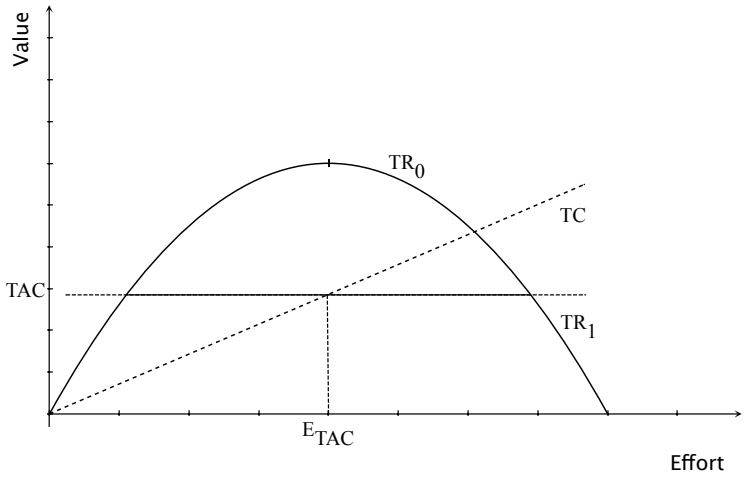

Figure 12 - Effect of imposing TAC
Source: Franquesa (2006)

The main measure used to maintain sustainable development of natural resource, especially the one that has to be shared between at least two countries, is TAC. The process of setting TAC is described in chapter 2, but the economic implication is presented in Figure 12. TAC limits the production and changes the TR curve to a straight curve form and prevents exploitation (or to restore balance) of the stock by lowering the fishing effort (Flåten 2011).

In Figure 12 we can observe that in E_{MSY} (expressed as E_{TAC}), the profit equals $TR - TC = 0$.

3.1.1 Individual Transferable Quotas

As mentioned earlier, one of the ways to lower fishing effort is licensing fishing vessels for commercial use. Every license has a certain share of the total allowable catch. In chapter 2 we described all the restrictions regarding transferability of quotas in Norway as a part of the individual vessel quota system. However, countries as Iceland, New Zealand, Australia, Canada and others, have introduced individual transferable quota system (ITQ) as a way of improving profitability of fisheries. In the early 1990s apparent advantages of this system were specified by Hannesson (1993):

"Dividing the TAC among all vessels participating in a fishery prevents a self-defeating race for the largest possible share of the total catch. And making the vessel quotas transferable makes it possible to minimize the cost of taking a given catch. In the short term, transferability ensures that the least efficient fishing vessels will not be used, as their quotas will be bought by the owners of the more efficient vessels at a price that benefits both buyer and seller. In the long run transferability means that the owners of fishing

vessels can adjust their fishing capacity to the amount they may expect to be able to take, or vice versa."

In the end of 1980s, when it was obvious in Norway that the cod crisis was coming, representatives from the Ministry of Fisheries, the Directorate of Fisheries and the Norwegian Fishermen's Association made the first attempt to change the system in order to prevent over-capacity. This idea faced strong opposition both from fishermen and from regional politicians, who named ITQs as a "dead horse", and saw the main consequence of the system as selling Norwegian harvesting rights to European companies. IVQ system is suppose to secure diversity of the fleet and decentralized ownership of cod quotas (Hersoug et al. 2000). However, according to Hannesson (1993), who studied the effect of introducing ITQ in Iceland, there is no evidence of this kind of impact on the industry.

ITQ system gives the possibilities of increasing the average revenue. One of the fishermen does not have to make the effort when he knows that the cost will exceed the revenue of fishing too small amount of quotas that he has left, and the other will decrease the average cost of fishing by increasing the amount of fish harvested. Buying the quotas within ITQ system increases the total cost, but as long as the price of quotas decreases average cost of fishing, the trade is profitable for both parties (FAO 1997).

3.2 Value Chain Analysis and Vertical Integration in Norwegian Cod Fisheries

According to Knútsson et al. (2008) the "value chain describes full range of activities which are required to bring a product or service from conception, through the intermediary phase of production, delivery to final consumers". In Norwegian wild fisheries, the value chain can be presented in a following way (Sandberg et al. 2004:19):

- Harvesting vessels (processing on board and delivering fresh)
- Sales organizations (first hand sales of fish through auctions or contracts)
- Fish merchants (distributors, exporters. They do not process the fish, just buy and sell. Can do packaging, portioning, etc. but not necessarily)
- Primary processors (can deal with filleting, heading, gutting, washing, cutting or peeling. The product they sell is further processed elsewhere)

- Secondary processors (produce final products that do not need any other actions before reaching final consumer)
- Mixed processors (their activities are within both primary and secondary processing)
- Wholesalers (supply retailers with products from processors)
- Retailers (sell products to the final consumers)
- Foodservice (catering) institutions (companies that provide away-from-home consumption, like restaurants, hotels, schools, hospitals, etc.)
- Exports from Norway to other countries that can occur at any level of the value chain. Export volumes can be expressed in terms of the weight of the product or live weight equivalent.
- Importers (distribute products to secondary processors, retailers, wholesalers or catering institutions in the importing country)
- Consumers

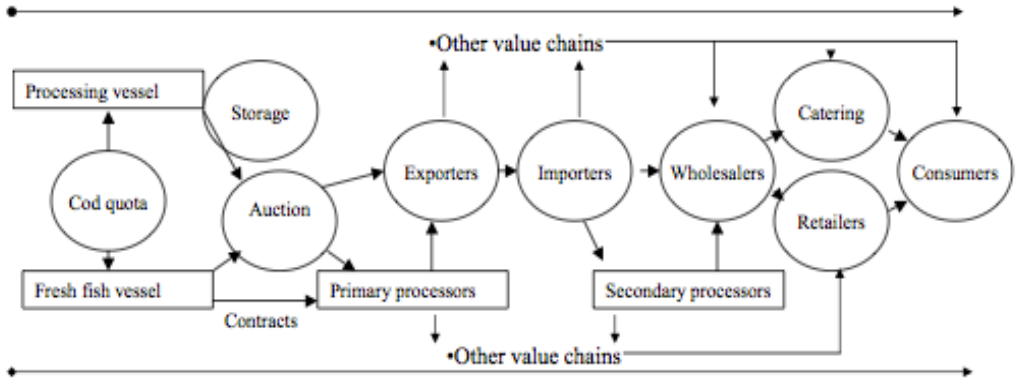

Figure 13 - Value chain in Norwegian cod fisheries
Source: Trondsen (2007)

Flexible value chains are capable to quickly adapt and respond to changes under the condition of stable quality of the product. Short-term flexibility refers to the adaptation to changes in consumer preferences and demand patterns by adjusting number of inputs. It also requires sufficient availability of raw material and efficient use of machinery (Engelhardt-Nowitzki & Willems 2011).

According to the value chain theory, sustainable fisheries do not only depend on the optimal level of extraction. They also depend on traceability mechanisms, which allow identifying the catch and its origin, thus have sustainable supply chain. This type of

supply chain needs to have information flow from one end to another. Example of sustainable value chain is Icelandic cod fishery. It mostly consists of vertically integrated companies, which control entire value chain, including even distribution network in the export country (Vallejo et al. 2009).

3.2.1 Theory of Vertical Integration

The theory of vertical integration (VI) has been present in economic literature at least since Adam Smith's (1904) statement that the division of labor is limited by the extent of the market. This approach was the base for George Stigler (1951), who developed the theory that production of new product is more likely to be vertically integrated. The reason for that it can be difficult to find a supplier, who would decide to produce the good on a very small scale, which is usually the case with a new product. Therefore, the producer of new product has no other choice than to cover the production entirely (Joskow 2005:329).

In modern economics the idea of vertical integration was developed in Ronald Coase's (1937) analysis of transaction costs[42]. The topic of vertical integration was also a part of industrial organization economics. Michael Porter (1980) defined this term as: "the combination of technologically distinct production, distribution, selling and/or other economic processes within the confines of a single firm." Incentives behind vertical integration, its use and consequences were also in scope of resource-based view (RBV) of the firm (Isaksen 2007).

Porter's definition quoted above is one out of many ways that has been used to define VI. However, all of them have a lot in common and can be summed up into simple explanation of VI as a common ownership of production that covers at least two stages of the value chain. This definition is sufficient, but needs specification of the term "ownership" since nowadays it does not necessarily mean managerial power. In the analysis of vertical integration, ownership means decision-making power, resource allocation and coordination (Isaksen 2007:8).

Basic idea behind transaction cost economy (TCE) is that the firm should integrate when the costs of managing and in-house production are lower than its price on the market (Dawson 2003:19). It also views vertical integration as a way of solving the problem of

[42] Costs of possessing partners, negotiating, monitoring and enforcement.

incomplete contracts in the market. These contracts can cause inefficient behavior of one of the parties of the transaction or conflicts between them. According to this view, production does not have to be integrated if the transactions are clear and simple and it should be integrated in case of uncertainty, complexity and specificity. However, empirical examples show that it is not always that vertical integration is most effective solution for dealing with those market features (Isaksen 2007:23).

Another argument supporting vertical integration of the production within TCE is that it eliminates the problem of transaction specific investments and information impactedness. The first one arises when the transaction requires investments that are utilized during the contract and lose the value when the contract is finished. Information impactedness takes place when one party of the transaction has an informational advantage over the other. According to TCE those problems of the firms are smoothened when the production is vertically integrated. (Isaksen 2007). TCE also determines whether to integrate vertically depending on frequency of the transactions. Adaptation to changing circumstances is much more difficult when the production is not integrated since it requires constant monitoring, which increases the cost of the transaction (Ibid).

Primarily, the economists who worked on industrial organization (IO) were interested in implications of vertical integration on market power and gaining monopolistic position in the market by big companies. After some time, economists[43] who were interested in the topic from IO perspective, saw the incentive to integrate vertically in minimizing the costs of the production as a way of gaining advantages in the market and eliminate the competitors (Isaksen 2007:23). Its focus on costs can lead to comparison with TCE's view on vertical integration. The differentiation between the two approaches is that TCE sees competitive advantage of one firm over the other because of its economic efficiency, whereas IO approach is focused on the position of the firm in the market and the strategic behavior of managers with regards to their rivals (Isaksen 2007:24).

According to IO approach there are two ways of gaining competitive advantage in the market. In case of upstream vertical integration, there is a possibility of lowering the costs, whereas downstream vertical integration can help with gaining differentiation advantages (Porter 1980). Porter also pointed out a very important issue that should

[43] Ronald Coase, George Stigler and Olivier E. Williamson

support vertical integration. It eliminates uncertainty related to the supply of crucial materials needed for the production.

Resource-based view of the firm is a part of strategic management developed by Wernerfelt (1984) and Barney (1986). The main focus of the study on strategic management was related to the ways of gaining long lasting competitive advantages in the industry. This theory has two assumptions: resources of the firms are heterogeneous (unique production of each firm based on individual traditions and experience) and immobile (due to their inelastic supply or high cost of production) (Barney (2005) cited in Isaksen 2007:25).

According to resource-based view of the firm vertical integration is a crucial feature of the production that allows producing unique and heterogeneous goods that are hard to imitate, thus gaining more comparative advantage in the market (Wernerfelt (1984), Ramanujam & Varadarajan (1989) cited in Isaksen 2007:104). Vertical integration should be a way of improving the position in the market and increasing the profit of the firm (Conner 1991:140-41).

The right decision whether to integrate vertically or not is not easy to make. The theory mentioned above does not make it much clearer since it is not always confirmed by empirical findings. Mahoney ((1992) cited in Isaksen 2007:36) concluded from his studies that to give specific advices is very complex and cannot be based on a single factor. Furthermore, Murray et al. (1995) claims that it requires deep analysis of the specific industry and production process, as well as the product and transaction to make any conclusion about level of optimal integration and any general conclusion about whether to integrate or not is impossible to make. As Baumol (1997) humorously pointed: *"Vertical integration, unlike virginity, is a matter of degree. The question, then, is not whether a firm will be integrated or non-integrated, but the degree to which this should or will occur. In practice, it will almost never take either polar form"*. It is also hard to base the decision regarding the level of integration on the past experiences. One has to take into consideration the temporal conditions and factors at the particular time (Christensen 2001).

3.2.2 Previous Research on Vertical Integration in Cod Fisheries

The theory of vertical integration is a substantial part of the economic literature. The previous section highlighted some essential issues related to the topic. This part will focus on empirical analysis on vertical integration in fisheries in Norway.

Bent Dreyer, John R. Isaksen, and Kjell Grønhaug (2001) investigated vertical integration by looking at profitability of firms within Norwegian fisheries for the period 1977 to 1995 (according to data collected from national survey), and they measured their level of integration captured in the year 1997 (the time of this data collection performed through telephone interviews with the biggest processing companies). They found that the profitability of the firms was not positively correlated with the level of vertical integration thus it cannot be the determinant of success or failure of the company. According to the research, stable deliveries of raw material are not crucial for the profitability in the industry. However, as they notice, some integrated companies are profitable, which should be further studied. This is contradictory to the resource based theory and transaction cost economy approaches on vertical integration. According to these theories, we should expect the opposite, because firms integrated vertically would probably have lower costs of raw material, but, more importantly, they could control the deliveries, and thus eliminate the problem of seasonality apparent especially in the white fish sector and uncertainty mainly regarding quality of the raw material. The authors explained that the possible reason for the contradiction between their findings and theory is that their model did not include processing trawlers as a form of vertical integration.

However, in their recent report from 2011 the result was different (Isaksen et al. 2011). This time they focused on the data from one point of time. Three groups of firms were distinguished: companies processing only white fish, those processing only farmed fish and companies that are using both farmed and white fish. They specified the level of vertical integration for each group by creating a measure. According to this measure, the first group mentioned is least integrated (17%) and the most integrated group is the firms using farmed fish in the production process (76%). The first group is also the least profitable with the value of return on total assets (RTA)[44] of 4.4%. The most profitable

[44] RTA is a profitability measure reflecting how the company is managing their assets for profit generation. It is calculated by dividing net income by the total value of assets. This type of measure presents overall efficiency of the firm instead of comparing profits/earnings/income with sales. Source: http://bizfinance.about.com/od/financialratios/a/Profitability_Ratios.htm

group turned out to be the companies using both farmed and white fish for the production with a RTA of 10.1%, which was 0.2% higher than the profitability of firms using only farmed fish. They also found that vertical integration and profitability are slightly correlated. However, their model did not include many variables, that would be important, due to measurement problems. They noted that performance should be measured also in other terms than financial, or that vertical integration of the firm can be a strategic way of gaining power in the market. Hence the only conclusion that they could make was that the effect of vertical integration on performance is difficult to specify.

It is difficult to find the correlation between vertical integration and profitability. Both studies, Dreyer et al. (2001) and Isaksen et al. (2011), have drawbacks and do not allow us to make any conclusions regarding this correlation. When we go back to the theory, we notice that optimal level of vertical integration is industry, product and time specific. The research in Norway (2011) puts together two completely different types of resources: white fish and farmed fish. Looking at the white fish sector one can see that it is hardly integrated and the integration is, mainly, due to delivery obligations regulated by the government or in the lower parts of the value chain. We should not conclude that there is no effect of vertical integration on profitability in wild fisheries in Norway without proper sample of firms that are vertically integrated from harvest to primary processing. Why is there so little integration in the white fish sector in Norway? One way to answer this question is to study similar industries in other countries and compare the way they manage wild fisheries.

A good example is Iceland and the result of research by Knútsson, Klemensson and Gestsson (2008) about the value chain of demersal fisheries. The value chain of cod in Iceland has gone from being non-integrated to be highly integrated. Most of the demersal fish in Iceland is either sold through long lasting contracts or processed in vertically integrated companies. Only one fifth is sold on the market. The study was done through questionnaires that were sent to the most important producers and exporters in Iceland.

Out of the companies that responded, two groups were distinguished: (i) vertically integrated firms with a big range of products in their offer and (ii) specialized producers of chilled products. The research determined main characteristics of the value chain in Iceland. First, it is highly downstream integrated. Most of the firms coordinate production activities from harvest to export. Next step in the value chain is either secondary

processing or distribution or selling the product to the end buyer (rarely). There are also some companies that even control abroad processing and distribution of the final product to the retailors. Second, the Icelandic industry is focused on the demand and pays attention to the signals from the market since the relationship between retailors and producers is very close. Integrated production allows smooth flow of that information and eases the control of the quality and size of landings at certain points in time. Finally, producing companies are in control of marketing activities of their products. Profitability of the industry from the year 2000 until 2007 was always higher than in the 1990s[45].

The transformation in the Icelandic wild fisheries started with the introduction of individual transferable quota system in 1984. It took some time and corrections in the regulations for the market to adjust to the new situation but the positive change was seen from the beginning of 21st century. New regulations resulted in integration of the value chain and increased the profitability of the industry in the long run.

Another country, where wild fisheries play an important role for its economy is New Zealand. The industry is analyzed by Jeff and Liyanage (2007). The sector of wild fishery in New Zealand is, similarly to the one in Iceland, characterized by high integration of its value chain. Most of the companies cover production from harvest to marketing to gain greater control over the production process and to increase the profitability by capturing value added throughout more levels of the value chain. The industry is focused on innovative management and long-term business relations. New Zealand has also one main characteristic differentiating its industry from the Norwegian model. They introduced quota management system with ITQs in 1986. This was a way to ensure full registration of catches. Quota holders consider their ownership as an asset that they should take care of by increasing its value, thus proper exploitation of the natural resource.

3.3 Quality Requirements

In a perfect market, there is an infinite number of byers and sellers. There are homogenous goods, perfect market information and insignificant transaction costs (Pindyck & Rubinfeld 2001). Furthermore, the actors are assumed to be maximizing profit with regards to the use of input factors. However, in reality we have imperfect

[45] This was also due to investments in technology that decreased the labor costs.

markets and there are many obstacles causing market failure. In fisheries, one of these is imperfect information regarding price and quality (Sogn-Grundvåg & Henriksen 2011).

The quality of raw material is crucial for the fishing industry, especially for the fresh fillets, to obtain high market price. According to Henriksen et al. (2010) when a bad quality haddock is bought at minimum price and processed, only 5% of the raw material pays a high premium in the end market (fresh loin). 95% of the fish is further processed into blocks or minced meat leaving a negative bottom line[46]. Hence, not focusing on the quality of the raw material, sold for a minimum price for further processing, is not economically rational for the industry, but it is convenient for the fishermen, who do not have to make an effort and focus on the quality and still get the minimum price for the fish. Processing raw material of high quality pays a fair surplus to the producer (Henriksen et al. 2010).

To obtain high quality of the raw material the main criteria (except the right choice of fishing technique) are[47]:

- Proper bleeding
- Proper gutting
- Low catch damage
- Proper handling (bruises, cuts, storage on vessel)
- Short time of the delivery to the shore (if the fish is not frozen on board)

Previous studies of the industry (Henriksen & Svorken 2011) showed that line caught cod has the highest quality. Furthermore, the size of the catch seems to have an impact where smaller catches are considered the best. The same study shows that the worst catch method is nets and seine[48]. Line caught cod is preferred by the fillet industry because of its dependence on steady, high quality supply of raw materials. However, this catch method is declining due to low profitability and insufficient price premium[49]

A new research released in 2013 (Heide & Henriksen) shows a strong correlation between the quality of raw material, end product and market price. One of the most common

[46] Studies done by Nofima in cooperation with Ålesundfisk in 2010.
[47] Studies done by shows that cod can be stored onboard in chilled seawater up to 24 hours without quality loss. Further reading: Akse, L., T. Tobiassen, et al. (2010)
[48] Processing purpose of raw material can change the preferable catch method. Some producers of salted fish preferred fish caught by net, if handled correctly.
[49] There is almost a 30% higher minimum price for haddock caught by line than other catch methods. For cod, there is no distinction like this.

quality defects of cod is the case of not proper bleeding, causing redness of fillets and fish meat. The difference in the average market price of all products (found in this research) between white raw material and raw material with 40% redness was as much as 23%. Furthermore, the labor cost of processing was 75% higher in the case of 40% redness (Table 6).

	White fish	20% red fillet	40% red fillet
Market price, all products*	28.6	25.8	21.9
Cost, raw material**	14.7	14.7	14.7
Handling	1.25	1.25	1.25
Packaging	1.75	1.75	1.75
Labor cost	4.00	5.50	7.00
Margin	6.90	2.60	-2.80

Table 6 - Margins in production in different scenarios.
*Mix of frozen/fresh loins, minced, block, tails and portions (in NOK) **Paid prices for cod (1-6kg) in 2012 (in NOK)
Source: NOFIMA

Hence, in the case of 20% redness the production is marginally profitable and in the case of 40% redness the production is unprofitable. Low quality of raw material reduces flexibility of the product line, forcing (or limiting) processors to make fewer products than desired. This makes demand-driven production more difficult. Low quality reduces the price in end market and, therefore, increases the risk for the processor. (Heide & Henriksen 2013). So, processors can (and should!) pay more than minimum price for high quality raw material, according to this research.

To give a numerical example, Iceland's high quality salted cod obtained €1/kg more than the Norwegian salted cod. In 2012 this would account for more that 120 mill. NOK in export value to the Portuguese market alone (Heide & Henriksen 2013).

Quality of the raw material is therefore a decisive factor for the price of end product, but as Bjarnason (2012) states; "it is not enough to find markets that are willing to buy our (Norwegian) cod products. We must find the markets with no lack of food and with strong purchasing power". Furthermore, he adds: "we must persuade the consumers that they need to buy our products to be really satisfied. This is quite a task". In the case of Norwegian cod products this is a difficult task. It is mostly because the consumers associates Norwegian export products with the supermarket that sells them (like *Tesco*

value cod in the UK and *Gode Hav cod* for the retailer group Rema 1000 in Norway). According to prof. Ragnar Tveterås in an interview with Norsk Fiskerinæring (2013) he explains that it is expensive and difficult for Norwegian producers to market their products. This is mainly due to the fact that they are in an upstream position in the value chain, and thus have difficulty to succeed with their own brand. Hence, it will not be that interesting for them to do so. This is one of the reasons why the Norwegian Seafood Council is established, he added.

3.4 Market-Oriented Fisheries

"…a market orientation refers to the organization-wide generation, dissemination, and responsiveness to market intelligence" (Kohli & Jaworski (1990) as cited in Trondsen 2001).

According to the marketing theory, strategic management of the fish from harvest to sales in the relatively best market segments is crucial for maximization of market values. Market value can be further increased by additional activities, like getting market information or improving business relations with buyers. There is a positive relationship between market-oriented marketing management and performance (Trondsen 2001).

As described in previous sections, the objectives of Norwegian fisheries management are focused on sustainability of fish stocks, allocation of the fishing rights and increasing capacity of fishing vessels. There has been less focus on increasing the market value of harvested fish. Cod processing companies in Norway have to control quantity, quality and time of catches to be able to satisfy market demand. Vital for maximizing market values is management of supply accordingly to the demand, instead of "catch driven sales". There is a conflict of interests between fishermen, who want to fish with lowest cost when the fish is accessible, and the processing companies that need certain timing of the deliveries but cannot get access to fish due to governmental regulations. Furthermore, the power seems to be assigned to the fishermen through the Raw Fish Act (Ibid).

Market oriented value adding requires (Trondsen 2007):

- Competent entrepreneurial drive
- Flexible value chain structure

- Vertical coordination
- Market and product chain specialization

Some fisheries management systems motivate market-oriented value added more than others. The Norwegian system is focused on catch. A system with transferable quotas and licenses is a good way of turning the attention towards demand on the market, but may cause difficulties (financial and legal) to enter the industry (Trondsen 2001).

Norwegian cod fisheries are not market-oriented because they lack flexibility in the value chain, which is related to the first hand sales through auctions. There is also little level of vertical coordination caused by limited transferability of quotas (difficulties in linking catch to market preferences) and low communication between harvest and primary processing. The industry is lacking innovation. Most of the resource rent is collected by quota owners what blocks market-oriented innovations (Trondsen 2010b).

3.5 Recap

- According to the theory, wild fisheries have to be regulated to maintain sustainability of the natural resource. Introduction of TAC allows achieving the sustainability, but it does not ensure profit-maximizing use of the natural resource.
- The individual vessel quota system in Norway does not give possibilities of increasing average revenue of the industry. Empirical studies mentioned in this chapter showed that individual transferable quota system has positive effect on profitability.
- Flexible and sustainable value chain in wild fisheries requires vertical coordination, standardized quality products and stable deliveries.
- Previous studies on vertical integration focus on circumstances that should support it. General conclusion of the literature review is that it is time, industry and product specific decision. Empirical researches on correlation between vertical integration and performance in Norwegian fishing industry show no positive effect. Examples from other countries show that vertical integration should not be remedy, but consequence of more liberal management system.
- Literature shows that market-oriented value adding in fisheries requires certain features and depends on the management system. It has to be focused on the

demand instead of catch-driven sales. System with transferable quotas is market-oriented, whereas Norwegian individual vessel quota system causes harvest-driven production.

In chapter 5 we will see if our respondents' opinions reveal the same problems in the industry.

4. Methodology

It is important to choose the best suitable methodology to answer your objectives. In the following section, we will justify our choice of method. Furthermore, an explanation of how the companies was selected and approached and how the interviews were conducted is also included.

4.1 Choice of Method

The purpose of this project is to have a better understanding of how the fisheries in Norway work. More specified, we wanted to investigate:

- If there are any structural changes that may promote a more demand oriented value chain for the Norwegian cod.
- Which countries and products that are most profitable to target for Norwegian cod exporters.
- How the variety of the products can be increased to satisfy these markets.

In order to do so, we used qualitative research that enables us to go into the depth of each respondent. At the same time, we can gather data of how the companies interpret the market and the fisheries, and how they see themselves in the different parts of the value chain.

The different experiences and opinions of our respondents are retold here by us and are characterized by their understanding and personal statements; of the industry and their company's position. The data we have collected through interviews are therefore colored by our own interpretations of the setting, their ability to communicate their opinions and our understanding of the respondent. Therefore, according to Thagaard (2009) we cannot interpret our respondents' opinions as definite correct or true. Nevertheless, it is their stated opinions and is our base for the analysis.

To obtain as accurate picture as possible of the industry, semi-structured in-person interviews was used. When questions or topics need deeper examination this is the best-suited form of technique. This way we are able to control the interview according to

topics of our interest as the interview is performed. A written survey would not let us investigate our objectives in a satisfying way. A quantitative method would not make much sense since we are dealing with thoughts and personal opinions.

4.2 The Respondents

We were given some criteria by the NORFISH project when searching for respondents. These criteria included: (i) The respondents should have a geographical distribution, (ii) the respondents should represent all parts of the value chain, (iii) the respondents should represent companies with different product ranges, including fresh, frozen, filets, clip, dried, salted and farmed fish. The farmed cod industry is, however, suffering difficulties caused by the decline in prices, and we were not able to include this category. The project manager of NORFISH and representatives from the Norwegian Seafood Federation and Norwegian Seafood Council supplied suggestions to respondents. We also did some additional research to find suitable companies[50] and found many companies fulfilling our criteria situated in both Tromsø and Ålesund. The main part of the industry is primarily situated in the Northern part of Norway, and typically clustered together in the largest cities or by traditional fishing locations, like Lofoten. We limited our interviews to Tromsø and Ålesund for practical as well as economic reasons. These cities have been of great importance, both historically and today, when it comes to Norwegian fishery. Some companies with headquarters in Oslo were also included.

First, we sent a request by e-mail to different companies containing information in English about the NORFISH project, the interview objectives and ourselves. As time showed, this was not a good approach and we sent out a second set of e-mails, this time in Norwegian. Then, we called each of them trying to set interviews and time of appointments. We also sent out a following confirmation mail with more information about the topics of discussion and the project itself. In few cases, we were quite surprised by the way some companies declined, and they showed no will to contribute in any research (*"We have no time for you*", hanging up in the same breath and *"We do not care about research"*). This behavior was mainly from large, conventional producers. Nonetheless, the industry was generally positive about our research. Some of the

[50] We also received good pointers from Trygve Bjørnerem from Fiskerlaget Sør

companies were easy to find due to exposure in the media (some wanted attention, some did not).

Our respondents are a small selection of companies from different parts of the value chain, from fishermen to end product suppliers. Moreover, the respondents were in the age of mid 30s to late 50s, some were fairly new in the industry; some had 30 to 40 years of experience. The research was not done as confidential and it contains no sensitive information. We will, however, refer to our respondents with anonymity[51].

4.3 The Questionnaire

The questionnaire is based on one used for a similar study done in Iceland. It is therefore built on the same fundamental ideas. This procedure was used to ensure that the results of the interviews can be compared with the previous Icelandic results and also later with results of some interviews conducted in New Zealand. This was adopted and translated into English by us, in cooperation with our supervisors Kyrre Rickertsen and Daði Már Kristófersson. Almost all of the interviews were conducted in English since one of us do not speak Norwegian. At first, we thought that this would cause some difficulties, especially when recruiting respondents. As it turned out, this was not a problem for most of them. Only one of the respondents refused to perform the interview in English, so it was held in Norwegian by one of us.

The questionnaire is semi-structured allowing us, as interviewers, to control the flow of the information. On the other hand, it lets the respondent talk uninterrupted about his/hers thoughts and opinions that would lead us to other topics. It was then our job as interviewers to lead the respondents back to topics that we want to elaborate.

The questionnaire was also made with guidelines; if questions were unclear, or the respondent was uncertain of what to say, these guidelines were used to continue the interviews. The guidelines were made by trying to anticipate the answers to a given question on the background of our thoughts regarding the different topics. Although we used the same questionnaire for each company, it was natural to emphasize different

[51] There were some cases of skepticisms regarding some topics that their personal opinions should be public.

questions and topics depended on their position in the market, part of the value chain or type of business.

4.4 The Interviews

According to (Thagaard 2009:155), a good interview question should contribute thematically to obtain knowledge and dynamics in order to create good interaction. This means to reflect on how to make good open questions, but also how to create good follow-up questions. As a strategy in advance of our interviews, we tested the questionnaire on ourselves to rule out any unwanted dynamics and for the practice of the interview in general. Based on this we performed a pilot interview at a whitefish production facility in Oslo. This way we got more knowledge on how to structure the interview. More importantly, we learned which questions that worked and others that needed revision. Another finding worth mention was our ability as interviewers to find the passion for their work, making him/her open up and talk more freely about certain topics. We could also add a few new questions to our final questionnaire guide after this pilot interview due to new knowledge[52].

We did, in addition to the pilot, twelve interviews. Interviews were done in Oslo (February 7th and March 21th), Ålesund (February 20th, 21st, 22th) and Tromsø (February 28th and March 1st). The interviews were digitally recorded with permission from the respondents[53], so that the focus would be on the interview and allow us to follow up questions in a professional way. All recordings are in good quality and are digitally available upon request[54]. After the interviews they were partially transcribed and the material was sorted by topics of interest. The interviews were held in English, except of two cases in Ålesund. Out of these, one was held in Norwegian and the other partially in English and Norwegian.

As already stated, with a semi-structured approach it is most common that the structure of the interview is changed. This was also our experience in most cases. Some of our respondents answered our questions one after one, other elaborated more around each

[52] In retrospect, we concluded that this interview was good enough to include in our final data.
[53] The pilot interview was recorded with different equipment that, unfortunately, crashed. Luckily we did the transcription before the recording was lost.
[54] One copy is supplied our supervisors, one copy to the external sensor.

question that lead us to other topics. Hence, it was then natural to change the order of our questions as the interview was conducted. Furthermore, questions that we had not predicted came up. Sometimes we experienced that the same new questions came up on several occasions, preparing us to follow up based on our previous findings. There were, also as predicted, large variations of topics emphasized by the respondents. This was, naturally, often related to the company's place in the value chain. About some topics some of our respondents were more than willing and eager to talk about their opinions and experience, whereas others did not want to, or had no opinion at all. The majority of the respondents were very open and eager to tell us with pride about their business and products. We felt a good chemistry between the respondents and us, even when we were more critical in our questions. This would, more than often, trigger a more excited conversation as the respondent tried to justify their operations and opinions. We think our findings are interesting and, not at least, very educational.

4.5 The Analysis

We partially transcribed the recordings as the interviews were conducted. Some of the interviews were relatively long and some sorting of the data was needed. We tried to divide the topics of discussion in different categories and made notes where found best suited. Furthermore, analysis of interviews can give an interesting base to study how persons create their own comprehension by the ways they expresses themselves. By the way people talk about certain topics, and how they present themselves in relation to those, one can be able to establish patterns the culture or industry represents. This can also become clearer when listening to the recordings multiple times (Kvale 2009).

In this type of research there are many opinions that, in all, can seem like a messy story. When sorting then correctly they can give a logical connection that, ideally, presents how the industry works. Unlike statistical analysis, our objectives are not ordinary testing of hypothesis, but more like a causality of the industry itself. It is the accumulation of all opinions that leads us to our results, and on this we can build our own predictions upon the industry. With this as a base, it allows us to answer our research questions and give policy recommendations (Thagaard 2009:144).

5. Respondents' Thoughts – The Analysis

The natural flow of the interviews caused that different topics appeared at different moments. Gathering information on each topic allowed us to distinguish the most important sections of the analysis. First, we will describe the respondents' opinions on the market situation depending on different sectors of the industry. Next we will focus on the most powerful actors in wild fisheries according to our respondents. Then we will describe how they are affected by seasonal pattern of landings and the quality of the raw material. We will also discuss how they are dealing with these issues. Furthermore, we will analyze what our respondents think about management system and regulations of wild fisheries in Norway. The end of this chapter will cover future possibilities for the industry from the point of view of our respondents.

5.1 Market Situation and Marketing

Companies in Norwegian whitefish sector are exporting their products to many countries worldwide. Our respondents are mostly focused on supplying other countries than Norway. Only two of our respondents' companies are producing products for Norwegian the market (fresh and frozen).

Most of the producers of fresh products export big quantities to the European market (up to 95%), where leading importers are France, Germany, Netherlands, Spain, Denmark and Sweden. One of these producers also supplies one company in the U.S. Since the fresh cod sector in Norway is not the most profitable, they have to produce other products as well. It is frozen fish, which can be stored longer before it is sold, mostly exported to the Eastern Europe, salted fish, dried heads for African market or fillets of other species than cod. Apart from the possibility of increased production for their biggest business partners, they considered the German and American markets to have the greatest potential for fresh cod. Only one company is not exporting its products because "*Norwegian fish should stay in Norway*". However, this is not a general tendency.

The producers of clipfish are mainly exporting their products to Portugal, Brazil and other countries in Latin America. In clipfish industry, the Brazilian market was recognized as

the one with the biggest potential of growth and room for other products. It is being investigated and targeted by one of the companies, which is producing many products, like clipfish, fresh and frozen fish: *"Brazil has potential. It is a big market with developing economy. It may be a new market for ready products".* Stable demand from importers of clipfish created a feeling of security within the producers about future sales. There were two companies among our respondents that only produced clipfish, and they did not plan to introduce new products or try to target new markets.

Companies owning fishing vessels sell mostly frozen headed and gutted cod for processing, sold to the major processing nations in the world: China, Vietnam and Eastern Europe, but also for further processing into clipfish in Norway. The final products have different destinations and the harvesting companies did not seem to be interested in these destinations. They have a general idea of what these products are and their destinations but with no certainty. Two out of four harvesting companies in also deliver fresh fish, but this is related to the delivery obligations attached to their licenses. These companies are vertically integrated and own processing facilities, but their vessels does not supply them more than they are obliged to. The rest of their catches are mostly exported to China.

All of the processing companies that we talked to are supplied mostly by coastal vessels and consider them as a very important source of the raw material. It was pointed out that the coastal fleet is needed as a main source of fresh fish for the production, which is not provided to that extend by trawlers. They also pointed out that there is a communication problem with the fishermen. They have little control over the raw material that is delivered and they express desire to be able to have greater influence on the catch methods and time of deliveries. It seems obvious from this that the industry is suffering from a non market-oriented harvest. Most of the processors said that they are willing to pay a premium for the fish that fulfills their expectations and allows them to produce according to the market demand.

Many processing companies noticed general overcapacity of production facilities in Norway and undersupply of white fish. One of the producers of fresh fish pointed out that there are markets, but unstable supply does not help to gain access to these markets. According to him, the deliveries of the raw material to China should stop. On the other hand, representative of the trawling company said that processors, who complain about getting too little raw material, usually do not want to pay the market price for it.

Marketing activities among the respondents of the industry did not seem to be a priority. Some harvesting companies put the responsibilities of promotion on processors and do not see the need to promote the raw material. However, the largest harvesting companies realize the beneficial aspects of labeling cod with the country of origin and promoting Norwegian brand, but are not actively involved in it. Only one fishing company is trying to build their own brand to promote their products. It emphasizes "transparency and traceability" of their products, alongside carbon footprint.

Processing companies in the clipfish sector do not make a big effort to promote their products, which is probably related to both the stability in the demand and their upstream position in the value chain. One of the clipfish producers said that he is not doing any marketing because exporters and importers take care of the promotion since *"they know their buyers"*. Most of them are not market-oriented and do not search for possibilities to extend their production and introduce new products. Thus, they do not focus on research regarding consumer preferences. These companies relay on the opinion of their biggest customers.

Companies producing fresh and frozen products are more market-oriented. They are in contact with retailers and, during the production, take into consideration signals they get. However, they are not able to fulfill some of the requirements of the retailers due to problems in Norwegian industry. The reasons will be analyzed in following sections. They realize the importance of marketing activities as a way of improving their position in the market, but most of them rely on the Norwegian Seafood Council. One of the fresh fish producers promotes themselves as a supplier of *"Fish with a story"* enhancing full traceability by including the name of the vessel and fisherman on their products. Another company, which only supplies the Norwegian market does not see the need of marketing and making effort to gain new customers because, as he said: *"they* (retailers) *come to me"*. Exporters appreciate the activities of the Norwegian Seafood Council and think that there has been an improvement in sales of cod on the European market thanks to these activities.

Based on our study we have an impression that many processing companies are not focused on targeting the markets that are paying the highest prices for cod products. Clipfish and salted fish producers realize that Portugal and Brazil are less demanding in terms of quality than Italy and Spain. A clipfish producer explains: *"Spain has higher*

quality expectations than Portugal, because Portugal wants dry fish, where quality issues are easier to camouflage". They are trying to maintain the current position and keep the markets that they have and do not see the need of possible changes to satisfy other importers, even though they are able to get a higher price in these markets.

One of the objectives of the government is increased production of fresh cod products in Norway. The producers of these products think that the policy is not efficient and has the opposite effect. They are concerned about the future. They think that they deserve more attention and are worried that China may reduce the imports of frozen fish. One of the respondents sees a future in fresh and frozen sector, only if there is stability in the industry. He said that Norway has an advantage of having the freshest raw material in the largest quantities and labor costs do not affect processing industry. Another producer of fresh fish said:

"The government has this fresh fish policy. But the trend in the industry is bigger boats, freezing. (...) If the whole fleet is doing that. What happens? Which markets do you sell these products to? (...) If China says: I don't want your 8,000 tons of haddock. What do you do then? What if the UK says: we don't want your frozen at sea any more? We have all eggs in one basket."

These concerns did not seem to be an issue for the representative of one out of two sales organizations we talked to. When asked about the importance of fresh fish deliveries for fillet sector in cod industry, he answered:

"I would like to turn the question around. Do we really need the filleting production? In Norway, is this really work that people want and does it create any value at all?"

It was also recognized by the industry that the crisis in Europe is dangerous. Most of our respondents noticed lower prices in the market and the continuous pressure for even lower prices from the buyers. Producers of clipfish noticed, however, that their product is bought in Portugal and Brazil at any price because of its traditional meaning for these nations.

A good way to sum up the situation of Norwegian cod industry in the market is to quote the representative of one of the vertically integrated companies in Tromsø:

"Key point is that Norwegian fishing industry is turning their back away from the market. It is taking existing markets for granted. For example Portugal. (...) they don't have that

high quality preferences. (…) You have to look at other markets to have bigger flexibility, especially when the quotas are up".

5.2 Value Chain

There are only two companies represented by our respondents that are vertically integrated. They control harvest, processing, packaging and export of their products. They are also the only companies among our respondents that have delivery obligations attached to their licenses. All of the other companies are specialized in production of fish products or fishing and exporting to the retailers or processing companies worldwide. We also talked to one exporter, who trades between producers in Norway and retailers outside of the country.

The two vertically integrated companies could have impact on the quality, quantity and time of the deliveries of the raw material, but they are mostly supplying their processing facilities with fish bought from coastal fishermen through sales organizations. Some of the raw material is supplied from their trawlers. The rest of fish harvested is exported mostly to China. One of these companies split up in 2012 to be more specialized in harvesting or in processing and sales. They remain under the same ownership and keep their relations and obligations as they were before so, by definition, they are still vertically integrated. The representative of the processing company explained their decision:

"Trawling fleet and fishing fleet should be focusing on doing the best fishing that they can do. The company of processing and sales should be best at what they do. That was the kind of thinking for the split. And I think that that kind of thinking is correct. But of course, if the demand variation is very big, it's difficult. Icelandic trawling fleet and processing facilities are integrated. So it's easier to kind of steer it, if you need raw material or not. (…) I think it's easier for them to kind of push and pull the resources in the right way. And we are not there."

The other respondents' companies are specialized in production of clipfish or fresh and frozen parts. Five out of eight companies in these sectors are somehow vertically integrated and also deal with packaging. The products are either sold to Norwegian retailers or exporters or are directly exported to foreign retailers or secondary processors.

One of the fresh fish producers also owns some processing plants in other European countries. One of the producers of clipfish used to own harvest vessels, but sold it long time ago. They decided to specialize in production, because that is what they do best and the fishermen do what they can do best.

Most of the companies in the fresh fish sector are not vertically integrated but they try to get more control over the deliveries through long-term relations and contracts with small number of chosen fishermen instead of buying raw material in auctions.

Vertically integrated production can also take place on factory trawlers. As mentioned in the background section, some of them are able to produce frozen fillets on board. One of the trawling companies used to own factory trawlers making frozen fillets. The respondent representing this company, believes that the best products from Norway are the ones vessel-produced, but they recently sold their last factory trawler to Russia because of high labor costs and the way of payment to the fishermen (30% of the value of the catch). Two of our respondents did not think that getting rid of the factory trawlers was good for the industry. One of them, from a trawling company, would like to have filleting vessel in his fleet but he does not have a license. They pointed out that this forces Norwegian producers of fillets to compete with cheap frozen fillets produced by these vessels in Russia. One of the respondents commented on the increased level of competition in the frozen fillet sector related to the decreased number of processing trawlers:

"I would like to make fillets in board, but we're not allowed to do that in Norway because we don't have the license for it. Just a few vessels have a license for it. So… of course if we could do the filleting and the finished product instead of shipping half-produced products outside, we could do all the value in Norway instead of giving it away to other countries. (…) But that's all political. (…) Strand sold their two factory trawlers. I think they are doing wrong. I don't agree with that."

5.3 Power in the Industry

For this research, it was very important to know the opinion of our respondents on the most powerful actors in the value chain. As it turned out, for most of them the answer to that question was not obvious or easy. Based on the feedback that we got on this topic, general conclusion is not clear right away. Respondents did not answer unanimously.

The respondent, who was the most certain of his answer, was the representative of a fresh fish company in Tromsø. In his opinion it is evident that the most powerful in white fish industry in Norway is Fiskebåt, because they are fishermen and trawler owners, who have money and connection with the Ministry. He said:

"This is not a question at all! That is Fiskebåt that have got power! (...) They have resources and connection with the Ministry. (...) I think this is as easy as that."

He thinks that this organization is responsible for the tendency towards freezing on board: *"They are spreading myth that processing is not possible in Norway because of high labor costs, because they want to freeze on board and make money."*

Råfisklaget was pointed out as the most powerful by one of the two vertically integrated companies, because they control the minimum prices. It was the only respondent, who was sure that it is the sales organizations that affect the market the most. The fishermen own the sales organizations so we can link this answer to the previous mentioned, but we should notice that the argumentation is completely different. He also noticed that Helga Pedersen[55], who was born in Finnmark, has impact on the industry, because *"she talks a lot and wants another period in Stortinget (Norwegian Parliament)."*

Two out of four trawling companies did not want to place the power to any particular place of the value chain and stated that it is changing. One of them noticed that it has been in the hands of the fleet for the last few years, because the fleet is investing and restructuring and is the most profitable. However, according to him, it is changing, because processing companies are merging and get larger, thus gain more power. After this, he realized that the "real" power is in the hands of big supermarket chains, and added, *"end consumer, of course"*. The other one mentioned end consumer and retailers as his first choice. He emphasized that quota holders have the possibility to become

[55] Norwegian politician from the Labor Party, Minister of Fisheries and Coastal Affairs 2005-2009.

powerful, but that it would be a misuse to *"flood the market with cod"*. In general, he thinks that the power is sometimes in hands of fishermen and sometimes in other parts of the value chain.

The power was placed in the hands of the fishermen also by one of the representatives of the sales organization. However, he noticed that the big supermarket chains and other retailers, as well as buyers of raw material, especially in the fresh fish sector, are becoming more and more influential. Our respondent, from the second sales organization we have talked to, did not see any particular actors in the industry to point out as more powerful than the others.

The exporter from Ålesund said that the power is in the hands of big processing companies, because they can buy at any cost and bid up the price of raw material when there is not much in the market. Representative of a clipfish company also thinks that it is in the hands of big companies, which will continue to grow. The largest company in the clipfish sector that we talked to does not feel to be particularly powerful. He does not think there is any part of the value chain that is affecting the industry more than others. One of the producers of fresh fish did not think about anybody in the industry to be particularly powerful either.

There are many opinions on this topic, but we can conclude that it is either fishermen or end buyers that are pointed out the most. The respondents, who chose the fishermen, are dependent on stable deliveries of high quality fresh raw material, which is not always provided. The companies that can use frozen raw material point out their competitors. Putting the power in hands of the end consumers is a safe answer for owners of harvesting vessels, who said that today is *"the buyers' market"*. Is it?

5.4 Seasonality

There was a strong consensus among our respondents about seasonality. It is considered as a big problem for the processing industry making fresh fillets, loins and frozen end products. Even though the producers of fresh products are the ones mostly affected by seasonal deliveries, all respondents had great opinions on this matter. Hence, not surprisingly, seasonality was a recurring topic as our interviews were carried out.

It is problematic to have a coastal fleet with so many small vessels with limited timespan of operation. This implies that most of the fish is landed within three months of the year. The key challenge is to smoothen out the landings curve. One of our respondents from a harvesting company said that if trawlers were given larger share of the quotas, they would be able to secure more stable landings all through the year. This would give processors the ability to approach large supermarkets and retailers in Europe, which appreciate stable supply of fresh fish. According to him, it would be easier to build a business around that. He shared his ironic view about the coastal fleet:

"*The coastal fleet is important, not only because this is how everyone thinks that fishing should be, but also based on history. And that makes it right.*"

Apparently, he meant that historically, the coastal fleet had been important, but now the fisheries need innovation and structural changes. Furthermore, he emphasized that, in 2012, his trawling company delivered more that 50% of the total fresh cod landed in the second part of the year. All industries need to develop constantly to meet new markets, including fisheries. He thinks, as well as other respondents, that the ocean fleet is crucial to even out the seasonality. When the TAC is set as high as in 2013, it would be impossible to catch all the fish without the trawlers.

One of the producers of fresh fish from Oslo said that he understands the seasonal pattern of the deliveries, and that he just needs to deal with this since this is the way nature wants it. He noticed that the cod needs to be caught during spawning season, and had no problem with the landings or how this is being handled today.

Another representative of the fresh fish sector said that seasonality is a big problem for the industry, but it has been like this forever. He thinks that this could be fixed with extended use of the trawler fleet, but on the other hand, they are too expensive in operating costs and cannot deliver that much fresh product to be profitable. He also noticed that the trawler fleet is too specialized around frozen fish and, as the fleet is structured today, cannot really help seasonality issue that fresh fish processing industry has.

Seasonal patterns of landings do not affect the clipfish producers. Two of the respondents, whose companies specialize in this product, did not consider it as problematic at all. One of them said that nothing could be done to even out seasonality, because it is related to

nature, which cannot be changed. It is worth mentioning here that this producer also prefers using frozen raw material for his clipfish, which can explain this point of view.

Most of the respondents agreed that since seasonality is a problem for parts of the processing industry, it should also be a problem for the fishermen. Hence, most of them had ideas on how this can be improved. Many agreed that a way to do this is starting the quota year in September instead of January. It could motivate some fishermen to start the harvest season right after the beginning of new quota year, but it is not likely to happen with the smallest vessels since they have to fish when the fish is closest to the shore. Representative of one of the trawling companies said:

"A way to smoothen out the landings curve is to start the quota in September. If all fails, you can catch the rest in February. But, of course, it depends on where you live."

A rather surprising outcome of the question about this possibility was from the two sales organizations that we talked to. As one put it, TAC starting in September would be a good idea. It would be a much better solution than the bonus quota for catching fresh fish in the second half of the year. This way the fisherman can wait to fish bigger quotas later during the year. This can, according to him, cause drop in prices. Representative of the other sales organization, however, thought that this is impossible to implement. According to him, sharing the TAC with the Russians makes it very difficult to even propose such change. Furthermore, he thought that many vessels were not able to fish in this period anyway, so the effect of this change would be minimal.

Producers from the fresh fish sector are most affected by the seasonal pattern of landings, thus they pointed out many ways of fighting this problem. One of them noticed the potential of other species could fight the seasonality of cod:

"Seasonality is a big problem, and that is where Iceland has a big advantage. An idea is to move the quota-start to September. But, the real joker is the haddock. If they could develop a strong market for haddock, with a price covering the cost and a small profit, the fishermen can fish less cod in the winter alongside haddock. Then they could have cod as bycatch in the summer. The problem is that we have destroyed the haddock market by sending it all frozen to China and the UK."

This is interesting for two reasons. Iceland has great advantage over Norway cause of their steady deliveries. This gives them larger bargain power, stable supply and other

advantages. Steady supply to the producers makes it possible for them to be market oriented and make products accordingly to consumer preferences. Thus, they could sell their products in markets where the willingness to pay is high. The production in Norway today is very supply-driven and producers make what is possible, not what is demanded. The other point that was made was that the haddock is the "joker". The minimum price for haddock has been low the last years, actually so low that quota is not even filled due to low profitability of harvest. However, price on haddock is increasing and in the beginning of 2013 it was higher than for cod (Skarbøvik 2013). Increased bycatch-quota of cod, here through haddock fisheries, can be a good idea to even out the seasonality.

Moreover, to even out seasonality (and to increase the supply of cod when TAC is low) two out of four companies in the fresh fish sector that we interviewed have tried both farming and live storage. One of these companies spent a mere 50 million NOK on cod farming in 2000. This was successful on a small-scale production, but they had not able to farm large volumes of high quality cod with low costs. Because of this and the difficulties related to natural features of the cod, they gave up. The same company also tried live storage of cod before farming. Again, cod is picky regarding food, vulnerable to diseases and mortality when not kept in natural environment.

A fishing company in Tromsø had another way to smoothen the yearly pattern of landings:

"We could focus more on live storage, more like aquaculture. But the best way is probably by more regulations; divide the quotas throughout the year. Then you also need the possibility to move quotas between periods. This is especially important for coastal vessels due to weather conditions."

The conclusion on this matter is that it seems to be great consensus to start the quotas in September, or to spread the quotas throughout the year. Some vessels cannot fish in other periods than in the high season; others can, but can be exposed to bad weather conditions and need the ability to move unused quotas to other periods if needed. A structural change in the fleet is desired, especially from the producers. Long-liners and auto-liners are preferred vessels, both due to quality and their possibility to catch fish for a longer time period than, i.e., small traditional boats. However, as discussed in previous sections, number of these vessels is constantly decreasing.

5.5 Quality

Another major concern, apart from the seasonality, is the quality of the raw material. Especially when TAC is high and the coastal fleet has the majority of the quotas, it is difficult for the fishermen to handle the fish properly. As already stated, bad quality raw material reduces both flexibility of the product line, and thus the profitability for the producers. However, there seem to be some differences in opinions regarding what is good quality and what is not. Fish from small vessels with hook and line is considered as the one with best quality. However, a fisherman from Tromsø said, it is not just black and white:

"You cannot generalize and say that the coastal fleet have a higher quality than the ocean fleet. It all comes down to handling and the pride of the fisherman."

He has A and B quality products from his trawler vessels, but many buyers want the second one because it is still very good. He also states that almost 70% of his catch is sold on contract. Trawler vessels are also considered to be able to deliver high quality fish. In his case, however, the fish is frozen and is not well suited for fillets or loins.

Many of the producers we interviewed agreed that the quality of the raw material is low, which is especially problematic for the fresh fish sector. The problem seems to increase with the size of the TAC causing more focus on the quantity than quality among the fishermen. As one of the representatives of the vertically integrated company from Tromsø stated:

"There is too much quotas for vessels that do not pay attention to quality. There is no good incentive to increase quality because they can have big quantities. There should also be better control system for quality. Vessels delivering bad quality should be punished with fewer quotas, and vice versa."

Again, a returning topic was that fishermen that should be able to ensure high quality have no real incentive to do so because they get paid anyway. Some of the producers we talked to said that it is difficult to ensure their fresh and chilled fish production based on market demand from, mainly France and the UK. Consumers' demand for quality is said to be high, but the retailers and supermarket chains also push for steady deliveries all year through. One way they try to maintain both stable supply and high quality, is by long-term contracts with fishermen. Many of them feel that the communication between the

fishermen and producers has to be better and stronger. One producer of fresh products from Ålesund explained:

"To get fresh, good quality raw material you need to have the right temperature, hygiene, timing and handling. All this also improves shelf life. It must be better communication between the fishermen and the producer. Do not go out without cold water. Do not fish too much each day."

He also added that fishermen do not have incentives to focus on quality:

"Today, quality does not give a price premium. In Iceland, they have autoliners; they are more efficient and have faster vessels. In Norway, we put bait on by hand, in small, slow vessels. And on a liner, there is no time to gut and bleed properly. We need investments in the medium sized coastal fleet. In other industries, there are lots of investments; in fisheries there are not much."

The low quality raw material is a big problem for the fresh and chilled fish industry. However, with the regulations today, it is more profitable for the fishermen to catch as much fish as possible at a minimum cost of time and effort. So why should they focus on quality? A trawler company in Ålesund explained:

"Price is mostly dependent on world market, and there is a high transparency. Quality raw material counts, but it is quite weak. There is a small premium paid for supreme quality, but very little in the first hand market. Hook and line has high quality, but premium is marginal."

So this clearly states that there is a deviation between the quality demanded and the quality supplied. An important note on this was mad; if a fisherman tries to deliver bad quality catch to a production facility and they turn him down, he can go to the next facility and they will accept it. There is no real "industry standard" of which is good and bad quality. It all depends on the use of raw material. Many of the respondents agree that there should be better communication not only between fisherman and producer, but also within the processors.

Quality does seem like a key issue for the processing industry. With the majority of the fishermen, both coastal and ocean fleet, having little economical profit to gain by supplying raw material with high quality, it is difficult for Norwegian producers to meet market demand and make good profit. Some of the producers explain that they are trying

to motivate fishermen to catch in the second part of the year. Not only to even out seasonality, but also to prevent contracted fishermen from delivering all at once, and thus eliminate the risk of bad handling. Furthermore, they try to have them fishing with other gear, such as lines, to improve quality. One processor in Tromsø is even experimenting with a system that baits the longlines for the fishermen to ease their job.

The general conclusion regarding quality is that among producers of conventional products, like clipfish, there is less focus on the quality of the raw material. Furthermore, they have no problem using frozen fish and supply countries with low quality expectations. For the fresh fillet, loin and byproducts, proper handling of raw material is crucial. Moreover, to have bargain power and make decent profit they need stable delivery all through the year to maintain good relations with their customers. A structural change in both the coastal and ocean fleet, with the usage of different types of fishing gear and lower catch delivered at once does seem desired. Many agree that this is perfectly doable, but strong communication throughout the value chain is needed.

5.6 Sales Organizations, Fisheries Management and Minimum Price

Discussing the regulatory framework around fishing industry in Norway was controversial. Almost all of our respondents could point out one or more problematic issues that their businesses were exposed to. Is a seasonal pattern of landings something that could be fixed or is that the way the nature works? Is the bad quality of raw material an issue that can be related to some regulations? Do minimum prices stabilize or create uncertainty? Management of cod stock in Norway, with regards to the way the natural resource is handled and the way the industry works, was commented in many ways.

Based on the interviews, general impression about the Norwegian way of managing cod as a natural resource is positive. Many of our respondents agreed that it is one of the best in the world. Northeast Arctic cod is in a good condition, which is appreciated by those, who build businesses around it. Today it is a sustainable resource, but we also heard some critique. A few of our respondents think that the TAC should have been set higher a few years before 2013 not to have a 33% “jump” from one year to another.

Good management of the stock does not seem to be enough for the industry in Norway. One of our respondents noted that if the companies in the processing industry are not

profitable, they cannot buy fish from the fishermen. A trawler representative comments on management system in a following way:

"...Room for improvement? (Laughs). It's a high political risk of doing fishery in Norway. You don't know from one day to the next if you are going to get some new legislations or regulations or some new laws that will cut down your ability to make money. (...) They are trying to regulate the fisheries to populate the coast. That's not the way of doing it."

Delivery obligations, regional distribution of quotas and regulations that prevent their transfers, as ways of pursuing the settlement objective of the government, do not seem to be proper instruments.

"Last year hook and line vessels went from 3 to 5 quota shares. This is a good idea. Every boat needs to have enough quotas. As long as it is profitable, people will fish. Settlement or not. It may be better to regulate how the fish is caught rather than where and volume. I think that business should have a bit more saying for how they fish."

Inconsistency of settlement policy was notable for the owner of a clipfish company, who decided to establish a new facility in the Northern Norway. He experienced difficulties from governmental institutions to have electricity connection to his plant, even though the new factory would create many workplaces in a desirable area.

Delivery obligations attached to licenses to the two of the vertically integrated companies do not seem to be a problem, but they are not considered to maximize their profits or increase the amount of fresh fish landed either. The worst scenario for the industry would be obligation to accept the deliveries by the trawlers. They would have to stop purchasing fish from the coastal fleet, which would have problems to sell these big quantities to another buyers. The recent proposal of the government regarding stricter delivery and buy obligations was strongly criticized by both of them. One formulated following response:

"We are amazed over the proposal when we find it difficult to see that a single one of the proposals will have a significant positive impact on the profitability of our groundfish industry."

As mentioned in previous sections, the largest problems for the companies in the fresh fish sector are seasonality of landings and quality of the raw material. Most of our respondents do not relate these issues directly to the regulations and management system.

Most of them would try to fight seasonality by starting the quota year in September instead of January (apart from farming and live storage of fish). They think that this would encourage the fishermen to start harvesting season much earlier. One of the respondents also suggested that this problem can be fixed by dividing quota year in more periods and assign certain amount of quotas to each period.

Bad quality of the raw material is, according to one of our respondents, the effect of bad regulations and control system. He thinks that fishermen should be rewarded with extra quotas for exceptionally good quality of delivered fish and punished by cutting the quotas in case of poor quality of the landing. Moreover, more quotas should be assigned to longliners, because they can operate all year long and supply fresh fish. Another respondent from the fresh fish production supported this point of view. He added that there should be a quantity limit of landings for each vessel group, because fishermen do not pay attention to quality when they harvest too much at once. One also noticed that it is questionable, whether vessels under 11m should be allowed to have as much quotas as they have.

Companies that use frozen fish in their production process and exporters are struggling with other regulations. Most problematic for them is the process of setting TAC. Five of our respondents brought it up during the interview. One of them expressed his opinion in a strong way:

"The Norwegian authorities, in June-July, were so stupid that they announced cod quotas increase by 33% and prices started dropping today. They have something to learn. (...) We lost 5 mill. NOK because of this."

Some of our respondents criticize the protection that Norwegian regulatory framework provides to the fishermen. Five of them agree that the minimum prices have a bad effect on the industry, thus it is not needed. One of them speculates that without minimum prices, the price of fish would be higher, there would be more competition among the fishermen and prices would fluctuate more, depending on the market situation at the moment of the transaction. Another pointed out that prices of cod would be differentiated depending on the quality of the fish and the minimum prices would make sense if it only regarded the lowest quality raw material. The third respondent was not so sure but, according to him, it would probably be better since people would not have to cheat (storhundra phenomenon described in chapter 2). Lower official price per kilogram

without minimum prices, when the TAC is as high as in 2013, also seemed probable for the exporter that we talked to. The last respondent who was certain about the negative effect of minimum prices emphasized that if they have to be there, they should be as low as possible to absorb changes of the market. He also sums up that:

"Management is best for the fishermen. Monopoly of sales organizations, minimum prices, etc. they can do everything against processors if they want to. Prices are not market-based."

A representative of the trawler company analyzed the possible market situation without minimum prices. According to him prices of fish would be higher and stable in the long run and world marked oriented, not based on the Norwegian TAC, but fluctuate more in the short run in case of bad weather conditions, for example. In the situation of low demand, increased level of competition among the suppliers would be noticeable.

Two other harvesting companies among our respondents, as well as the representative of one of the sales organizations share the opinion regarding minimum prices. They said that minimum prices are important for small immobile vessels in the coastal fleet, and one of them states that minimum prices are *"artificially keeping the coastal vessels alive"*. The respondent from the sales organizations also pointed out that it would be much more work for them without the minimum prices, because the auctions would have a lower starting point and would last longer.

During our interviews we found some general opinions regarding management system in Norway interesting:

"It is ok, but it needs to rearrange the fleet. It is all political. We need access to investments. There is a lot of improvement needed in the fleet and at the processors. Many plants are from the 90's when we only did frozen fish. There is no innovation. We need a diversified fleet. (...) With the hearing[56], it seems like the government tries to regulate your way into profit. In my head that is impossible. (...) It's the wrong problem they are trying to solve. We should leave things the way they are now, and stop talking about that. (...) And focus on the real issue, and that is how to make the processing industry profitable."

[56] Hearing issued by the government, dated 7th of November 2012. See section 2.3.1 for further details.

Another representative from a trawler company said: *"Well, that's politics (laughs). I don't involve myself that much in politics. But, I think that this is a well-established view in all political parties that there should be settlements in the local community on the coast. (...) I don't particularly like that idea, I think that fishing industry should be as equal as any other industry."*

5.7 Changes

All of the respondents described unique nature of the company, its history, products, customers, suppliers and most problematic issues that they are facing. Most of them were very experienced and gave us valuable overview of the situation in the industry. What changes do they consider as possible? None. Not any time soon.

There were only few respondents that were positive about changes in the wild fisheries in Norway. Most of our respondents were skeptical and concerned, thinking that anything new would be worse than what it is now. Representative of a harvest company considered change with the redistribution of quotas, which would not bring anything good for him. He does not want change, but stability. Stability was also the most important for another of the respondents.

Two of our respondents saw the need of modernization of the Raw Fish Act, because the law that is applicable now is not developed enough to be appropriate for current market situation. One of them thinks that sales organizations should not be owned only by fishermen, but also by processors and the government so everybody is able to affect system and prices equally.

We heard opinions that the situation in wild fisheries depends on the mentality of all the actors in the industry. They emphasized that before it is possible to introduce anything new, many people have to change their way of thinking. Negative attitude towards changes within players in the industry was noticed by three of our respondents, who thought that it was the biggest issue blocking development in the near future. One of them pointed out that it would be difficult for everybody to adapt to any new situation in the market.

Four of our respondents from both the fishing and production sector saw the need of change in the fleet. They also did not consider it to be possible soon, but most needed in the long run. They think that Norwegian vessels should be more modern and there should be more longliners in the coastal fleet. One of them saw the need of technological changes for the processing plants, which are, for now, made to process frozen raw material. Another respondent from one of the processing companies noticed the need of increased attention to the production of fresh products. He said that fresh products used to be noble and the industry used to pay more attention to quality. According to him, it is not a good direction to base Norwegian fishing industry on frozen fish.

We noticed that many of our respondents mentioned the Icelandic model of fisheries as a comparison. One of the clipfish producers thinks that the system of individual transferable quotas will eventually appear in Norway. Two producers noticed that the Icelandic fleet has more longliners and another two pointed out that Iceland has more integrated value chain, which is advantageous for planning the production and investments.

Discussing the future of Norwegian fisheries with our respondents was not easy, and they cannot see any real changes in the near future. Many seemed to know what should be different and what would be better for the industry, and they realize the difference between Norwegian and Icelandic fisheries. However, they seem not to know what changes are needed to achieve the wanted results. We sum up this part by citing one of our respondents, who commented on level of competition among the fleet and in the way that the industry is regulated: *"Norwegian fishing industry should be the same as any other industry"*. Our question is: Can it be as market oriented as any other industry? This opens the discussion in the next chapter.

5.8 Recap

We will summarize the conclusions of the interviews as follows:

- There is insufficient focus on consumer preferences in all sectors of the industry. Some producers are more market-oriented, but have limited production because of seasonality and quality. It is difficult to provide stable deliveries of standardized products required from the retailers.
- Marketing activities are not the top priority for the respondents. They rely on generic marketing from the Norwegian Seafood Council. Only two of our respondents (from two different sectors: fresh fish producer and harvesting company) emphasized transparency and traceability of their products.
- Most of the respondents from processing companies think that the fishermen are most powerful in the value chain of cod. They are powerful because they own sales organizations and influence decisions of the authorities regarding changes in the industry.
- All of the producers in the fresh fish sector among our respondents are facing problems regarding quality of the raw material and seasonal deliveries. For producers of clipfish it does not seem to be a major problem. They can produce the clipfish from frozen raw material and supply countries with low quality expectations.
- Some of the respondents see the need of amendment of the regulatory framework, especially the Raw Fish Act to improve the situation of the industry. However, most of them, even though they can be experiencing many problems, think that this is how it is supposed to be, because it has always been like that. According to them, that is how the nature works and they have to deal with it. Most of them do not see the need of minimum prices in the first-hand sale of fish. They have some ideas of improvements but are skeptical about the possibility of implementation changes.
- Our general impression from the interviews is that most of our respondents do not have innovational and entrepreneurial attitude. They focus on the markets they supply and do not want to expand their activity. Stability is more important than the possibility of improvement by implementing changes.

6. Discussion

Our overview of wild cod fisheries in Norway in the case of cod industry showed that there are issues, which should be fixed. The same problems were pointed out during the interviews discussed in the preceding chapter. We got a cleat idea of some of these issues, and in our discussion will try to confront idealistic propositions with reality so that we are able to suggest the best possible way of improvement with consideration of specific features of the industry.

The general problem of the industry in Norway is that it is not market-oriented. Analysis of the export volumes, values and destinations of cod products showed that most of the producers are not targeting markets that pay the highest price for specific products. There is a tendency that the product range supplied by the industry have become more bulk-oriented and sold in unpacked, large quantities. Almost 50% of the total exported cod volume was in 2012 whole, frozen at sea fish (23%) and conventional clipfish (25%). These products are sold to markets with low ability (and willingness) to pay, such as Portugal and emerging markets like China and Brazil. We have also shown that these products have increased their export share in volume, but decreased in value. Furthermore, the value of export of fresh and chilled products (fillets, loins, etc.) has increased with as much as 17%[57]. Nevertheless, the share of the total volume exported of these products has been almost the same the last ten years. Profitability in the fresh fish sector has been proven difficult to obtain, and in the last years both the number of facilities and the number of land-based employees have been significantly reduced.

This tendency is the opposite of what the government is trying to focus on. Authorities want more processing facilities and increased production of fresh cod products in order to keep more value added production in Norway. As we have discussed, the current management system does not seem to give the fishermen good incentives to focus on fulfilling requirements of market-demand. Rules of the Participation Act give the fishermen exclusive right to fish. Regulations of the Raw Fish Act, like the minimum price on first hand sales ensure income for the fishermen. Furthermore, trawler licenses with delivery obligations restrict fishing methods most suitable for fresh fish delivery. A

[57] In the period of 2000-2012

more market-oriented production including a more flexible value chain, more entrepreneurial drive, stronger vertical coordination and market and product chain specialization are needed to obtain a more market-oriented value chain. The three first characteristics are lacking in cod value chain in Norway. The research also showed that the industry is suffering from harvest-driven production what raises the problem of seasonal landings and low quality of the raw material, especially affecting fresh fish sector. The research also showed lack of innovational and entrepreneurial attitude in the industry.

We have described that the regulatory framework does not sufficiently motivate fishermen to land fresh fish of high quality. This is due to the minimum price and a very low price premium. The value of the catch can most of the time only be increased with the increase of its volume. Moreover, we have described implications of this for the producers in the fresh fish sector. There are ways to eliminate, or improve, this problem. Examples of management systems in Iceland and New Zealand described in chapter 3 are possible to apply in Norway. However, attempts by the government regarding introduction of individual transferable quota (ITQ) system were rejected by regional politicians who were influenced by organizations owned by the fishermen, like Fiskebåt and the sales organizations. This clearly shows the power that the fishermen have on the industry, which was also noticed by several of our respondents.

One of the consequences of introducing the ITQ system in Iceland and New Zealand was a higher level of vertical integration of the value chain. That allowed producers to have more control over the time of landings and quality of raw material. Two of our respondents were integrated companies from harvest to export, but they do not use their structure to control the deliveries. Why? Their vertical integration is related to the delivery obligations explained earlier. They have trawling licenses and they are restricted from using any other fishing techniques. It would be expensive for trawler owners to harvest small amounts of fish and deliver it fresh to the processing plants. Because of this it is better for them to freeze large part of their own catch and sell it for a higher price on the world market to maximize their profit. To maintain the supply for their processing facilities they buy cheaper, fresh fish from the coastal fleet. In our opinion, there is no need for such fishing technique restrictions. Integrated companies should be able to choose the fishing technique that is best for profit maximization. To fully benefit from vertical integration, having full control over harvest and production seems to be

necessary. By being allowed to use longliners, for example, they could supply their own plants with quantities and qualities of the fish in the periods most suitable for the production. Harvesting companies with delivery obligations that we interviewed would like to be able to use other vessels than trawlers for their fresh fish deliveries. It would be easier for them to supply high quality, fresh raw material and have large flexibility to produce best suitable products.

An option of fighting the quality and seasonality problems is restructuring the coastal fleet. More vessels that can operate all year long and that are not limited within the 12 nautical mile limit would help. This could be combined with a system of seasonal quotas, larger bycatch quotas and different fishing techniques allowed to use. Increased number of longliners in the fishing fleet is desirable according to many of our respondents. Earlier research cited in chapter 3 and feedback from our respondents shows that longliners are considered to be the best fishing vessels, because they can deliver high quality fresh raw material and travel long distances all year long. In Norway, the number of this type of vessels is decreasing.

Is there a way of changing this tendency? The easiest solution would be to redistribute the quotas from the ones belonging to vessels smaller than 11m and assign them to longliners. This seems to be an easy solution, but might be difficult in practice. This would obviously reduce the number of small vessels and quota-owners, but more importantly, it would create uncertainty regarding the future of quota share among fishermen in other vessel categories. From our respondents, especially from the fishermen, it was stated that changing the system (for whatever reason) adds uncertainty. To hold on to the government's settlement policy redistribution could apply to certain geographical areas.

Another possible way to reduce the seasonality problem would be to begin the quota year in September, instead of January, which was also mentioned by many of our respondents in all parts of the value chain. We cannot be certain about the result of this change, but we do not see any negative implications. Even though the representative of the Råfisklaget expressed his concern regarding difficulties of imposing the change, because of the agreement with Russia about the new TAC from the beginning of January, we cannot see the reason why Russia should be opposed a change of the quota year. The fishermen

should not be against this change either, because it would not affect their share of quotas. If anything, the smallest vessels can always fish in spawning season.

There is one more regulation that could solve the problem of seasonality. If vessels in each group had to use certain shares of their quotas in certain periods of the year, deliveries of the raw material would be better distributed over the whole year. In the period when cod is close to the coast small vessels could be the most active ones. Vessels from the coastal fleet above 15m and trawlers would have adjusted limitations to cod fishery during that period and would be more active in the second part of the year. This concept would also allow increasing the amount of quotas in the second part of the year if they were not used entirely in the first part. That would allow us to control the activity of the smallest vessels and take into consideration their capacity so they do not harvest massive amounts of fish when the TAC is high. This could also have a positive impact on the quality of the raw material landed.

Bycatch quotas have been recognized, both in the theory and by some of our respondents, as a way to smoothen the seasonality of cod, and to improve overall profitability of the industry. Bycatch quota of cod in saithe and haddock fisheries should be increased. The larger coastal vessels and the ocean going fleet could focus more on these fisheries in the winter and harvest cod as bycatch in the summer.

Regarding quality, eliminating minimum prices could solve the issue. The first hand sales prices of cod are not differentiated enough to categorize anything other than size of fish and whether it is fresh or frozen. Minimum prices secure income of the fishermen so that they pay insufficient attention to quality. If the processors had bargaining power to pay low price for low quality product, the fishermen would focus on profit-maximizing rather than cost-minimizing, which is the case today. The value of the fish would increase proportionally with its quality. As our fresh fish producing respondents stated, the price is not the main issue. If the quality is good, they can pay more because of better utilization of the fish and higher market price. Furthermore, price would probably fluctuate more in the short run, but it would increase when the quantity of fresh fish landed was lower (i.e., more supply and demand based first hand price).

Minimum prices create a barrier of the relationship between fishermen and processors. Vertical coordination and better flow of information in the value chain would be easier if

it was possible to agree on price, size and time of the deliveries. It would also give the possibility of agreement regarding quality expectations.

Eliminating minimum prices could also have positive effect on seasonality. When paying more attention to quality, the fishermen would probably not be able to harvest as big quantities as now. Quotas would be left to use in the second part of the year. This regulation is dependent on a restructure of the coastal fleet towards larger vessels, again, like longliners, to be able to harvest in the second part of the year. We can also assume that a profit-maximizing fisherman, who owns a small vessel, would invest more in fishing equipment and type of vessel. On the other hand, this could cause exploitation from the processing plants towards small vessels owners in rural areas with few potential buyers. This could, as some respondents expressed their concern about, lead to a reduction of small-vessel fishermen and, as a causal effect, lead to more expensive raw material for the rural-located processing plants (which eventually run out of business). Whether this is a bad thing or not is a question of political character.

During the research, we heard opinions about the quality of raw material could be improved by better communication among the processors. If all of them had higher quality expectations and processing plants refused acceptance of landing when the quality is not sufficient, fishermen would have to deliver better fish. Selling raw material of low quality would be more difficult. For now, if one processing plant does not want a certain landing, the fisherman just redirects it to another facility. The idea of certain quality expectations among processors makes sense, but only if it was somehow controlled. Some products need high quality raw material and some do not. It would be possible to create a system of certified harvesting vessels providing high quality raw material. The fishermen delivering the best quality of fish would be recognized in the industry. Processors demanding this quality would obviously have to pay price premium, but according to studies discussed earlier the profitability increases with the quality of raw material because of flexibility and value adding. The disadvantage of this idea in the present system is that we are not certain whether fishermen supplying high quality would be paying enough attention to the demand of the producers. They would have to prioritize these processors and supply others only if there is no more demand for high quality. Again, the flow of information seems to be crucial.

Limiting the size of landings from each vessel type could also solve the quality issue by reducing the daily catch and enhance better handling. It could also even out the seasonality. We emphasized in the theory which requirements have to be fulfilled by the fishermen to deliver high quality raw material: proper bleeding, gutting and handling, low catch damage and short time of the delivery to the shore. Our study has shown that these requirements are often ignored. We have stated that when the TAC is as high as in 2013, the smallest vessels have problem handling such big amounts of fish. They still do this to use their quota when it is possible (and cost-minimizing) for them to fish, but as of this the quality suffers. However, it is possible that the level of unreported landings would increase or that they would follow the regulation, but still ignores quality of the fish to keep the effort low. Again, stronger vertical cooperation and flow of information is crucial to obtain a demand-oriented value chain.

Our proposal of how to improve the communication between fishermen and primary processors is to change the character of the sales organizations. Their function as an intermediary in the transactions of sale seems to limit the flow of information between the buyer and seller. This could lead to increased contractual relations with more specified terms of trade (i.e., quality and timing).

6.1 Policy recommendations

We believe that to promote a more demand-oriented value chain for Norwegian cod, a more flexible and better coordinated value chain is required. Without stable supply of standardized products, it would be difficult to gain access to large markets where the demand for fresh fish already exists. For the same reason, marketing of products is very limited. As we see it, an introduction of an individual transferable quota system, would probably result in increased vertical integration in the value chain. Based on the examples of wild fisheries in other countries we can assume that ITQ could create a more demand-oriented and profitable value chain. However, ITQ has been suggested some years ago with no luck. Thus, we do not find it very likely to appear in Norway in the near future. Therefore, we propose the following policy recommendations:

To prevent seasonal landings

- TAC year starting in September.

- Increase the bycatch quota of cod in saithe and haddock fisheries.
- Restructure quotas from small vessels (less than 11m) to larger longliners.

To increase quality of raw material

- Better flow of information in the value chain by changing the monopolistic character of the sales organizations as an intermediary between the seller and buyer.
- Stronger communication between the processors. Agree on quality standards.

General

- Raw fish act should be more liberal:
  - Minimum prices should be removed. This would create incentives for the fishermen to focus on quality and enable more demand-oriented value chain.
  - Less restrictions regarding transferability of quotas (i.e., transfers between vessel groups)
  - More lenient delivery obligations, not stricter (i.e., choosing plants of deliverance according to area of harvest and fishing technique)
  - Both the fishermen and the processing industry should own the sales organizations.

7. Conclusion

The analysis of cod industry showed traditional character of Norwegian fisheries, which combined with the regulatory framework affects implementation of changes. The data showed increased volumes of cod exported as frozen for further processing and decreasing amounts in export of fresh and salted fish followed by smaller number of processing facilities and employees in the industry. Examination of the export destinations in terms of value and volume draw a conclusion that the countries receiving the largest quantities pay the lowest price per kilogram of the particular product. Moreover, we noticed small variety of cod products exported from Norway.

To answer our main objective, of how to promote a more demand-oriented value chain of Norwegian cod, we first had to locate problems that prevent this. Demand-driven production requires large range of products and the possibility of targeting many markets. Norway seems too focused on massive production of clipfish and frozen whole fish and supplies mostly China, Brazil and Portugal, without focusing on either quality or market-demand. Knowing that China already started producing clipfish out of Norwegian raw material to compete in the same markets does not seem to be a particularly sustainable business strategy for the sake of Norwegian cod export. Products that achieve a price premium in the market are high quality fresh and frozen products, high quality clipfish and salted fish. Markets with willingness to pay a price premium for high quality fresh and frozen products are France, Denmark, Sweden, Germany and the UK. The US has also been recognized to have preferences for specific cod products and can have great potential. Consumers preferring clipfish of high quality from Portugal, Spain, Italy or Brazil should be possible to target by Norwegian producers. Spain is also the main market for salted fish, but requires high quality products what is not provided by Norwegian producers today, causing the decrease of export. Other countries supply markets that have high quality expectations. Norwegian production should develop to become competitive on these markets. Gaining meaningful position should be supported by strong marketing activities from the producers, not only through the Norwegian Seafood Council.

The situation will not change unless the processing companies have flexibility. Flexibility will not occur unless they are able to control the time, volume and quality of the raw material. Flow of information and coordination between different levels of the value

chain, especially fishermen and primary processors, should be improved. Without extensive regulatory reforms (i.e. ITQ) upstream vertical integration does not seem to be beneficial. However, vertical coordination in terms of better flow of information between the fishermen and producers about consumer preferences is required to obtain a more demand-driven value chain. Furthermore, the power needs to be more evenly distributed between the fishermen and the processors. The fishermen must be more quality-oriented and seasonality must be evened throughout the year.

Possibilities of structural changes in the industry have been discussed in the previous sections. Traditional character of the fishing profession in Norway makes the discussion about changes both difficult and somewhat abstract. It is not enough to state that the Raw Fish Act has to be reformulated. Emotional attachment with the tradition is recognized among most of the people from the industry that were involved in our interviews. As we see it, the only way to implement any changes is by doing this step by step.

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APPENDICES

A1. The Questionnaire

Personal information	Personal information: o Position in the company and responsibilities? o How long have you been working in the industry?
General information about the company	Company history and ownership? (Examined in advance) o *Founded when, where, by whom and why?* o *Initial activity in the company (fishing/processing/sales ...)?* o *Current ownership?* o Describe the company's production o *What are the main products and size of production as of 2012?* o *What is done in the different parts of the value chain, which the company covers? Describe the production process.* Operating and development of the last 5-7 years. o *Operating profit in 2012? What is the general trend? How did it look like in 2009? Why do you think the prices were so low?* o *How have the results developed over the last 5-7 years?*
The organization of the value chain	Where do you place the company in the value chain? o *What is the main focus of the business?* o *Are any of your products further processed elsewhere? If yes, who is responsible for this?* o *Are you planning on doing this yourself in the future, or did you use to do this process yourself?* How does the company cooperate with other actors in the value chain? o *The nature (and flow) of the cooperation* o *Who are the main (or largest) partners in the value chain, and in what parts of the chain are they?*

	○ *Do you cooperate with competitors?* ○ *How large a share of the production is outsourced to others? Packaging, transport, warehouse etc.*
Sales and Marketing	How is the marketing organized? ○ Who are the largest purchasers from the company? ○ *Distributors, processing, retail, restaurants, etc.* ○ *To which countries do you sell the most? Do they export at all?* ○ If the largest purchasers are *not* end buyers, who are the final buyers of the products? ○ *Retail, restaurants, catering, etc.* ○ What are the biggest changes you have experienced within marketing of the company's products in the last 5-7 years? ○ Have you introduced any new methods regarding marketing within the last 5-7 years? What is your goal regarding possessing new customers? How do you plan to achieve that? ○ Have your company created or are in the planning of establish subsidiaries abroad? Regarding your products, what factors are the most important to price variation? ○ Season? ○ Supply from other countries? ○ The size of the Norwegian quota? ○ Demand for fish? ○ The quality of the product? ○ Overall uncertainty? ○ Other? How important is the coastal fishing for the company? ○ The supply of raw materials? ○ Is the use of coastal fish the same as of other fish? ○ *Exclusiveness / price / quality?* ○ Is the utilization of coastal fish and other fish the same? ○ How much (share) of the company's turnover is based on coastal fishing? ○ Have coastal fish similar quality as other fish or is it better/worse?

Value added	*What changes have occurred in the production and value added in the last 5-7 years?* • The use of labor, raw material per hour (efficiency), and/or sold quantity/value per employee • The production of main products (roughly) o *Frozen on land* o *Frozen on trawlers* o *Fresh fillets* o *Salted fillets* o *Salted fish* What have been the focus areas of the company to increase the value added (profit) in the last 5-7 years*?* o *Reduce costs and / or increase revenues* o *Providing more and / or better raw materials* o *Outsource parts of the production* o *Investment in equipment and / or production facilities* o *Increase and / or improve the quality of products* o *Finding new markets* o *Improving manufacturing processes* o *Equalize raw materials access during the year* o *Other - what?* Are there any special events that have made you to focus on increasing value creation? • *How do you think the company can increase the value added in the future?* What effect has the Fisheries Management (fiskeriforvaltningen) had on corporate value? • *Have the Fisheries Management helped to increase value added?* • *If yes - How?*

Fisheries Management and marketing system	*Does the current Fisheries Management System have any effect on the development of the company's value chain in the last 5-7 years? If yes, which ones?* o *What has the Management System changed?* o *What factors in the system have promoted or lead to any changes?* Which effects have the Fisheries Management had on the marketing of your products? • *Have the Fisheries Management changed anything in the marketing of your products? If yes, what has changed?* • *If it has had an effect, what factors have contributed to the change or supported the changes?* • *Is there anything in the current fishery that you think should be changed to improve the conditions of competition for your business?* What do you think about the distribution of power in the company's value chain? • *How would you consider the balance of power between the different parts in the value chain?* • *How have these power relations occurred?* • *Have the owners of quotas greater market power than other players?* o *How effective do you find the current Fishing Management system?* o *What advantages do you think the current management system has?* o *What disadvantages do you think that the current management system has?* o *What kind of changes in the Fishing Management system would you like to occur within the next 5 years?* o *What kind of changes in the Fishing Management system do you think will occur over the next 5 years?*

A2. List of Respondents

Company		Representative	Place	Date
Aker Seafoods ASA (Havfisk)	Harvesting company	Lene Christin Bratseth & Olav Holst-Dyrnes	Ålesund	20.02.2013
Ålesundfisk AS	Fresh fish producer	Mette Solvik	Ålesund	22.02.2013
Fiskcentralen AS	Fresh fish producer	Magne Paulsen	Oslo	07.02.2013
Fjordlaks AS	Clipfish producer	Svein Fløl o	Ålesund	21.02.2013
Hermes AS	Harvesting company	Jan Roger Lerbukt	Tromsø	28.02.2012
Nils Sperre AS	Clipfish producer	Harald Sperre	Ålesund	21.02.2013
Nergård AS	Fresh/frozen/clipfish producer	Christian Håkon Olsen	Tromsø	01.03.2013
Norfra AS	Fresh fish producer	Steinar Eliassen	Tromsø	01.03.2013
Norway Seafoods	Fresh/frozen fish producer	Anne Sølvberg Breivik & Frode Mikkelsen	Oslo	21.03.2013
Saga Seafood	Exporter	Tron Drevik	Ålesund	20.02.2013
Strand Havfiske AS	Harvesting company	Webjørn Barstad	Ålesund	22.02.2013
Sales organizations				
Sunnmøre og Romsdal Salgslag		Jon Grimstad	Ålesund	21.02.2013
Norges Råfisklag		Thor Kalsås	Tromsø	28.02.2013

A3. Recordings

Available on attached CD.