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RESEARCH FOR PECH COMMITTEE - SEAFOOD INDUSTRY INTEGRATION IN THE EU

STUDY

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This document was requested by the European Parliament's Committee on Fisheries.

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Abstract

The aim of the study is to provide the Members of the Parliament's Fisheries Committee with a clear description of the corporate structure of the EU seafood industry (fishing, processing and the retail market). It provides a description of both the horizontal and vertical integration in the industry through the use of case studies. The research utilised both quantitative and qualitative research methodologies in order to provide an in-depth and nuanced picture of integration in EU fisheries.

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Contents

LIST OF ABBREVIATIONS

FPO Fish Producers' Organisation

FQA Fixed Quota Allocation

GDP Gross Domestic Product

GT Gross Tonnage

ITQ Individual Transferrable Quota

PO Producers' Organisation

LIST OF TABLES

LIST OF FIGURES

EXECUTIVE SUMMARY

Background

The aim of this study is to provide the Members of the Parliament's Fisheries Committee with a clear description of the corporate structure of the EU seafood industry (fishing, processing and the retail market). It provides a description of both the horizontal and vertical integration in the industry. The study, to the extent possible within the scope of the research, also explains the role of the third country operators and intermediaries.

Issues around vertical integration centre on what drives a firm to vertically integrate; why a firm will buy out one of its suppliers or customers or in some other way internalise the production of an intermediate good. In commercial fisheries there is one added dimension. The resource exploited - fish - is not always characterised by a private property rights structure. Rather, the fishing grounds are either common property or open access resources.
A number of EU countries have instituted a form of private property rights management of their fisheries by using individual transferable quotas (ITQs) that assign the right to harvest a certain share of the total allowable catch (TAC) of a fishery to a harvester.

Like any private property, the ITQs are transferable. Therefore, if a harvester wishes to catch more fish than allowed by the quota he holds, he may purchase ITQs from another harveter. Harvesters might sell their quota for many reasons. Similarly, harvesters might come to temporary agreements, such as leasing or borrowing quotas.

The ITQs create a barrier to entry that does not exist in an open access or common property fishery. In a non-ITQ fishery, the processor wishing to gain monopoly control over the resource must not only buy out the majority of fishing vessels but must find a way to keep out new entrants. With ITQ management. the processor does not even need to buy the fishing vessels, but only needs to gain access to all of the available quota shares.

Other methods of controlling harvest in order to develop and maintrain sustainable fisheries include non-transferable quota, gear restrictions, and fishing season limitations. These have been used around the world. However, the ITQ system is gaining in prominence for a number of reasons, not least its inherent flexibility. As ITQs are proportions of TACs they can theoretically prevent overexploitation. Furthermore, as ITQs can be traded, leased and/or borrowed, fishermen can adjust their fishing strategies to focus on a particular species or fishing ground relevatively easily. ITQs can also assure a fishermen a source of income if he is termporarily unable to harvest due to mechanical or health issues.

This management strategy seems to be successful from a purely economic point of view. Fisheries worldwide have become more economically efficient after the implementation of quota programs. Efficiency occurs because the fishing fleet shrinks, allowing each boat a greater catch. The exit of traditional independent fishermen leads to an increase in either horizontal or vertical integration, or both.

Some fishermen, politicians, and others with an interest in fisheries are concerned by the increase in integration. The main concern is not based on economics but on equity and social justice. Fishing, like farming, has been a family tradition in many communities for hundreds of years. And while evidence suggests that integration can make fisheries more efficient, some find the potential gains in efficiency to be outweighed by social and other costs. These costs include the decline in independent fishermen and the disruption to coastal communities where many fishermen live, because of lost revenue and jobs.

This research is intended to document the evidence and provide an analysis of the current level of integration, both horizontal and vertical, at the EU level through a number of case studies.

Methodology

The research combined both quantitative and qualitative research methodologies. Due to the large number of stakeholders in the European Union's fishing and fish processing industry, the most appropriate strategy to meet the research objective was to conduct a thorough analysis of horizontal and vertical integration in the sector using six selected case study countries. For each case study, an analysis of the company structures of the main fish catching companies was carried out in order to identify horizontal and vertical integration. Interviews were conducted with major fishing companies and producer organisations in the selected case study countries, as well as with representatives of the small-scale fishing sector.

Due to data restrictions, a simplified definition of horizontal integration is used for the quantitative analysis of the processes of integration. The adopted definition of horizontal integration rests on the theoretical framework that industry integration results in a decreased number of one-vessel enterprises and an increased number of vessels in multiple-vessel enterprises. Empirical models were developed to estimate the impact of integration on employment in the fish catching and fish processing industries, the correlation between employment fluctuations in the fish catching and fish processing industries, and the correlation between wages in both industries.

Definition of integration

Integration was found to take a number of different forms. This could generally be separated into two categories: structural and non-structural. Within these two categories integration could be either vertical or horizontal.

Structural vertical integration is defined as the process of investing in businesses further up or down the value chain. Structural horizontal integration could take two forms. The first form could be simply called expansion through the addition of new vessels to a fleet. The second form is the acquisition of or investment in peers. These peers could be members of the same Producers' Organisation (PO), other POs domestically, or internationally.

There are a number of informal arrangements that can be considered as non-structural forms of integration to the extent that they are utilised in order to generate economic efficiencies by corporations. For example, firms may develop off-take agreements. These are agreements between a supplier and a buyer that the buyer will acquire a certain value of a commodity supplied by the supplier. This can be considered an example of non-structural vertical integration. An example of a form of non-structural horizontal integration is when fish catching companies choose not to buy or sell their quota, but rather borrow, rent or lease quota in order to either gain access to quotas or to generate capital to be used for other business activities.

Findings

This research has found that the levels and forms of both structural and non-structural vertical and horizontal integration vary between the different case study countries (see Table 1 for an overview).

Table 1 Overview of integration in selected EU fisheries

	Structural integration		Non-structural integration	
Country	***Vertical***	***Horizontal***	***Vertical***	***Horizontal***
Denmark	Very limited.	Domestically, both in demersal and pelagic segments. Very little foreign investment in demersal segment. Significant foreign investment in pelagic segment.	Particularly in the pelagic segment. Although majority of pelagic and demersal harvests sold at auction or markets.	Trade in quotas now stable. Renting in and out of quota, particularly in the demersal segment.
Estonia	High levels of integration in Baltic Sea and Gulf of Riga segment, particularly fish catching and fish processing. Integration less common in Baltic Coastal segment.	Both in the same PO and in Estonian fishing companies investing abroad, particularly in Finland.	Due to high level of structural integration, less non-structural integration.	Trade in quotas now stable. Quota swapping and renting is common. A formal system will be introduced to facilitate this.
France	Limited, with a few exceptions.	Limited, though there is some integration domestically. A growing trend is Spanish fish catching companies investing in France.	Limited due to varied catch composition. Majority of harvest sold in market.	No quota trade. Quota leasing is illegal. There is quota swapping.
Portugal	Yes	Limited. Some investments of Portuguese companies in Spanish fishing companies and vice versa.		
Spain	High levels of integration. Initially upstream to downstream, recently also downstream to upstream, driven by access to markets and access to raw materials respectively.	Limited domestic integration due to overcapacity. Significant investment by Spanish fish catching companies in France, the UK and Ireland.	Yes, more common than structural vertical integration.	No quota trade due to overcapacity. Quota swapping in PO, both domestically and internationally.
United Kingdom	A number of companies with high levels of vertical integration, though not including retail. Notably, some companies have own PO.	High levels of horizontal integration. 13 companies hold at least 60% of quota and have access to more through vessel partnerships and minority investments.	Yes, however, off-take arrangements are not generally formalised.	Yes, quota trade, quota leasing, and quota swapping. Quota swapping within PO, both domestically and internationally.

Structural integration

There are a number of factors explaining the levels of vertical integration in the different case study countries. No one, single factor can explain any general trends. In Spain there are increasingly high levels of vertical integration, particularly an increase in full value chain integration. In France there is only one example of full value chain integration. Generally, vertical integration, where it does occur in the case study countries, is limited to upstream and midstream, i.e. fish catching, processing, and trade/distribution, apart from the few cases of full value chain integration which also include retail through outlets or supermarkets.

A number of factors were found to drive or obstruct structural vertical integration. These are listed below:

- Fishing segment
- Cost
- Ease of acces
- Firm performance

None of these factors alone can be considered as the main driver of structural vertical integration. In general it can be surmised that it is a combination of these drivers, in addition to external factors, that determines the effectiveness of structural horizontal integration, and the effectiveness of the efforts made in both non-structural vertical and horizontal integration.

Denmark, Estonia, Portugal and Spain have all implemented the ITQ system, while both France and the UK have not. Nevertheless, there are high levels of horizontal integration in the UK but not in France. There are high levels of horizontal integration in Denmark and Estonia, but not in Portugal or Spain. For Portugal and Spain, the lack of horizontal integration, particularly domestically, is explained by the fact that there is an overcapacity in their fleets and high levels of competition for quota. This further explains the high levels of overseas investments in fish catching companies, especially by Spanish fishing companies, and particularly in cheaper regions such as Africa and Latin America. Spanish fishing companies have limited investments in other EU fisheries.

When considering international forms of horizontal integration, i.e. investments by foreign companies in a national fishery, or by national companies in international fisheries, a number of factors need to be taken into consideration. However, none of these factors alone can definitively explain any identified trend:

- Cost
- Ease of access
- Fisheries management system

Non-structural integration

In many ways similar to structural vertical integration, the level of non-structural vertical integration depended to a large degree on the fishing segment and the targeted species. In segments where species could be targeted more selectively, there was a higher degree of vertical integration in the form of off-take arrangements between fish catching companies and fish processing companies. Where such arrangements were not the case, the harvests were sold in markets or at auction.

In the Spanish fisheries, non-structural vertical integration was reportedly more common than structural vertical integration. This did not appear to be species or segment specific. However, the integration implied here includes off-take agreements between fish catching companies and distributors, skipping the processing stage in the value chain for species where processing

decreases the value of the product. Another element is the that processing of some species of fish simply implies preserving the fish. Such processing is also common in Spain.

In terms of non-structural forms of integration, although there were still some differences, more similarities are found among the case study countries. In most countries there was a trade in quotas, the exceptions being Spain and France. In France, this was related to the fisheries management system which made it difficult to trade quotas as quotas were tied to vessels. The vessels themselves had to be purchased in order to access the quotas. In Spain, the lack of quota trade was due to a combination of overcapacity in the Spanish fishing fleet and the insufficient quotas for the active fishermen.

In all countries, apart from France, fishermen engaged in the renting in or out of quotas in order to compensate for surplus catch, to increase the quota for a targeted species, or to compensate for by-catch. In France, it was reportedly illegal to do so.

Fish catching companies in all the selected case study countries engaged in quota swapping. This occurred within the PO, between POs in the same countries, and between POs internationally. It also occurred between companies in a PO, and between different companies domestically and internationally.

Conclusion

The quantitative analysis carried out in this study has indicated that if there is a 10% increase in structural horizontal integration or in the expansion of fleet size, there is a 0.001% decrease in employment. Therefore, the negative impact of horizontal integration on employment can be considered minimal. The study also found that fluctuations in employment in the fish catching segment do not directly correlate to fluctuations in employment in the fish processing segment. As is always the case with quantitative analysis, data limitations and the consideration of variables affect the findings. Nevertheless, the tests were robust. Further tests using different definitions of horizontal and vertical integration and using company level data could prove useful in future studies into the socioeconomic impacts of vertical and horizontal integration in the EU fisheries industry.

Regarding structural vertical and horizontal integration, it is difficult to determine general trends between the countries simply by looking at the companies themselves, the fisheries management system, the targeted species, historic factors, or the geographic location. External factors beyond the scope of this research, such as the business environment, rules and regulations, government policies, the economic condition of the country, and European economic conditions, play a significant role in describing the trends in both structural and non-structural horizontal and vertical integration. Further research on other countries, as well as expanding the research to factor in the external factors that were beyond the scope of this research, is needed in order to develop more holistic policy recommendations at both national and EU levels. Nevertheless, this research has identified a number of trends in both structural and non-structural vertical and horizontal integration in the six case study countries.

The full implementation of the landings obligation is also likely to have a significant impact on the processes of integration. Respondents already indicated efforts to take this into consideration, including seeking access to more quotas in addition to developing more selective fishing techniques. This quota seeking integration in response to the landings obligation will likely include more structural horizontal integration domestically, where resources allow this. In cases such as Spain and Portugal, it is likely that structucal horizontal integration driven by the landings obligation will be in the form of international investments. Existing processes of non-structural horizontal integration will become more fully utilised. It is likely that tools such

as the web-based tools developed in Denmark and Estonia will become more common place, and potentially an EU-wide tool will emerge.

Additionally, the Brexit will also have an impact on the processes of integration in EU fisheries. However, it is impossible to determine, as yet, what this could entail. Most particularly as it is not yet clear what the Brexit will mean for UK and EU fisheries management.

Recommendations

As stated above, the levels and forms of integration vary between the different case study countries. These differences relate in part to external factors beyond the scope of the study. Further differences relate to the fishing segment (e.g. demersal or pelagic), the targeted species, ease of access, cost, firm performance, and the fisheries management system. This study focused on six case study countries in order to draw general conclusions. One of the key conclusions is that there are significant differences between the case study countries.

It can therefore be expected that expanding this research to include more of the 23 EU member countries with a coastline will highlight yet further differences, as well as similarities. Furthermore, the strategic responses of fish catching and processing companies to the landings obligation and the Brexit have not yet been fully developed. Given this context, it is difficult to develop EU level policy measures that could mitigate the economic and social costs and optimise the benefits of integration in the industry, in particular for the coastal communities most concerned. This is more especially so as fisheries management and commercial and industrial policies in general are, to a large extent, determined at the national level.

Nevertheless, this research has developed the following recommendations:

Further research

Further research is needed on two fronts. Firstly, the inclusion of more case study countries would be informative as it would highlight further similarities and differences. Suggested additional countries include Germany, the Netherlands, Sweden, Italy, Latvia and Greece. These countries are suggested due to the relative importance of their fisheries sectors as well as their geographic location. If 12 of the 23 EU countries with a coastline were analysed in the same way as has been done in this current research, the results could be considered more open to generalisations.

Secondly, using a basic econometric model and limited data, this research found that integration did not have a significant impact on employment or wages in the fish catching and fish processing segments. This is potentially a positive finding for communities that rely to a large degree on fish catching and processing as their source of income. However, further econometric research is needed in order to confirm this. The econometric analysis would need to use a number of more complex definitions of integration. It would further need access to more detailed data, preferably at the community level. This would mean, for example, access to income, employment, and fiscal data at the community level of a large number of communities that are or were reliant on the fish catching and processing sectors. Such data would need to be available for at least the last 10-20 years.

Broader qualitative analyses and more robust econometric analyses will help to confirm the findings of this study.

EU level platforms

While, given the autonomy of the member states and the significant differences between them, it may be more difficult to address structural integration through EU level policy measures, the non-structural forms of integration lend themselves much better to targeting through EU level policy measures. In terms of non-structural horizontal integration, this research found that fish catching companies engaged in quota trade, quota swapping and quota renting. In terms of non-structural vertical integration, this research found that fish catching companies committed to off-take arrangements or, more commonly, sold their harvest at auction or in markets. This research therefore recommends a concrete measure to optimise, in particular for the coastal communities most concerned, the benefits of non-structural forms of integration in the industry: establishing two platforms at the EU level to facilitate these non-structural forms of integration.

Quota trading, renting, and swapping platform

One such platform would formalize non-structural horizontal integration. It would be accessible to fishermen throughout the EU. Initiatives are already in place in Denmark and Estonia; however, scaling this up to the EU level would allow more fish catching companies to benefit. Given the implementation of the landings obligation/discard ban, fish catching companies will increasingly seek to gain access to quotas, possibly outside of their quota portfolio. A transparent EU level platform will help them to flexibly, efficiently and effectively restructure their portfolios in order to maximise their income and minimise their losses.

EU level fish auction

Findings from the Danish fisheries suggest that fish auctions have a positive effect on increasing the benefits to fish catching companies. The Norges Sildesalgslag online auction is transparent, and guarantees a buyer. Norges Sildesalgslag staff are present at the landing sites to ensure that the volumes and qualities meet the deal requirements, and there is also insurance in case the processor is suddenly unable to pay for the transaction. The system avoids conflict between the vessels/skippers and processors. Scaling this up to the EU level would increase the benefits to fish catching companies throughout the EU, and would support the more common non-structural form of vertical integration.

Quota concentration safeguards

Given the varying interests of EU member states and the different national-level fisheries management systems, it may not be plausible to develop quota concentration safeguards at the EU level. Indeed, it may not even be desirable. A certain number of large-scale international fishing companies can be considered desirable as they can drive technological development and economic efficiencies.

Nevertheless, quota concentration safeguards need to be developed, at least at the national level, in order to mitigate the economic and social cost and optimise the benefits of integration, in particular for the coastal communities most concerned. The findings from Denmark show that it is vital that quota safeguards be comprehensive and are able to anticipate the efforts of companies to find loopholes in the legislation. Evidence from the United Kingdom and France shows that POs can play an effective role in ensuring that rights to fish are kept in the local fishing communities. EU level policy measures to promote quota concentration safeguards can be developed, while the integration of these safeguards into the national level fisheries management systems should remain the responsibility of the Member States. Such a strategy would remain within the spirit of the Common Fisheries Policy.

1. METHODOLOGY

The research combined both quantitative and qualitative research methodologies. The methodology used for the quantitative analysis is described in Chapter 2. This chapter outlines the methodology used for the qualitative analysis.

Due to the large number of stakeholders in the European Union's fishing and fish processing industry, the most appropriate strategy to meet the research objective was to conduct a thorough analysis of horizontal and vertical integration in the sector using six selected case study countries. For each case study, an analysis of the company structures of the main fish catching companies was carried out in order to identify horizontal and vertical integration.

Interviews were conducted with major fishing companies and producer organisations in the selected case study countries, as well as with representatives of the small-scale fishing sector.

1.1. Case study selection

This research focused on six selected EU countries in which the subsequent analysis of trends in horizontal and vertical integration in the fishery industry was conducted. Two rankings were made of relevant criteria, described below, based on absolute values and relatives values. The year 2013 was used as the base year indicator. Consistent data were not available for all EU countries for more recent years.

Relative measures take the value of a criterion as a proportion of a total. For example, landings income as a proportion of total gross domestic product, or enterprises with more than one vessel as a proportion of the total number of fishing enterprises. The relative ranking is relevant as it indicates the relative importance of the fishery industry in different countries. It is important to select a number of case studies on the basis of the relative importance of the fishery industry in a given country.

Absolute measures simply measure the total value of a criterion. For example, the total value of landings income, or the total number of enterprises with more than one vessel. The absolute ranking is relevant as it indicates the overall size of the fishery industry in different countries. It is important to select a number of case studies on the basis of the size of the fishery industry in a given country.

Below the criteria are described and rationalized:

- **Enterprises with more than one vessel**
  This criterion indicates the potential level of horizontal integration through fleet expansion. Countries with a higher proportion of all enterprises engaged in fisheries that have more than one vessel potentially have a higher level of horizontal integration.

- **Landings income (€) (as a proportion of gross domestic product)**
  This criterion indicates the economic importance of the fish catching sector.

- **Employment in the fish catching sector**
  This was calculated on the basis of the number of full-time employees engaged in the fish catching sector as a proportion of the total national workforce. This criterion indicates the socioeconomic relevance of the fish catching sector.

- **Employment in the fish processing sector**
  This was calculated on the basis of the number of full-time employees engaged in the fish processing sector as a proportion of the total national workforce. This indicates the socioeconomic relevance of the fish processing sector to local communities.

- **Total processing production (€) (as a proportion of gross domestic product)**
  This criterion indicates the economic importance of the fish processing sector.

- **Imports of fish products (€) (as a proportion of gross domestic product)**
  This criterion indicates the economic importance of the trade in fish products.

- **Exports of fish products(€) (as a proportion of gross domestic product)**
  This criterion indicates the economic importance of the trade in fish products.

Table 2 provides an overview of the ranking criteria.

Table 2 Ranking criteria

Ranking criteria
Relative criteria
Highest proportion of enterprises with more than one vessel
Landings income (euros) as proportion of GDP
Highest level of employment in the fish catching sector (of total national workforce)
Highest level of employment in the fish processing sector (of total national workforce)
Total processing production (euros) as proportion of GDP
Imports of fish as % of GDP
Exports of fish as % of GDP
Absolute criteria
Highest number of enterprises with more than one vessel
Landings income (euros)
Highest level of employment in the fish catching sector
Highest level of employment in the fish processing sector
Total processing production (euros)
Imports of fish
Exports of fish

The average ranking of the EU-28 on the basis of these criteria was used for the final selection. The top three countries in terms of the relative criteria rankings and the top three countries in terms of the absolute criteria rankings were selected.

Table 3 presents the selected case study countries on the basis of their average ranking using the relative criteria.

Table 3. Average relative criteria ranking

Rank	Country	Average ranking
1	Portugal	4.00
2	Denmark	5.71
3	Estonia	6.14

Table 4 presents the selected case study countries on the basis of their average ranking using the absolute criteria.

Table 4. Average absolute criteria ranking

Rank	Country	Average ranking
1	Spain	2.14
2	France	3.57
3	United Kingdom	3.86

The final list of selected case study countries is therefore:

- Denmark
- Estonia
- France
- Portugal
- Spain
- United Kingdom

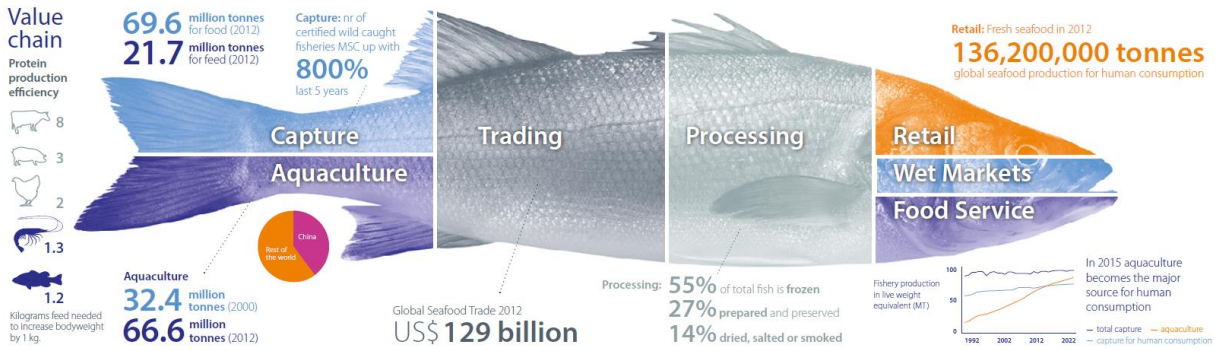
1.2. Definition of integration

This section outlines the definitions of integration utilised in this report.

1.2.1. Vertical Integration

Vertical integration is defined as the process of investing in businesses further up or down the value chain of a specific commodity. In the case of the fish industry, a fish catching company might consider vertical integration through the acquisition of fish processing plants, ports, cold chain logistics companies, fish retail/wholesale companies and other distribution outlets. Companies operating downstream in the value chain could similarly integrate through the acquisition of companies operating upstream. This study refers to this form of integration as structural vertical integration.

Figure 1. Fish product value chain



Source: Rabobank (2015), "Sustainable seafood is needed to nourish the world", online: https://www.rabobank.com/en/about-rabobank/food-agribusiness/sectors/from-animals/sustainable-seafood/index.html, viewed in April 2016.

1.2.2. Horizontal Integration

Horizontal integration can take two forms. The first form of horizontal integration could also simply be called expansion. In the fishing industry, this is when a fishing company purchases more vessels.

The second form of horizontal integration is the acquisition of peers. In the fishing industry, this is often done to take advantage of quota arrangements. As such, horizontal integration through the acquisition of peers can occur in three different ways.

Firstly, a fishing company may acquire a peer that is member of the same producer organisation. Doing so allows the company to increase the size of its quota within the same fishing area. In such instances, the company may even decide to decrease the size of its fleet in order to reduce costs if a smaller number of vessels are still able to fulfil the quota.

Secondly, a fishing company may acquire a peer or establish a subsidiary in another producer organisation within the same country. This allows the company to increase and/or diversify its quota.

Finally, a fishing company may acquire or invest in a peer or establish a subsidiary in another country. Similar to the second horizontal integration mechanism, this allows the company to increase and/or diversify its quota. This study refers to these forms of integration as structural horizontal integration.

1.2.3. Informal arrangements

There are a number of informal arrangements that can be considered as forms of integration to the extent that they are utilised in order to generate economic efficiencies by corporations. For example, fish catching companies may choose not to buy or sell their quota; rather they may borrow, rent or lease quota in order to either gain access to quotas or to generate capital to be used for other business activities. This is thus a form of non-structural horizontal integration.

Another example is that fish catching companies may negotiate off-take agreements with fish processing companies. An off-take agreement is an agreement between a supplier and a buyer in which the buyer acquires a certain value of a commodity supplied by the supplier. This guarantees demand for the fish that the supplier has harvested in a similar way that investments in fish processing companies does. Therefore, this can be considered a non-structural form of vertical integration.

2. QUANTITATIVE ANALYSIS

KEY FINDINGS

- 10% increase in *Integration* is likely to cause about 0.001% decrease on *Employment Growth*, *ceteris paribus*
- Changes in employment in the fish catching sector do not correlate with change in employment figures in the fish processing sector
- There is a small difference between the distribution of *Employment* across the fish catching sector and the fish processing sector

2.1. Quantifying horizontal integration

Due to data restrictions, a more simplified definition of horizontal integration is used for the quantitative analysis of the processes of integration. The adopted definition of horizontal integration rests on the theoretical framework that industry integration results in a decreased number of one-vessel enterprises and an increased number of vessels in multiple-vessel enterprises. However, defining horizontal integration in this manner does not capture the possibility that vessels change ownership due to occurrences other than integration (some vessels might be scrapped, others newly purchased) or that firms expand.

Therefore, to build a sound econometric model, a more precise and simplified definition of horizontal integration is needed to prevent the analysis from exhibiting endogeneity born of the fact that a decrease in the number of one-vessel companies is not tantamount to an increase in the number of vessels in a multi-vessel firm. Thus, in order for the error terms in our models not to contain any unobserved factors which could relate to e.g. change in vessel ownership, the definition of horizontal integration is as follows:

$$Integration_{i,t} = Probability_{Integration} * Growth_{MVvessels_{i,t}} \quad (i)$$

This proposed definition rests on the following assumptions:

- There is a high probability that a reduction in the number of one-vessel companies results in an increase in the number of vessels which are owned by multi-vessel companies (with two or more vessels). This can be proxied with "covariance" between the two terms and we would expect it to be significant and negative.
- The number of vessels which are the property of multi-vessel companies increases on annual basis.

The above-mentioned two assumptions are estimated in the following manner:

$$Probability_{Integration} = \left|\mathrm{cov}\left(Growth\_MVvessels_{i,t}; Growth\_OVvessels_{i,t}\right)\right| \quad (ii)$$

where:

$$Growth\_MVvessels_{i,t} = \frac{MV_{vessels_{i,t}} - MV_{vessels_{i,t-1}}}{MV_{vessels_{i,t-1}}} \;\&$$

$$Growth\_OVvessels_{i,t} = \frac{OV_{vessels_{i,t}} - OV_{vessels_{i,t-1}}}{OV_{vessels_{i,t-1}}}$$

In the above-mentioned specifications, the abbreviations used are defined as follows:

$MV_{vessels_{i,t}}$: Number of vessels which belong to companies owning more than one vessel.

$OM_{vessels_{i,t}}$: Number of vessels which belong to companies owning one vessel only.

Where: i, t stand for country and year respectively.

Probability of Integration was computed as defined in (i) as:

$Probability_{Integration} = 0.13$

2.1.1. Integration per country

Subsequently, *Integration* was computed as defined in (ii). Table 5 provides figures for the calculated element, as well as the mean averages for each country and year. Thus, for the researched countries, integration ranges between the interval as so:

$Integration_{i,t} \in [-0.11\,, 0.81]$. Malta exhibits, on average, the highest integration over the years ; Latvia and Romania the lowest.

Table 5. Integration per country and year

Country	2009	2010	2011	2012	2013	mean
Belgium	0.09	-0.02	-0.10	0.30	-0.05	**0.04**
Bulgaria	0.04	0.03	-0.04	0.01	-0.11	**-0.01**
Cyprus	0.05	-0.09	0.01	0.03	0.00	**0.00**
Denmark	0.01	0.00	0.00	-0.06	0.00	**-0.01**
Estonia	0.00	-0.01	0.00	0.00	0.01	**0.00**
Finland	0.00	0.00	0.00	0.03	-0.01	**0.00**
France	-0.04	0.00	0.00	0.00	0.00	**-0.01**
Germany	0.00	0.00	-0.01	-0.01	0.00	**0.00**
Ireland	0.04	0.01	0.07	0.00	-0.03	**0.02**
Italy	0.03	0.00	0.00	0.00	0.00	**0.01**
Latvia	-0.01	-0.01	-0.07	-0.01	0.00	**-0.02**
Lithuania	-0.02	0.00	-0.01	-0.01	0.01	**-0.01**
Malta	0.07	0.01	-0.02	0.02	0.81	**0.18**
Netherlands	-0.02	0.00	0.02	-0.01	0.01	**0.00**
Poland	0.01	0.02	0.00	0.01	0.02	**0.01**
Portugal	0.00	0.00	0.00	0.00	-0.01	**0.00**
Romania	0.03	-0.01	0.00	-0.06	-0.04	**-0.02**
Slovenia	0.01	0.00	0.00	-0.03	-0.01	**-0.01**
Spain	-0.02	0.00	-0.01	-0.01	-0.01	**-0.01**
Sweden	0.00	-0.01	0.00	0.00	0.00	**0.00**
United Kingdom	-0.01	0.00	0.00	0.01	0.01	**0.00**
Mean	**0.01**	**0.00**	**-0.01**	**0.01**	**0.03**	-

In order to estimate *Integration,* data were collected from: Scientific, Technical and Economic Committee for Fisheries (2015, July), *The 2015 Annual Economic Report on the EU Fishing Fleet: Electronic Appendices*, Publications Office of the European Union, Luxembourg.

2.2. Empirical model I

The following empirical model was formulated to research the effect of horizontal industry integration on *Employment Growth* in the fish catching sector.

$$Epml^{catch}\ grth_{i,t} = b_1 * Integr_{i,t} + b_2 * Infl\ rate_{i,t} + b_3 * GDPgrth_{i,t} + b_4 * Crew\ Wage^{catch} grth_{i,t} + b_5 * Pop\ grth_{i,t} + \varepsilon_t \quad \text{(I)}$$

2.2.1. Variables

Table 6 gives and overview of the summary statistics for the variables presented in the first empirical model (I). Mean average, median, as well as minimum and maximum values of the variables are reported.

Table 6. Summary statistics

Variable	Observations	Mean	Min	Median	Max
Employment growth	105	0.00	-0.84	-0.02	1.27
Integration	105	0.01	-0.11	0.00	0.81
Inflation rate	105	2.04	-4.48	2.17	6.09
GDP growth	105	-0.24	-14.81	0.59	7.58
Crew wage growth	105	0.05	-0.55	0.02	1.06
Population growth	105	0.12	-2.26	0.36	1.24

Data were collected from: *The World Bank*, "World Development Indicators - Inflation, consumer prices (annual %)", viewed in February 2015; *The World Bank*, World Development Indicators - Population growth (annual %)", viewed in February 2015; *The World Bank*, World Development Indicators - GDP growth (annual %)", viewed in February 2015; Scientific, Technical and Economic Committee for Fisheries (2015, July), *The 2015 Annual Economic Report on the EU Fishing Fleet: Electronic Appendices*, Publications Office of the European Union, Luxembourg.

2.2.2. Hypothesis and findings

Our first hypothesis can be defined as follows:

Hypothesis (1):
Horizontal integration has a negative effect on employment.

The hypothesis expressed above (1) was analysed using a Multivariable Fractional Polynomial (MFP) regression, which assumes that there is a relationship between *Employment Growth* and *Integration* but allows for the possibility that this relationship might be curve-linear, not only linear. The MFP algorithm tries to fit the best line or curve through the available data and to do so it repeats the regression analysis while altering the variables' power. Thus it allows for curvature in the estimated relationships where necessary (StataCorp, 2009).

Table 7 presents the results regarding the effect of *Integration* on *Employment Growth*. *Crew Wage Growth, GDP Growth, Population Growth* and *Inflation Rate* serve as control variables. The reported results are from the Multivariable Fractional Polynomial algorithm for selecting the best fitting regression model and transforming the variables for best fit where necessary (Sauerbrei and Royston, 1999).

Table 7. Effect of Integration on Employment Growth

Dependent variable :	Employment Growth		
	(1)	(2)	(3)
Integration	-0.00010***	-0.00010***	-0.00010***
	(-5.94)	(-5.93)	(-5.78)
Crew Wage Growth	0.35806**	0.35737**	0.36973**
	(2.07)	(2.10)	(2.17)
GDP Growth	0.00641	0.00652	
	(1.16)	(1.29)	
Population Growth	0.01825	0.01768	
	(0.57)	(0.52)	
Inflation Rate	0.00105		
	(0.07)		
Constant	0.01398	0.01399	0.01396
	(0.58)	(0.58)	(0.59)
Observations	105	105	105
Adjusted R-squared	0.169	0.177	0.181
F-statistic	10.96749	13.53506	19.32043

***, **, * indicate significance levels of 1%, 5%, 10%, respectively. T-statistics are reported in parentheses.

To assess the effect of *Integration* on *Employment Growth* in the fish catching industry, several model specifications were estimated, thus testing Hypothesis (1). Table 7 gives the results of three different variations of the main specification to serve as robustness checks of the structural validity of the main analysis (Xun and Halbert, 2010). The specifications have *Employment Growth* as the dependent variable with *Integration* as the main variable of interest.

Specifications (1) and (2) show that even when the empirical model is void of the selected control variables, the coefficient of *Integration* is the same as in specification (3), which thus vouches for the stability of the effect under model variations. Taking into account the adjusted R-squared and F-statistic values, as well as the non-significance of the control variables selected, apart from *Crew Wage Growth*, we conclude that the most suitable specification is (3).

All specifications provide a very significant result regarding the coefficient of *Integration*. Since *Integration,* based on definition (i), and all the other variables are in terms of growth, the results can be understood in terms of elasticity (percentages). In other words, results show that a 10% increase in *Integration* is likely to cause about a 0.001% decrease in *Employment Growth*, *ceteris paribus.* Consequently, the effect of *Integration* (as it was previously defined) on *Employment Growth* in the fish catching industry is minor. Our result is significant at the 1% level (i.e. there is a 1% chance that *Integration* does not impact *Employment Growth*).

The low adjusted R-squared value (0.181) could be attributed to many possible factors. The non-significance of *GDP Growth*, *Population Growth* and *Inflation Rate*, as well as the persistantly low adjusted R-squared values in all specifications (1), (2), (3), render the necessity of further scoping and identifying other more suitable explanatory variables. Thus, we conclude that the low adjusted R-squared value could possibly be attributed to an omitted variable bias.

2.3. Empirical model II

The following empirical model was formulated to research the effect of employment in the fish catching industry on the employment in the fish processing industry.

$$Empl^{proc}\ grth_{i,t} = \gamma_1\, Epml^{catch}\ grth_{i,t} * + \gamma_2 * Infl\ grth_{i,t} + \gamma_3 * GDPgrth_{i,t} + \gamma_4 * Wage^{\,proc} grth_{i,t} + \gamma_5 * Z_{i,t} + \gamma_6 * Z_{i,t-1} + \varepsilon_t \quad \text{(II)}$$

Due to data limitations in the fish processing sector, econometric analysis was established to be infeasible. However, non-parametric statistical analysis allows for testing of the hypotheses described below.

2.3.1. Hypotheses and findings

Hypothesis (2):
There is correlation between employment in the fish catching sector and employment in the fish processing sector.

Hypothesis (3):
There is correlation between wages in the fish catching sector and wages in the fish processing sector.

Hypothesis (4):
Employment in the fish catching industry has an effect on employment in the fish processing industry.

Hypothesis (5):
Wages in the fish catching industry have an effect on wages in the fish processing industry.

Table 8. Spearman's rank correlation coefficients

Variable	2008	2009	2010	2011	2012
Employment	0.72***	0.65***	0.60**	0.53**	0.53**
Wages	0.89***	0.90***	0.88***	0.88***	0.86***

***, **, * indicate significance levels of 1%, 5%, 10%, respectively

Data were collected from: Scientific, Technical and Economic Committee for Fisheries (2015, July), *The 2015 Annual Economic Report on the EU Fishing Fleet: Electronic Appendices*, Publications Office of the European Union, Luxembourg; Scientific, Technical and Economic Committee for Fisheries (2014, November), *The Economic Performance of the EU Fish Processing Industry: Electronic Appendices*, Publications Office of the European Union, Luxembourg.

Table 8 gives an overview of the calculated Spearman's rank correlation coefficients between *Employment* and *Wages* in the fish catching industry and fish processing industry for the last five available years.

We can conclude that:

1) there is strong and significant correlation between *Employment* in the fish catching industry and *Employment* in the fish processing industry;
2) there is strong and significant correlation between *Wages* in the fish catching industry and *Wages* in the fish processing industry; and
3) correlation between *Employment* in the fish catching industry and *Employment* in the fish processing industry is decreasing over time.

Table 9 presents Z-ratios, calculated by performing Mann-Whitney U tests between *Employment* and *Wages* in the fish catching industry and fish processing industry for the last five available years.

We can conclude that:

1) we fail to reject the hypothesis that the distribution of *Employment* is the same across the fish catching sector and the fish processing sector, at a 5% significance level, for all of the five years;
2) we reject the hypothesis that the distribution of *Wages* is the same across the fish catching sector and the fish processing sector, at a 5% significance level, for all of the five years.

Table 9. Mann-Whitney U test (one tailed), Z-scores

Variable	2008	2009	2010	2011	2012
Employment	1.0565	1.3333*	-	1.4590*	1.2829
Wages	1.9370**	1.9370**	1.7718**	2.0125**	1.9621**

***, **, * indicate significance levels of 1%, 5%, 10%, respectively. Z-score for *Employment*, in 2010 cannot be used, since the U value was higher than the critical U value.

Data were collected from: Scientific, Technical and Economic Committee for Fisheries (2015, July), *The 2015 Annual Economic Report on the EU Fishing Fleet: Electronic Appendices*, Publications Office of the European Union, Luxembourg; Scientific, Technical and Economic Committee for Fisheries (2014, November), *The Economic Performance of the EU Fish Processing Industry: Electronic Appendices*, Publications Office of the European Union, Luxembourg.

Table 10 gives an overview of the effect size computed for the same variables. The effect size can help us understand the size of the difference between the above-mentioned distributions.

Table 10. Effect size

Variable	2008	2009	2010	2011	2012
Employment	0.23	0.29	-	0.32	0.28
Wages	0.42	0.42	0.40	0.44	0.43

$r = Z/\sqrt{N}$, where r is the effect size, Z is the Z-score and N the number of countries. Effect size could not be computed for *Employment* in 2010 since the Z-score cannot be used.

Data were collected from: Scientific, Technical and Economic Committee for Fisheries (2015, July), *The 2015 Annual Economic Report on the EU Fishing Fleet: Electronic Appendices*, Publications Office of the European Union, Luxembourg; Scientific, Technical and Economic Committee for Fisheries (2014, November), *The Economic Performance of the EU Fish Processing Industry: Electronic Appendices*, Publications Office of the European Union, Luxembourg.

Thus we can conclude that:

1) there is a small effect (based on Cohen's benchmark for r) (Cohen, 1988), thus a small difference, between the distribution of *Employment* across the fish catching sector and the fish processing sector; and
2) there is an intermediate effect (based on Cohen's benchmark for r) (Cohen, 1988), thus an intermediate difference, between the distribution of *Wages* across the fish catching sector and the fish processing sector.

3. EUROPEAN FISH AND SEAFOOD MARKET

KEY FINDINGS

- European fish and seafood market estimated to be worth approximately US$ 72 billion in 2015
- EU prepared fish and seafood market 45% of total fish and seafood revenue
- Supermarkets and hypmarkets main distribution channels for prepared fish and seafood

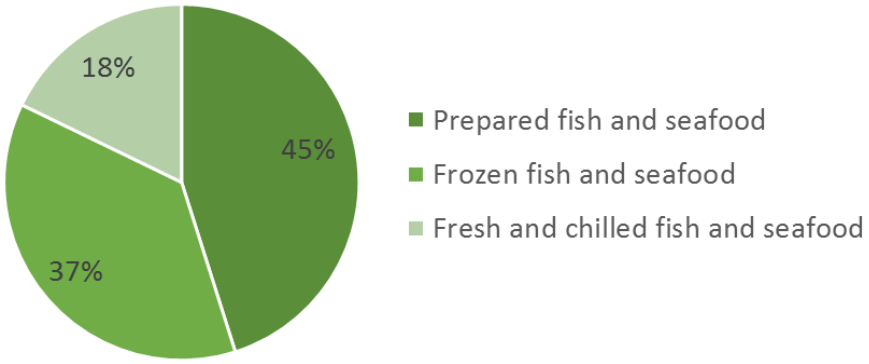
The European fish and seafood market was estimated to be worth US$ 72 billion in 2015 (Infinity Research, 2015a, p.15). It is expected that the value of the European fish and seafood market will, at a compound annual growth rate of 2.93%, reach US$ 83 billion by 2020 (ibid.). Europe accounted for 34.7% of the total global fish and seafood market in 2015 (ibid.). The main contributors to the market are: Denmark, France, Germany, Ireland, Italy, the Netherlands, Poland, Spain, Sweden and the United Kingdom (ibid.).

The fish and seafood market in Europe can be separated into three product segments:

- Prepared fish and seafood
- Frozen fish and seafood
- Fresh and chilled fish and seafood (Infinity Research, 2015a, p.18).

Figure 2 provides an overview of the product segmentation of the European fish and seafood market by revenue in 2015 (Infinity Research, 2015a, p.19-21). The European prepared fish and seafood market was estimated to be worth approximately US$ 32 billion in 2015 (ibid.). The frozen fish and seafood market segment was estimated at approximately US$ 27, and the fresh and chilled fish and seafood segment was estimated to be worth approximately US$ 15 (ibid.).

Figure 2. Product segmentation of European fish and seafood market by revenue (2015)



Source: Infinity Research (2015), *Fish and Seafood Market in Europe*, p. 18.

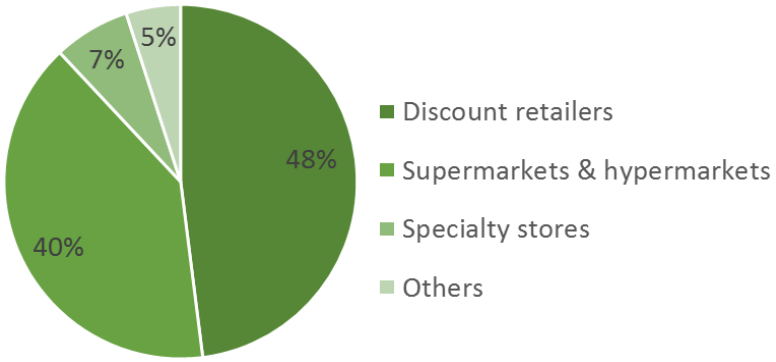
The European fish and seafood market composition contrasts sharply with the global fish and seafood market composition. Globally, the fresh and chilled fish and seafood product segment accounts for 68% of the total market. Prepared fish and seafood, and frozen fish and seafood each accounted for approximately 14% in 2015 (Infinity Research, 2015b, p.15).

The main channels of distribution for prepared fish and seafood products in Europe are supermarkets and hypermarkets (Infinity Research, 2015a, p.19). Similarly, the main channels of distribution for frozen fish and seafood products are also supermarkets and hypermarkets.

They account for more than 40% of total share in the market segment (Infinity Research, 2015a, p.20). Technological limitations have restricted the distribution channels and market for fresh and chilled fish, although recent technological developments are thought to open up the market's potential. In a number countries, fresh and chilled fish constitutes a significant market share. For example, in Italy 54% of total fish and seafood consumption is accounted for by the fresh and chilled fish segment (Infinity Research, 2015a, p.21).

Figure 3 provides an overview of the main distribution channels for fish and seafood products in the European market. The 'Others' distribution channel category consists of independent retailers, open markets and online retailers.

Figure 3. European fish and seafood market distribution channels (2015)



Source: Infinity Research (2015), *Fish and Seafood Market in Europe*, p. 22.

Table 11 provides an overview of major fish and seafood vendors in Europe, as well as the brands they market.

Table 11. Major fish and seafood vendors in Europe

Company	Brand
Bolton Group	Palmera
	Rio Mare
	Saupiquet
Grupo Freiremar	Nakar
Marine Harvest	Admiral's
	Appeti'Marine
	Donegal Silver
	Ducktrap River
	Harbour Salmon
	Irish Organic Salmon
	Kritsen
	Laschinger
	Mowi
	Olav's
	Pieters
	Rebel Fish
	Sterling
	Supreme Salmon
Nomad Foods	Birds Eye
	Findus
	Iglo
	La Cocinera

Source: Infinity Research (2015), *Fish and Seafood Market in Europe*, p. 7-8.

4. DENMARK

KEY FINDINGS

- Landings and processing account for 2% of Danish GDP
- 98% single vessel enterprises, 81% small vessels
- Limited structural vertical integration
- Significant structural horizontal integration, in pelagic sector also high level of foreign investment
- Majority of harvests sold at auctions and markets
- Trade in quotas stabilised, renting in and out of quotas is common practice

4.1. Composition of Danish fishing industry

The fishing industry plays a significant role in the Danish economy (Eurofish, 2015a). Together, landings and fish processing accounted for nearly 2% of GDP (see Table 12). This misses the significant proportion that fish catching revenues also play. The Danish fishing fleet consisted of 2,747 vessels in 2014. Gross tonnage was approximately 64,000 tonnes (Eurofish, 2015a). 98% of the fishing enterprises in Denmark own only one vessel (see Table 12). 81% of the fleet is small vessels. >24m vessels account for only 3% of the Danish fishing fleet; however, they account for 63% of gross tonnage as they are all large pelagic trawlers (Eurofish, 2015a). In the last 10 years the number of vessels of over 24 metres has dropped more rapidly than the number of shorter vessels. However, the capacity of the over 24 metre fleet has remained stable. In the same period, the number of 12-24 metre vessels has remained stable, having experienced a rapid decline between 1995 and 2006 (Semrau and Ortega Fras, 2013, p.41).

The Danish fisheries sector is composed of three segments:

- Demersal fishery for human consumption
- Trawler fishery for industrial use
- Pelagic fishery for predominantly herring and mackerel (Semrau and Ortega Fras, 2013, p.29).

The fish catching and processing industries in Denmark employ 8,307 people. 18% of these are employed in the fish catching sector, with the remaining 82% are employed in the processing sector.

50% of the landed fish is destined for human consumption (Eurofish, 2015a). The processing industry generated €4 billion in revenue in 2012 (ibid.). The majority of Danish processing facilities are located in northern Jutland, close to major landing sites such as Thyborøn, Hirtshals and Skagen (ibid.). Together these ports account for almost half of the gross tonnage of the Danish fleet (ibid.). Preserved and canned fish accounts for 57% in value of total processed fish for human consumption (ibid.). Smoked fish accounts for 26% (ibid.). Fish meal and fish oil account for 31% in value of total industrial fish products, and 68% in terms of volume (ibid.).

In 2015, Denmark exported approximately €2 billion in fish (TradeMap, n.d.). 71% of this was destined for EU member countries (ibid.). Germany was the largest export destination, accounting for 21% of total fish export value (ibid.). This was followed by Italy, France, Sweden and the Netherlands accounting for 9%, 8%, 7%, and 6% respectively (ibid.).

Imports of fish in 2015 amounted to approximately €1.5 billion (TradeMap, n.d.). Roughly 80% of this was from non-EU member countries (ibid.). Norway and Greenland were the most important countries of origin, accounting for 35% and 18% respectively of all imported fish in terms of value (ibid.).

Herring and mackerel are the two main species harvested in Denmark (Sverdrup-Jensen, 2016). Herring is usually exported to Germany, consumed domestically, or, to a lesser degree, exported to other Nordic countries (ibid.). Mackerel is mostly exported to the EU and Japan, according to Sverdrup-Jensen, CEO of DPPO (ibid.).

Table 12. Overview of fish industry in Denmark

Segment	Measure	Value	Proportion of total fishing enterprises / GDP / workforce
Fish catching	Enterprises with more than one vessel (2013)	36	2%
	Landing income (2013, € mlns)	393	0.16%
	Employment in the fish catching sector (2013)	1,489	0.06%
Processing	Employment in the fish processing sector (2012)	6,818	0.25%
	Processing production (2012, € mlns)	4,020	1.64%
Trade	Imports of fish (2015, € mlns)	1,468	0.55%
	Exports of fish (2015, € mlns)	2,093	0.79%

Source: Scientific, Technical and Economic Committee for Fisheries (2015, July), *The 2015 Annual Economic Report on the EU Fishing Fleet: Electronic Appendices*, Publications Office of the European Union, Luxembourg ; EUROSTAT (2015, November), "GDP and main components - Current prices [nama_gdp_c]", online: http://ec.europa.eu/eurostat/data/database, viewed in January 2016; EUROSTAT (2015, October), "Employment (main characteristics and rates) - annual averages [lfsi_emp_a]", online: http://ec.europa.eu/eurostat/data/database, viewed in January 2016; TradeMap (n.d.), "List of importers for the selected product: Product: 03 Fish, crustaceans, molluscs, aquatic invertebrates nes", online: http://www.trademap.org/, viewed in January 2016; TradeMap (n.d.), "List of exporters for the selected product: Product: 03 Fish, crustaceans, molluscs, aquatic invertebrates nes", online: http://www.trademap.org/, viewed in January 2016.

4.2. Producer organisations

There are two producer organisations in Denmark, representing the pelagic and coastal segments respectively:

- Danmarks Pelagiske Producentorganisation (DPPO)
- Danmarks Fiskeriforening Producentorganisation (DFPO)

DPPO represents 12 vessels, while DFPO represents approximately 750. 0 provides an overview of the members of DPPO.

4.2.1. DPPO

As Table 13 shows, and Sverdrup-Jensen (CEO of DPPO) confirms, DPPO is mainly composed of one-vessel enterprises which are owned by the fishermen themselves. This is based on a

Danish regulation, colloquially known as the "boots on board principle", which states that 1/3 of a fishing vessel must be owned by the skipper, private enterprises can own 2/3 of a vessel (Sverdrup-Jensen, 2016).

Table 13. Members of Danmark's Pelagiske Producentorganisation

Company	Vessel name
Astrid Fiskeri	Astrid
	Rockall
Benny Rasmussen	Lingbank
Cattleya A/S	Cattelya
Niels Jensen og Co	Isafold
Nordic Pelagic	Ariadne
P/R Asbjorn	Asbjorn
P/R Beinur	Beinur
Rederiet Gifico ApS	Ceton
Gitte Henning A/S	Gitte Henning
Rederiet Ruth	Ruth
Themis Fiskeri	Themis

Source: Danmarks Pelagiske Producentorganisation (n.d.), "Vessels", online: http://www.dppo.dk/, viewed in March 2016

Quotas in Denmark are limited per skipper per vessel. Each company cannot own more than 10% of the Danish, in this case, pelagic quota (Sverdrup-Jensen, 2016). In Denmark, only two companies are close to this limit. These are Gitte Henning and Rederiet Ruth, described below (ibid.). According to Sverdrup-Jensen, these two companies are wholly owned by fishermen (ibid.).

In Denmark, quotas are granted to vessels, not to the Producer Organisation (PO) as is the case in other countries (Sverdrup-Jensen, 2016). The PO, therefore, has no role in the quota allocation decision-making process. In 2001, the Individual Transferable Quota (ITQ) system was introduced in the Danish pelagic segment (ibid.). Allocation was based on a 10 year reference period (ibid.). After the introduction of the ITQ system, the Danish pelagic fleet decreased from 100 vessels to 20 (ibid.). However, the capacity of the individual vessels increased (ibid.). When the system was introduced in 2001, there was a crisis in the pelagic sector (ibid.). One indication of this was that the herring stock was severely depleted (ibid.).

The introduction of the ITQ system led to a rapid concentration of quotas (Sverdrup-Jensen, 2016). Many fishermen sold out (ibid.). Those that remained increased the capacity of their vessels and the size of their quotas (ibid.). When the ITQ system was about to be introduced, everyone was aware of the consequences in terms of the reduction of fleet and concentration of quotas (ibid.). It was a "major political decision" (ibid.). There were social costs, but the purpose was to reduce the fleet size (ibid.). With the introduction of the ITQ system, quota prices increased rapidly (ibid.). According to Sverdrup-Jensen, those that sold out made a lot

of money, those that sold later made a fortune (ibid.). Many people made significant profits by selling (ibid.). Those that stayed were "dedicated fishermen" (ibid.). This seems to be a rather rosy picture, and ignores the fact that employment dropped from 4,032 FTE in 2002 to 1,489 in 2013. Estimates of the total numbers of affected employees ranges from 4,552 FTE to 14,241 FTE (Goulding et al., 2000, p. 69; Sea Fish Industry Authority, 2008, p. 6).[1]

Nevertheless, Sverdrup-Jensen states that the ITQ system "saved the sector" (Sverdrup-Jensen, 2016). There is now more stability in the sector (ibid.). The sector has been more profitable for a while now (ibid.). The return on investment is very quick (ibid.). As an illustration of this, five new vessels will enter the Danish pelagic segment in 2016 (ibid.). These will be replacing vessels that are only 10 years old (ibid.). The new vessels are more efficient and technologically advanced (ibid.). Furthermore, fishermen are spreading their risk by fishing for more and different species and in different fishing areas, and through portfolio expansion (ibid.). Fishermen who used to only fish for the human consumption segment are now also fishing for the industrial use segment (ibid.). In fact, 70% of the pelagic fishermen in Denmark are now fishing for both these segments (ibid.). Additionally, the ITQ system has led to an increase in the number of working days. From 240 days in 2001, to 320-330 days now (ibid.).

4.2.2. DFPO

Table 14 provides an overview of the members of the DFPO with more than three registered vessels. There are 64 members with more than two registered vessels. The remaining 694 only have one registered vessels.

In 2007, the ITQ system was introduced in the Danish coastal fishing segment (Sverdrup-Jensen, 2016).

Table 14. Members of Danmarks Fiskeriforening Producentorganisation

Company	Vessel name
Gitte Henning A/S	Birgitte Martine
	Birthe
	Myggenes
	Stefenie
	Vestfart
H W Larsen & Sønner I/S	Mågen
	Svanen
	Tejsten
	Ternen
Amy A/S	Bering Sea
	Bigtana
	Maritana

[1] Estimates for the employment multiplier for the fisheries industry vary per region, per segment per year. These estimates are based on two studies. The low estimate is based on the Denmark fishing industry employment multiplier in a 2000 EU study on employment and dependency in the fishing. The high estimate is the employment multiplier for the UK pelagic fishing segment in a 2008 study.

Company	Vessel name
	Mette Kynde
Partsrederiet E61 DI-JE	Di-Je
	Jeppe
	Sine
Tommy Bach	Arkona
	Malle
	Tambosund
Snaptun Muslinger ApS	Freja
	Frigg
	Ydun
L229 Lykke Hametner/ John Anke	Lykke Hametner
	Silje Hametner
	Thingholt
Niels Erik Jensen	Dorte-Ann
	Sarina
	Tuggy
Jens Granlund	Ida
	Paulet
	Tulle
Jørn Martin Larsen	Jannie
	Josefine
	Klump

4.3. Company analysis

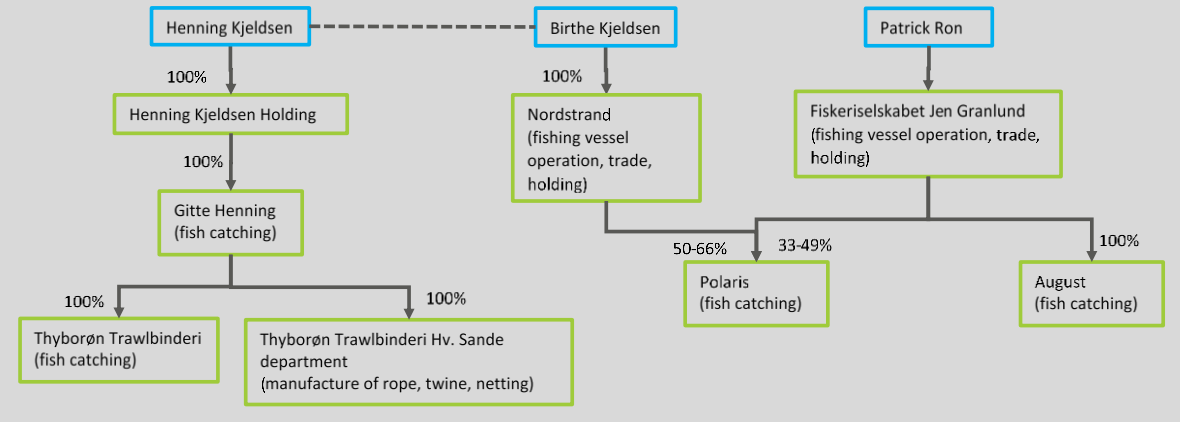
This section provides an analysis of the company structures of six companies in both the pelagic and coastal fishing segments. These include three companies with the highest number of vessels which are members of the DFPO, as well as three companies with significant size vessels which are members of the DPPO.

4.3.1. Gitte Henning

As seen from Table 13 and Table 14, Gitte Henning has vessels in both the pelagic and coastal fishing segments. In the pelagic fishing segment, Gitte Henning has one vessel, while it has five vessels in the coastal segment. These vessels are members of their respective POs.

Investment Company Henning Kjeldsen Holding is the parent company of Gitte Henning (see Figure 4). Entrepreneur Henning Kjeldsen is the full owner of the investment company. Gitte Henning has two subsidiaries: Thyborøn Trawlbinderi is also engaged in fish catching, while the Thyborøn Trawlbinderi Hv. Sande department produces rope, netting, and twine used in fishing.

Figure 4. Company structure of Gitte Henning



Source: Virk (2016, March), *CVR data: Henning Kjeldsen Holding*, p. 1; Virk (2016, March), *CVR data: Gitte Henning*, p. 1; Birgite Lesanner (2015, September 8), "Politianmeldelse: Fusk med fisk for millioner", online: http://www.greenpeace.org/denmark/da/nyheder/blog/fusk-med-fisk-for-millioner/blog/54015/, viewed in March 2016; Virk (2016, March), *CVR data: Nordstrand Fiskeri*, p. 1; Virk (2016, April), *CVR data: Fiskeriselskabet Jens Granlund*, p. 1; Virk (2016, April), *CVR data: August A/S*, p. 1; Virk (2016, April), *CVR data: HG 352 Polarsi ApS*, p. 1.

In 2014, Gitte Henning generated €18 million in gross profit, down from €21 million 2013. The company had total assets worth €174 million in 2014. Approximately €106 million of this was fish quotas, €53 million was vessels (Gitte Henning, 2015, p. 9-10). As Gitte Henning is the only subsidiary of Henning Kjeldsen Holding, the holding company reports the same consolidated figures as its subsidiary.

Another fishing company owned by Birthe Kjeldsen, the wife of Henning Kjeldsen, is registered at exactly the same address as Henning Kjeldsen Holding. The name of the company is Nordstrand Fiskeri. The company formerly belonged to the father of Henning Kjeldsen, Erik Kjeldsen (Virk, 2016a, p. 1).

The business activities of Nordstrand Fiskeri are noted as trade, the operation of fishing vessels and to act as a holding company (Virk, 2016a, p. 1). It is also curious that a company with a turnover of approximately €786,000, and total assets of €11 million in 2014, has no staff costs (Nordstrand Fiskeri, 2005, p. 9-10). The return on assets (ROA) for Norstrand Fiskeri is also considerably lower than that of its peers. The ROA for Nordstrand Fiskeri is 0.07, this compares with a ROA of 0.40 for Hiiu Kalur and 0.23 for Kalalaev Kotkas. Nordstrand also has "other debts" of approximately €9.2 million, with no further details (Hiiu Kalur, p. 4-5, p. 31 and Kalalaev Kotkas, 2015, p. 4-5).

The Nordstrand annual report does not contain a lot of detail. For instance, it does not refer to its fishing quota or its vessels in its balance sheet. However, as the fishing quota is usually the only intangible asset included in the annual reports of fishing companies, we can assume that the same is true for Nordstrand. If this is the case, then it has a fishing quota worth approximately €11 million, nearly all of its assets. Fishing companies usually include vessels in the tangible assets category in the balance sheets. Nordstrand has one sub-category in the category tangible assets, namely 'plant and machinery'. This title is a little misleading, as one would assume 'plant and machinery' to be used for fish processing. It is possible that this is a misnomer. As vessels are not included in the balance sheet, and the category tangible assets is the logical place to include these, it can be assumed that 'plant and machinery' could have

been used to refer to the fishing vessels. If this is the case, then Nordstrand has vessels worth €14,500. This does not seem likely (Hiiu Kalur, p. 4-5, p. 31 and Kalalaev Kotkas, 2015, p. 4-5).

The son of Birthe Kjeldsen, Røn Patrick, also owns a number of companies engaged in the operation of fishing vessels and commercial fishing. Røn Patrick, and the companies with which he is affiliated, are registered at the same address as Henning and Birthe Kjeldsen and their affiliated companies (Virk, 2016b, p. 1). Fiskeriselskabet Jen Granlund was established in 2014. In that year, it generated a gross profit of €37,000, and had total assets of €343,000. The company had no reported labour costs, similar to Nordstrand Fiskeri (Fiskeriselskabet Jen Granlund, 2015, p. 9-12). It is conceivable that Nordstrand Fiskeri and Fiskeriselskabet Jen Granlund do not have labour costs as they are used as quota swapping and/or renting vehicles.

Wholly owned subsidiary August, generated a gross profit of €1.3 million in 2014, down from €1.5 million the previous year. August reports labour costs of approximately €800,000. In 2014, it had total assets of €6.9 million. The company reports a cost of quota of €13.5 million; after depreciation and impairments, the quota is €5.6 million (August A/S, 2015, p. 10-11, p. 13).

Sister company Polaris, generated a gross profit of €448,000 in 2014, down from €605,000 in 2013. In 2014, Polaris had total assets of €3. 4 million. Just over half of this, €1.8 million, was in fishing quota (HG 352 Polaris ApS, 2015, p. 9-10).

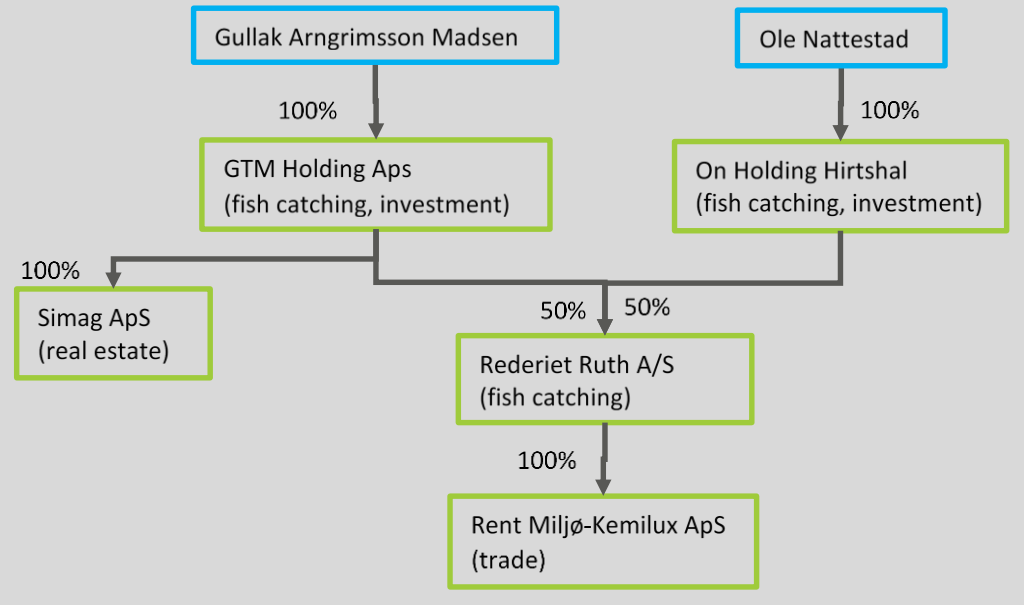
The company structure of Gitte Henning does not show significant evidence of strutural vertical or horizontal integration. The main business of the company is fish catching, with one subsidiary producing equipment used in the fisheries. However, there seems to be evidence of non-structural integration through cooperation between the companies owned by Henning Kjeldsen, his wife Birte Kjeldsen and their son Røn Patrick. It is possible that Nordstrand Fiskeri, Fiskeriselskabet Jen Granlund and their subsidiaries are used as vehicles to purchase quotas which are then rented out to or swapped with Gitte Henning in order for the quota owned by Gitte Henning to remain below 10% of the national quota as legally stipulated, while still allowing the company to increase its harvesting capacity (Scheller, 2016).

4.3.2. Rederiet Ruth

As seen from Table 13, Rederiet Ruth has a vessel in the pelagic fishing segment (Sverdrup-Jensen, 2016). The spokesman from DPPO stated that Rederiet Ruth was one of the largest fishing companies in Denmark in terms of quota ownership. Figure 5 provides an overview of the Rederiet Ruth company structure. The company has two owners who invest in the company through investment holding companies. The owners are Gullak Arngrimsson Madsen and Ole Nattestad. Gullak Arngrimsson Madsen's investment vehicle is also engaged in real estate. Ole Nattestad's investment vehicle does not report any other investments.

Rederiet Ruth has one full subsidiary which is engaged in trade. The group generated a gross profit of €20 million in 2014, with a similar level in 2013. The group had total assets worth €125 million in 2014. Of this, €79 million was fishing quotas, and €17 million was fishing vessels (Rederiet Ruth, 2015, p. 12-13).

Figure 5. Company structure of Rederiet Ruth



Source: Virk (2016, March), *CVR data: Rederiet Ruth Holding*, p. 1; GTM Holding (2015, June), *Annual Report 2014*, p. 4, 27; Rent Miljø-Kemilux (2015, June), *Annual Report 2014*, p. 11; Simag Aps (2015, June), *Annual Report 2014*, p. 13; ON Holdings Hirtshals Aps (2015, June), *Annual Report 2014*, p. 12. Rederiet Ruth (2015, June), *Annual Report 2014*, p. 19.

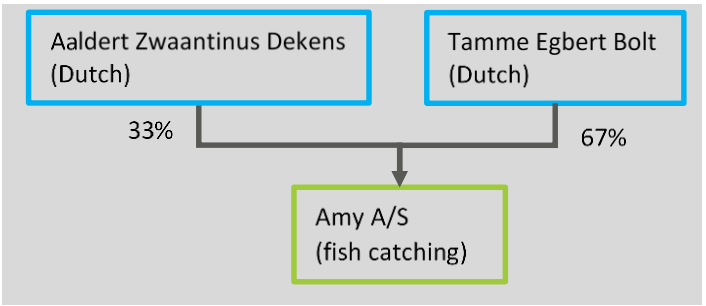
Rederiet Ruth shows evidence of vertical integration, through its subsidiary engaged in trade. The trade is, therefore, likely to be in fresh caught and frozen fish and seafood, rather than processed.

4.3.3. Amy A/S

As Table 14 shows, Amy has four vessels in the coastal fishing segment. Amy is owned by two Dutch fishermen. One of whom, Tamme Egbert Bolt, resides in Denmark.

In 2014, Amy generated a net profit of €454,000, up from €284,000 in 2013. The company had total assets worth €4 million in 2014. Of this, €2.8 million were fishing vessels and €1.3 million were quotas (Amy, 2015, p. 7-8).

Figure 6. Company structure of Amy A/S



Source: Virk (2016, March), *CVR data: Amy A/S*, p. 1-2; Amy (2015, June), *Annual Report 2014*, p. 15.

Amy does not show evidence of vertical integration as no downstream activities were identified. With its four vessels, it has a significantly sized fleet. Although the owners of Amy are both Dutch, this research could not find evidence that the owners also had investments in the Netherlands.

4.3.4. Astrid Fiskeri

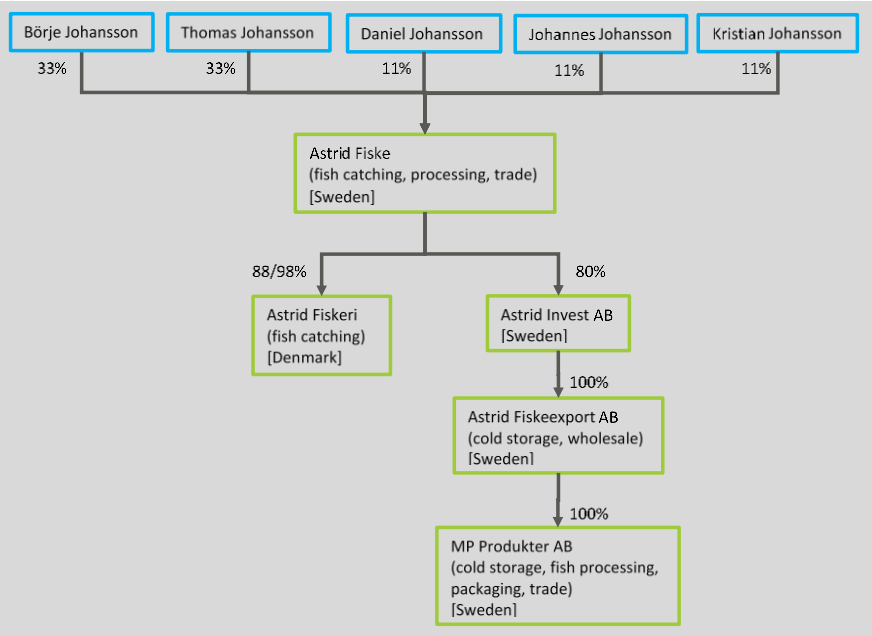
Table 13 shows that Astrid Fiskeri has two vessels in the pelagic fishing segment, 264 Astrid and E532 Rockall. The vessels, which are members of the DPPO, have a combined gross tonnage of 3,813. Figure 7 provides an overview of the Astrid Fiskeri company structure. The company registered in Denmark is a subsidiary of Astrid Fiske in Sweden. Astrid Fiske is owned by the Johansson family. Astrid Fiske's registered business activities are fish catching, fish processing, and trade. The company further has one other direct subsidiary, Astrid Investment, which is an investment holding company registered in Sweden. Astrid Invest is the parent of Astrid Fiskeexport which is engaged in cold storage and wholesale in Sweden. Astrid Fiskeexport has one further subsidiary in Sweden, MP Produkter, which has cold storage, fish processing and packaging as well as trading activities. In 2014, Astrid Fiskeexport divested from a freight company in Denmark, Truck Kompagniet Skagen Aps (Astrid Fiskeexport, 2015, p. 2, p. 10-12).

Truck Kompagniet Skagen is now owned by Werner Larsson Fiskeexport in Denmark. Werner Larsson is part of the Dutch Kennemervis Group with activities in the fish processing and distribution sectors in the Netherlands, France and Denmark. Kennemervis Group, in turn, is owned by Bracamonte Seafood through investment holding company KVG Invest (Virk, 2016c, p. 1 and Kennemervis Group, 2014, p. 6).

In 2014, Astrid Fiskeri generated a gross profit of €15 million, down from €16 million the previous year. The company had total assets worth €109 million in 2014. The Astrid Fiskeri annual report does not mention fish quotas or vessels. However, the categories in which these are usually included are intangible assets and tangible assets respectively ; in 2014, Astrid Fiskeri had intangible assets worth €72 million, and tangible assets worth €35 million.

The parent company, Astrid Fiske, generated €36 million in net sales in 2014. This was an increase from €32 million in 2013. The company had total assets of €123 million in 2014. Of this, €79 million is fish quota, and €35 million is fishing vessels (Astrid Fiske, 2015, p. 4-5).

Figure 7. Company structure of Astrid Fiskeri



Source: Astrid Fiske (2015, June), *Annual Report 2014*, p. 2, 16; Astrid Invest (2015, June), *Annual Report 2014*, p. 12; Astrid Fiskeexport (2015, June), *Annual Report 2014*, p. 2, 10-12; MP Produkter (2015, June), *Annual Report 2014*, p. 2, 12; Astrid Fiskeri (2015, May), *Annual Report 2014*, p. 23.

Astrid Fiske owns vessels Marie and Martina in Sweden. It also rents vessels Astrid and Falcon in Sweden (Astrid Fiske, 2015, p. 2). It is noteworthy that Astrid Fiskeri and Astrid Fiske note different ownership percentages for Astrid Fiskeri.

Anders Illeborg, director of Astrid Fiskeri, states that there is vertical integration in Astrid Fiske's activities in Sweden. In Denmark Astrid Fiskeri has a long-term and close relationship with the Dutch PP Group (Parlevliet en van der Plas Group). PP Group has a processing plant in Germany. Almost all of Astrid Fiskeri's herring goes to PP Group. The off-take agreements between Astrid Fiskeri and PP Group are renewed annually. They have already been renewed for approximately 10 years. The two companies also swap quotas. PP Group swaps herring for Astrid Fiskeri's horse mackerel, for example (Illeborg, 2016).

Given Astrid Fiskeri's close relationship with PP Group, and the fact that investment in downstream processing in Denmark is too complicated and not cost effective, Astrid Fiskeri is not considering vertical integration through downstream investments (Illeborg, 2016).

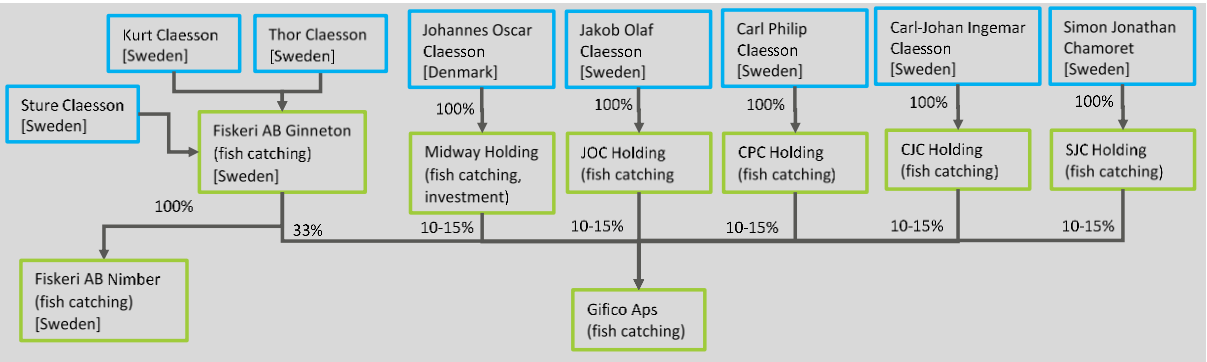
Astrid Fiskeri's company structure x shows evidence of both vertical and horizontal integration. Horizontal integration is found in the investments in the fish catching sector in both Denmark and Sweden. Vertical integration is found in the upstream investments of parent company Astrid Fiske, also through its subsidiaries in Sweden. These upstream activities include processing, packaging, cold storage, wholesale and trade. Non-structural vertical integration is also evident through the long-term off-take agreements between Astrid Fiskeri and PP Group.

4.3.5. Rederiet Gifico ApS

Table 13 shows that Rederiet Gifico has one vessel, S205 Ceton, which is member of the DPPO. Gifico is thus engaged in the pelagic fishing segment in Denmark. Gifico's gross tonnage is 1,337.

Figure 8 provides and overview of Gifico's company structure. It shows that the ultimate owners of Gifico ApS in Denmark are the Claesson family of Sweden. Five of the owners invested through holding companies in Denmark. A further three invested in Gifico ApS through Fiskeri AB Ginneton, a fish catching company registered in Sweden. Fiskeri AB Ginneton has the largest single stake in Gifico ApS. Fiskeri AB Ginneton also has one other subsidiary engaged in fish catching registered in Sweden.

Figure 8. Company Structure of Gifico



Source: Fiskeri AB Ginneton (2015, May), *Annual Report 2014*, p. 1, 13, 18; Fiskeri AB Nimber (2015, June), *Annual Report 2014*, p. 1; Virk (2016, March), *CVR data: Gifico ApS*, p. 1-4; Virk (2016, March), *CVR data: Midway Holding*, p. 2; Virk (2016, March), *CVR data: SJC Holding*, p. 2; Virk (2016, March), *CVR data: JOC Holding*, p. 2; Virk (2016, March), *CVR data: CPC Holding*, p. 2; Virk (2016, March), *CVR data: CJC Holding*, p. 2; Svensson, A. (2013, October 20), "Familjen Claesson – Fiskeri AB Ginneton", *Njord*, online: http://fiske.zaramis.se/2013/10/20/familjen-claesson-fiskeri-ab-ginneton/, viewed in March 2016.

In 2014, Gifico generated a gross profit of €3.2 million, up from €2.1 million in 2013. The company had total assets of €21 million. Of this, €8.6 million were fishing quotas, and €11.2 million were fishing vessels (Rederiet Gifico, 2015, p. 9-10).

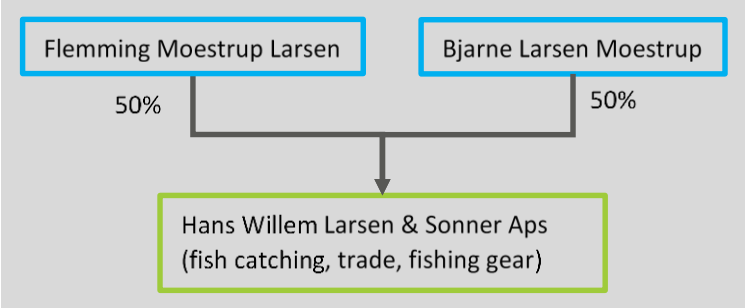
The major shareholder of Gifico, Fiskeri AB Ginneton, does not consolidate Gifico ApS in its annual report because its stake is not large enough. Fiskeri AB Ginneton generated net sales of €4.8 million in 2014, up from €4.3 million in 2013. The company had total assets of €17 million in 2014. Fishing quotas accounted for €0.9 million of this, and €4.1 million were vessels (Fiskeri AB Ginneton, 2015, p. 2-3).

The company structure of Gifico ApS shows a degree of horizontal integration. The owners of Gifico also have fish catching activities in Sweden. Gifico owns much higher value fishing quotas than its main investor Fiskeri AB Ginneton.

4.3.6. H W Larsen & Sønner I/S

As Table 14 shows, five of H W Larsen Sønner I/S' fishing vessels are members of the DFPO. Figure 9 provides an overview of the H W Larsen Sønner company structure. It shows that the company is owned by Flemming Moestrup Larsen and Bjarne Larsen Moestrup. The company does not have any further subsidiaries. However, the company's registered business activities include fish catching, trade and fishing gear.

Figure 9. Company structure of HW Larsen & Sønner I/S



Source: Virk (2016, March), CVR data: Hans Willem Larsen & Sønner Aps, p. 1.

H W Larsen Sønner I/S made a gross loss of €1,823 in 2014, this was lower than 2013 when it made a gross loss of €7,035. The company had total assets of €368,000 in 2014 (H W Larsen Sønner I/S, 2015, p. 10-12).

4.3.7. Themis Fiskeri A/S

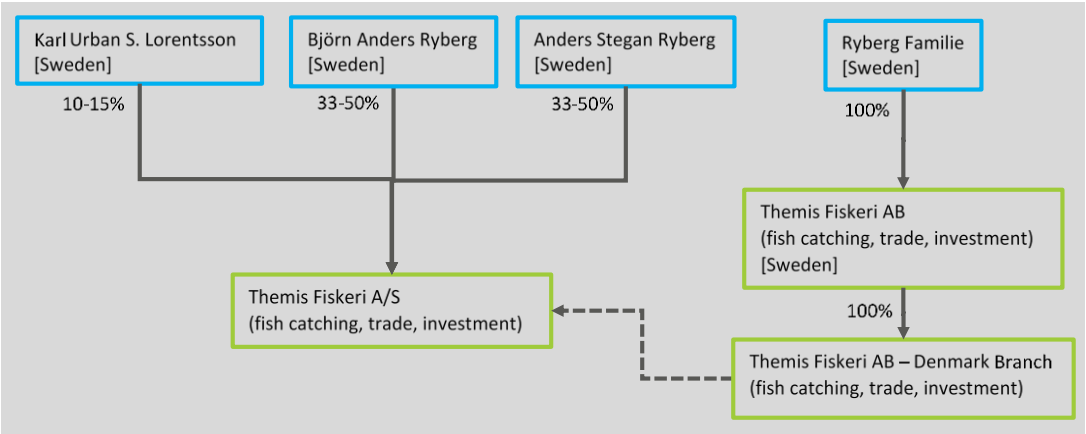
Table 13 shows that Themis Fiskeri A/S' vessel S144 Themis is a member of DPPO. Themis Fiskeri is engaged in the pelagic fishing segment in Denmark. Figure 10 shows Themis Fiskeri' A/S' company structure. The company is majority owned by Björn and Anders Ryberg from Sweden. Karl Lorentsson, also Swedish, has a minority stake. Themis Fiskeri A/S is engaged in fish catching, trade and investment. It does not have any other registered subsidiaries.

In Sweden, the Ryberg family owns Themis Fiskeri AB. The family has a registered branch office in Denmark, registered at the same address as Themis Fiskeri A/S. There are 70 companies registered to the same address as both Themis Fiskeri A/S and Themis Fiskeri AB's branch office in Denmark. This is probably because the address is used by a trust company which provides services to these companies. It can be reasonably assumed that Themis Fiskeri A/S is the subsidiary of Themis Fiskeri AB.

In 2014 Themis Fiskeri A/S generated a gross profit of €3 million, a slight increase over the previous year. The company had total assets of €30 million in 2014. €20 million of this was intangible assets, the category often used by fishing companies to refer to fishing quotas. A further €4.7 million of this was in tangible assets, often used by fishing companies to refer to fishing vessels. €5.2 million was a loan to Themis Fiskeri A/S (Themis Fiskeri A/S, 2015, p.10-11,16).

Parent company Themis Fiskeri AB generated net sales of €2.1 million in 2014. This was up from €1.5 million in 2013. The company had total assets of €10 million in 2014. Of this, €4 million was fish quota. Themis Fiskeri AB sold its vessel (S144 Themis) to Themis Fiskeri A/S in 2011. According to the annual report, Themis Fiskeri AB mans the vessel, although the the fishing activities are carried out by Themis Fiskeri A/S. Through the Danish branch of Themis Fiskeri AB, the company acquired Danish fishing rights. These have been leased to Themis Fiskeri A/S (Themis Fiskeri A/S, 2015, p.2).

Figure 10. Company structure of Themis Fiskeri



Source: Virk (2016, March), *CVR data: Themis Fiskeri A/S*, p. 1-4; Themis Fiskeri A/S (2015, June), *Annual Report 2014*, p. 15; Themis Fiskeri AB (2015, September), *Annual Report 2014*, p. 3.

The company structure of Themis Fiskeri indicates horizontal integration across geographic boundaries. The owners of Themis Fiskeri A/S are apparently the same as the owners of Themis Fiskeri AB. The motivation for the relationship between Themis Fiskeri AB and Themis Fiskeri A/S is clearly described by Themis Fiskeri AB, i.e. to gain access to Danish quotas, although the vehicle through which it does so, namely the Themis Fiskeri AB Denmark Branch, does not have a vessel. Therefore, the integration construction also includes the element that Themis Fiskeri A/S owns the fishing vessel it bought from Themis Fiskeri AB. The latter thus still mans the vessels which Themis Fiskeri A/S now owns.

4.4. Integration

The company analysis in section 4.3 has shown that integration is taking place in the Danish fisheries industry. No vertical integration was identified in the analysed companies. Sverdrup-Jensen of DPPO affirmed that there are very few if any examples of vertical integration in the Danish fisheries industry. He could only think of one example, however, of a company that had sold off its fleet to focus on the processing segment. Initially the company sold its quotas to finance the processing plant. However, it was unable to generate sufficient revenues as an integrated company. It therefore focused on processing (Sverdrup-Jensen, 2016).

Lunderg Larsen of the Danish Fish Producers Organisation (DFPO) stated that there is also no vertical integration in the Danish demersal fisheries segment. For the demersal segment, the lack of vertical integration is, according to him, in large part due to the fact that demersal fish

species lose value with every processing step. Therefore, the sale of demersal species tends to be in the form of fresh fish at auctions and markets. Furthermore, demersal fishermen in Denmark believe that they are already receiving a fair price at auction and a stable level of sales. For these reasons, Danish demersal fishermen are not motivated to invest in downstream segments. Lundberg Larsen attributes this lack of downstream investment into the fish catching sector to the strict regulation regarding investments in the fish catching segment. These Danish regulations stipulate that a company investing in the fish catching sector should earn at least 60% of their income from fishing. This is to protect the sector against capital speculation and to stop quotas being owned by investors such as pension funds. However, it also makes it difficult for downstream companies to invest upstream (Lunderberg Larsen, 2016).

The fish catching sector is more profitable in Denmark than the fish processing sector. The main species harvested in Denmark are mackerel and herring. There are high national quotas for these species, and there is a strong market. Furthermore, the reduction in fleet capacity and fleet size has resulted in less competition, thus ensuring theat the remaining individual companies and fishermen have access to sufficient resources. These companies have also been able to lower the costs, improve fuel efficiency and introduce better management. They have also deployed newer vessels. On the other hand, margins in the processing segment have dropped. According the Sverdrup-Jensen there is a lot of competition in the market. He states that many European supermarkets have merged. Because of this there are fewer buyers, enabling these buyers to use their leverage to push down prices (Sverdrup-Jensen, 2016).

A number of the analysed companies did have trading activities, either through their affiliates/subsidiaries or as part of their own business activities. This implies that this vertical integration is in the form of fish catching and the trade of frozen and chilled fish.

As the company analysis in section 4.3 has shown, horizontal integration is the dominant form of integration in the Danish fisheries sector. Only one analysed company was active in both pelagic and coastal fisheries, and another one or two pelagic fisheries companies have invested in the demersal segment (Lunderberg Larsen, 2016). However, four of the six analysed companies had foreign owners. This is particularly the case for the pelagic fishing sector, with a large number of Swedish investment companies. Horizontal integration in these cases is international horizontal integration in order to gain access to fishing quotas. Lundberg Larsen notes that there is, in contrast to the pelagic segment, very little foreign investment in the Danish demersal segment. He states that this can again be attributed to the strict regulations in the Danish fisheries industry, as well as to the fact that the companies active in the demersal segment are financially strong, and thus less likely to face buyouts (Lunderberg Larsen, 2016).

Aside from the corporate structures that indicate formal forms of integration, integration in the Danish fisheries industry also takes on other forms. In terms of non-structural forms of vertical integration between the fish catching and fish processing industries, Sverdrup-Jensen reports that some pelagic fishermen negotiate off-take agreements with processing facilities. These are not exclusive, i.e. the fisherman also sells his fish at auction (as will be described in more detail below). Off-take arrangements are usually short term, between ½ a year and one year. The price is usually the auction price plus a premium. Off-take arrangements are slightly more common in the industrial use fishing segment than in the human consumption segment. Off-take arrangements are sometimes made because the fishermen own minority stakes in the fish processing companies (Sverdrup-Jensen, 2016). Lundberg Larsen of the demersal segment states that in this segment fishermen in the East of Denmark tend to have off-take agreements with processors, while fishermen in the North and West tend to sell their fish at auction. This is because of the long distance to auction from the East of the country (Lunderberg Larsen, 2016).

Danish pelagic fishermen sell most of their harvest at auction, in particular on the Norges Sildesalgslag online auction. The fishermen catch the fish at sea, and then put their catch in the online auction system. Buyers then bid online and the fishermen land the fish at the port of the highest bidder. Landing sites include: Norway, Shetland Islands, the Faroe Islands, Germany and the Baltic. The catch, however, still comes off the Danish quota. The system, according to Sverdrup-Jensen, is very transparent. There are no tax levies on fresh fish landings. Norges Sildesalgslag is so popular because it was the first to offer such services, it is the largest, it is transparent, and it is guarantees a buyer. There are Norges Sildesalgslag staff at the landing sites to ensure that the volumes and qualities meet the deal requirements. There is also insurance in case the processor is suddenly unable to pay for the transaction. The system avoids conflict between the vessels/skippers and processors. The focus of the system is the North Atlantic and is mainly used by Swedes, Norwegians, Scots and Danes (Sverdrup-Jensen, 2016). Due to the low margins in the processing segment, the profitability of the catching segment, the efficiency of the Norge Sildesalgslag auction, and the balance of the fleet capacity and fish stock in the Danish fisheries, there does not appear to be a significant driver for more structural vertical integration.

As noted above, there is strong evidence of horizontal integration in Danish fisheries. In the structural sense, the main form of horizontal integration is international investment, particularly by Swedish companies and individuals. Non-structurally there are also systems of integration focused mainly on access to quotas. Sverdrup-Jensen notes that there are registers of the trade in quotas. Although these records are online, the deals are private. Bidding is usually in the form of closed bids facilitated by consultants. Banks are key financiers of the quota trade. Since the introduction of the ITQ system, quotas can be used as collateral for bank loans. Quota prices are determined by free market prices. Quota trade is free within a 10% cap per individual. Sverdrup-Jensen states that DPPO recently conducted a study which found that only 2% of current quota allocation is based on the original 2001 allocation proportions. He adds that quotas in the pelagic sector are pretty much fixed, and that there are only a few examples of small quantities being bought or sold : renting out and in is more common (Sverdrup-Jensen, 2016).

In addition to quota trade, there is also a system of renting and borrowing quotas. Sverdrup-Jensen reports that this an online system. He states that, using this system, renting and borrowing can be in Denmark as well as internationally. Quotas are put up for rent online and interested parties can then rent the quota. This is more often used in the demersal segment according to Sverdrup-Jensen. At the beginning of the year there are a lot of internal transactions (Sverdrup-Jensen, 2016). The renting in and out of quotas is a mechanism that can be used by companies which are close to the legal limits of quota ownership, such as Gitte Henning, to gain access to more quotas (Scheller, 2016).

In summary, both the structural and non-structural forms of integration in the Danish fisheries industry are predominantly in the form of horizontal integration driven by the desire to access quotas. There is very little structural, vertical integration, and most of the fish in both the pelagic and demersal segments are sold at auction, with a minority being sold through off-take arrangements.

5. ESTONIA

KEY FINDINGS

- 21% of Estonian fishing enteprises own more than one vessel
- 65% of exports destined for EU market
- High levels of structural vertical integration in two fishing segments
- Significant structural horizontal integration, both within POs and internationally
- Low levels of non-structural vertical integration
- Trade in quotas stabilised, renting in and out of quotas is common

5.1. Composition of Estonian fishery industry

The Estonian fish catching sector is composed of four segments: the Atlantic distant water, the Baltic trawl, the Baltic coastal, and the inland water fleets (Eurofish, 2015b). In 2014, the distant water fleet was composed for six vessels (ibid.). These were active mainly in the Northwest Atlantic, Northeast Atlantic and Svalbard (ibid.). The Baltic trawl fishery consists of approximately 50 vessels, employing 500 workers (ibid.). The majority of the catch is sprat and herring (ibid.). These are landed mainly at Estonian ports and sold to fish freezing and processing companies (ibid.).

The Baltic coastal fishery consists of approximately 600 vessels, employing 2,500 workers (Eurofish, 2015b). However, these fishermen are generally only active on a part-time basis (ibid.). As with the Baltic trawl fishery, the Baltic coastal fishery lands mainly herring and sprat (ibid.).

The Estonian fish processing industry produces a range of seafood. This includes: block frozen pelagics, canned products, and smoked and marinated fish (Eurofish, 2015b). Products are destined for both domestic and international markets (ibid.). The most important export products are: frozen northern prawn; frozen small pelagics; frozen, fresh and chilled fish fillets; preserved small pelagics; and smoked fish including salmon and trout (ibid.).

In 2015, Estonia exported €157 million in fish and fish products (TradeMap, n.d.). 65% of this was destined for EU member countries (ibid.). Germany, Finland and Sweden were the three largest export destinations, accounting for 13%, 13%, and 8% of total exports respectively (ibid.).

Estonia had fish imports to the value of €136 million in 2015 (TradeMap, n.d.). 76% of these imports originated in non-EU member countries (ibid.). Norway was the largest exporter of fish to Estonia, accounting for more than half of total fish imports in 2015 (ibid.).

21% of the all fishing enterprises in Estonia owned more than one vessel in 2014 (see Table 15). In 2014, landing income was €15 million, and the revenues from fish processing were €143 million in 2012. There were approximately 4,000 people employed in the fish catching and fish processing industries. 52% were employed in fish catching, and 48% in fish processing.

Table 15. Overview of fish industry in Estonia

Segment	Measure	Value	Proportion of total fishing enterprises / GDP / workforce
Fish catching	Enterprises with more than one vessel (2014)	238	21%
	Landing income (2014, € mlns)	15	0.07%
	Employment in the fish catching sector (2013)	2,046	0.33%
Processing	Employment in the fish processing sector (2012)	1,861	0.30%
	Processing production (2012, € mlns)	143	0.82%
Trade	Imports of fish (2015, € mlns)	136	0.66%
	Exports of fish (2015, € mlns)	156	0.77%

Source: Scientific, Technical and Economic Committee for Fisheries (2015, July), *The 2015 Annual Economic Report on the EU Fishing Fleet: Electronic Appendices*, Publications Office of the European Union, Luxembourg; EUROSTAT (2015, November), "GDP and main components - Current prices [nama_gdp_c]", online: http://ec.europa.eu/eurostat/data/database, viewed in January 2016; EUROSTAT (2015, October), "Employment (main characteristics and rates) - annual averages [lfsi_emp_a]", online: http://ec.europa.eu/eurostat/data/database, viewed in January 2016; TradeMap (n.d.), "List of importers for the selected product: Product: 03 Fish, crustaceans, molluscs, aquatic invertebrates nes", online: http://www.trademap.org/, viewed in January 2016; TradeMap (n.d.), "List of exporters for the selected product: Product: 03 Fish, crustaceans, molluscs, aquatic invertebrates nes", online: http://www.trademap.org/, viewed in January 2016.

The ITQ system was introduced in Estonia in 2001 (Undrest, 2016). This led to a rapid reduction of fleet size (ibid.). In 2000 there were 197 vessels and 90 companies active in the fish catching segment in Estonia (ibid.). By 2016 there are only 30 active vessels, and 20 companies according to Mart Undrest, executive director of production organisation Eesti Kalapüügiühistu (ibid.). The gross tonnage of the fleet has also reduced (ibid.). Government regulation induced three scrapping rounds aimed at creating a balance between fleet size and fish stock (ibid.). These scrapping rounds occurred in 2005, 2008 and 2013 (ibid.).

While the ITQ system reduced domestic competition in the catching segment, membership of the EU has led to greater international competition, as well as opportunities. This has created a "healthy industry", according to Undrest (Undrest, 2016). Mauno Leppik, CEO of producer organisation Eesti Traalpüügi Ühistu, states that the majority of industry leavers left around 10 years ago. Now the industry is more or less stable (Leppik, 2016).

As a result of the introduction of the ITQ system and the reduction in fleet size, employment in the fisheries sector also decreased (Undrest, 2016). Undrest states that this process was gradual, and adds that there was no shift of employment from the fish catching segment to the fish processing segment (ibid.). In fact, it is now increasingly difficult for Estonian fishing companies to find qualified personnel (ibid.).

5.2. Producer organisations

There are five main producer organisations in Estonia. They have between 5 and 7 members each. Table 16 provides more information.

Table 16. Producer organisations in Estonia

Producer Organisation	Number of members	Number of vessels	Member company
Eesti Kalapüügiühistu *(EstoFish - Estonian Fishing Association)*	6	64 active trawlers and fishing vessels under 12 metres	Hiiu Kalur AS
			Kaabeltau OÜ
			Keskpunkt OÜ
			Monistico OÜ
			Pärnu Rannakalurid TÜ
			Saare Kalapüügi OÜ
Eesti Kutseliste Kalurite Ühistu *(Estonian Professional Fishermen's Cooperative)*	5		Abimerk OÜ
			Bentros OÜ
			Caroline AS
			Fortem Holding OÜ
			Morobell OÜ
Eesti Rannapüügi Ühistu *(Estonian Trawling Cooperative)*	7		Ain Killing FIE
			Järve OÜ
			Kipperi Kala OÜ
			MMMSprattus OÜ
			Peipsi Kalatööstus OÜ
			Purekkari Rand OÜ
			Wats OÜ
Eesti Traalpüügi Ühistu *(Estonian Coastal Fishing Cooperative)*	5		DGM Shipping AS
			Eru Kalandus OÜ
			Kalalaev Kotkas OÜ
			Krapesk AS
			Prangli Kalandusühistu

Producer Organisation	Number of members	Number of vessels	Member company
Kalakasvatajate Ühistu Ecofarm *(Fish Farmers Cooperative Ecofarm)*	5		Aquamyk OÜ
			Arowana OÜ
			Ösel Harvest OÜ
			Pähkla Vähija Kalakasvatuse OÜ
			Torgu Kala OÜ

Source: Offical Journal of the European Union (2013, March), "Information and notices", 56, p. 68/22; Eesti Kalapüügiühistu (n.d.), "About", online: http://www.estofish.ee/pages/et/avaleht.php, viewed in February 2016; Ministry of Rural Affairs (n.d.), "Estonia fishing and aquaculture producer organisations", online: http://www.agri.ee/et/eesti-kalapüügi-ja-vesiviljelussektori-tootjaorganisatsioonid, viewed in February 2016; Eesti Kalapüügiühistu (2015), *Annual Report 2014*, p. 3.

A number of companies are members of more than one producer organisation. For example, Hiiu Kalur is a member of Eesti Kalapüügiühistu. Its affiliate, Krapesk is member of Eesti Traalpüügi Ühistu. In fact, Krapesk is 20% owner of Eesti Traalpüügi Ühistu (Aktsiaselts Krapesk, 2015, p. 16). In its annual report, Eesti Traalpüügi Ühistu, states "Eesti Traalpüügi Ühistu belongs to a group KRAPESK AS, which prepares and publishes consolidated financial statements" (Eesti Traalpüügi Ühistu, 2015, p. 8). Two other Krapesk subsidiaries are also members and 40% owners of Eesti Traalpüügi Ühistu: namely Eru Kalandus and Kalalaev Kotkas. Additionally, a member of the management board of Eesti Traalpüügi Ühistu, Oleg Omeltšenko, is also the owner of Kajax Fishexport in a joint venture with Hiiu Kalur and the European Fish Investment Company (E-Business Register, 2016d, p. 2 and E-Business Register, 2016b, p. 2).

Fortem Holding management board member, Raivo Baum, is also the only listed management board member of the producer organisation Eesti Kutseliste Kalurite Ühistu, of which Fortem Holding is also a member, and the only listed management board member of Fortem subsidiary Caroline which is also a member of the same producer organisation. It is also possible that Raivo Baum is related to the owner of Fortem Holding, Ragnar Baum (E-Business Register, 2016f, p. 2; Eesti Kutseliste Kalurite Ühistu, 2015, p. 18; Fortem Holding, 2015, p. 8 and Caroline, 2015). Raivo Baum is the 85% owner of Morobell, which is also a member of Eesti Kutseliste Kalurite Ühistu. Morobell further owns two fish catching subsidiaries in Finland (Morobell, 2015, p.14, p. 32).

5.3. Company analysis

In Estonia there is a steady increase in the importance of larger, horizontally and vertically integrated companies (Eurofish, 2015b). These companies have direct ownership of all production activities in the fish industry value chain, from fish catching to fish processing and export (ibid.). There is also an increase in long-term contractual supplier-customer relationships between producing and processing companies and supermarkets (ibid.). In the Baltic trawl fisheries, vertical integration is very common (ibid.). Vertical integration is in the form of processing or fishing companies owning quotas, hiring external fishers, processing raw materials and managing trade relations including export (ibid.). Most vertically integrated companies export almost all of their production (ibid.). In the Baltic Sea fisheries, vertically integrated companies are organized in producer organisations (ibid.).

As mentioned in section 5.1, the Estonian fish catching sector is composed of four segments: the Atlantic distant water, the Baltic trawl, the Baltic coastal, and the inland water fleets. Given the size of the segments, and their relevance to the Common Fisheries Policy, this research has focused on the Baltic trawl and Baltic coast fisheries in its analysis.

5.3.1. Baltic Sea and Gulf of Riga fishing segment

Table 17 provides an overview of the 20 largest fishing companies in the Baltic Sea and Gulf of Riga (Baltic trawl) segment based on total catch between 2011 and 2014. From this it is clear that Hiiu Kalur, Morobell and Kaabeltau are the top three fishing companies in the Baltic Sea and Gulf of Riga segment.

Table 17. Baltic trawl catch by company (tons)

Company	2011	2012	2013	2014	Total
Hiiu Kalur AS	13,529	10,860	11,157	11,088	46,633
Morobell OÜ	6,236	5,925	5,247	3,535	20,942
Kaabeltau OÜ	3,862	4,920	4,430	4,377	17,589
DGM Shipping AS	4,050	3,211	3,447	3,389	14,097
Fortem Holding OÜ	2,137	1,531	3,189	4,426	11,283
Krapesk AS	3,361	2,351	2,758	2,215	10,684
Abimerk OÜ	2,750	1,448	1,708	1,692	7,599
Keskpunkt OÜ	1,862	1,841	1,758	1,762	7,223
Monistico OÜ	1,795	1,342	1,695	1,856	6,687
Caroline OÜ	1,659	1,678	1,513	1,549	6,399
Bentros OÜ	1,656	1,490	1,058	1,806	6,010
Kalalaev Kotkas OÜ		902	2,476	1,979	5,358
Saare Kalapüügi OÜ	1,774	1,054	914	1,129	4,871
Saare Rand AS		1,137	1,310	1,206	3,653
Novirina Kalaparadiis OÜ	864	909	890	963	3,626
Kalavara OÜ	2,257	1,083			3,340
Prangli Kalandusühistu	833	791	645	722	2,991
Ramsun AS	507	345	440	553	1,845
Rosalie OÜ	1,241	295			1,537
Mootorlaev Ermistu OÜ	1,017	99			1,116

Source: Ministry of Rural Affairs (2015, January), *Baltic Sea (including Gulf of Riga): Commercial fishing catch by company, 2014*; Ministry of Rural Affairs (2014, January), *Baltic Sea (including Gulf of Riga): Commercial fishing catch by company, 2013*; Ministry of Rural Affairs (2013, January), *Baltic Sea (including Gulf of Riga): Commercial fishing catch by company, 2012*; Ministry of Rural Affairs (2012, January), *Baltic Sea (including Gulf of Riga): Commercial fishing catch by company, 2011*.

After an analysis of the company structures, this research has identified the parent companies of the companies listed in Table 17. Table 18 lists the top 10 Baltic trawl fishing companies by total catch for the period 2011-2014. It shows that the Hiiu Kalur group had by far the largest catch during the period. It is followed by companies owned by Raivo Baum, Fortem Holding and Kaabeltau.

Table 18. Baltic trawl catch by parent company (tons)

Rank	Company	2011	2012	2013	2014	Total
1	Hiiu Kalur	16,890	14,113	16,390	15,283	62,675
2	Raivo Baum companies	7,892	7,415	6,305	5,340	26,952
3	Fortem Holding	3,796	3,209	4,702	5,975	17,682
4	Kaabeltau	3,862	4,920	4,430	4,377	17,589
5	DGM Shipping	4,050	3,211	3,447	3,389	14,097
6	Monistico	3,569	2,396	2,609	2,985	11,558
7	Abimerk	2,750	1,448	1,708	1,692	7,599
8	Keskpunkt	1,862	1,841	1,758	1,762	7,223
9	Saare Rand		1,137	1,310	1,206	3,653
10	Novirina Kalaparadiis	864	909	890	963	3,626

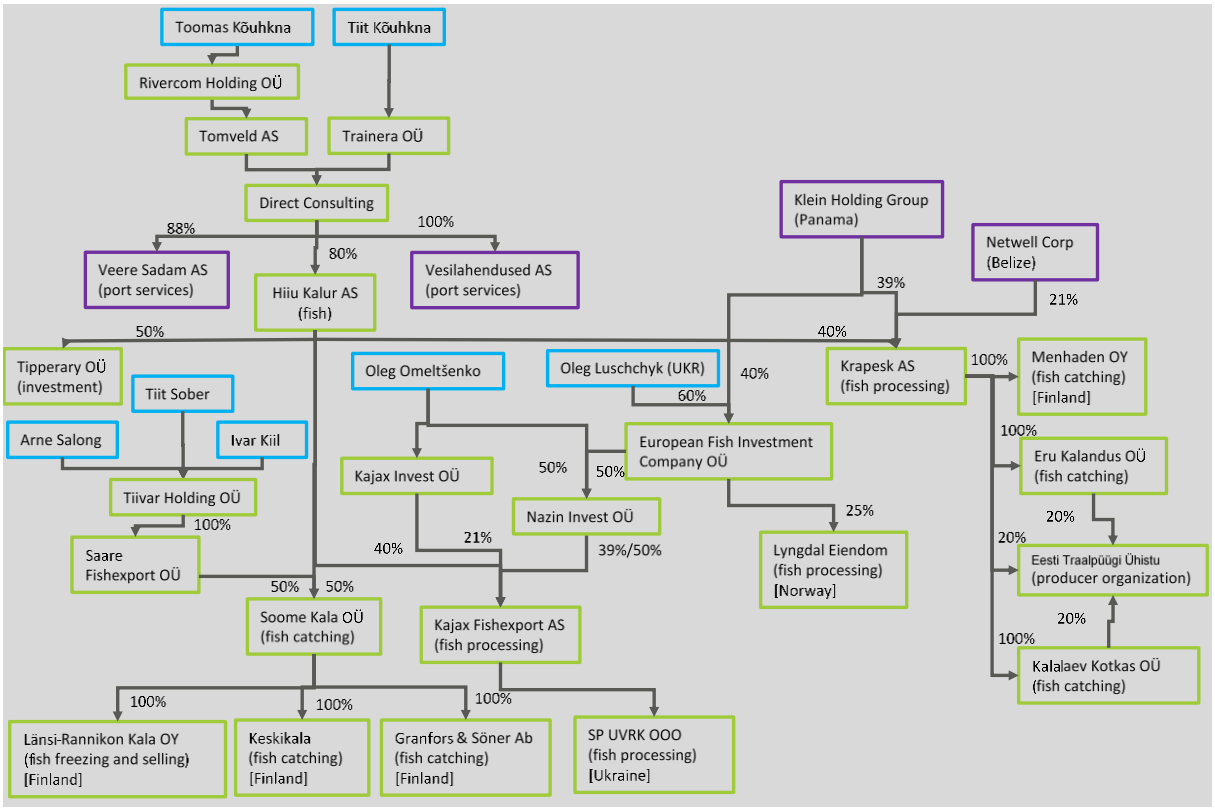
Source: Ministry of Rural Affairs (2015, January), *Baltic Sea (including Gulf of Riga): Commercial fishing catch by company, 2014*; Ministry of Rural Affairs (2014, January), *Baltic Sea (including Gulf of Riga): Commercial fishing catch by company, 2013*; Ministry of Rural Affairs (2013, January), *Baltic Sea (including Gulf of Riga): Commercial fishing catch by company, 2012*; Ministry of Rural Affairs (2012, January), *Baltic Sea (including Gulf of Riga): Commercial fishing catch by company, 2011*.

The remainder of this section will provide an analysis of the company structures of the parent fishing companies with accumulated annual catches of over 5,000 tons for the period 2011-2014. It should be noted that due to data limitations and the restrictions in functionalities of the Estonian company register, it is not always possible to identify companies on the basis of their owners. For example, it is not possible to see a list of companies owned by Ragnar Baum. However, it is possible to identify corporate ownership.

5.3.1.1. Hiiu Kalur

As shown in Table 18, Hiiu Kalur had an accumulated catch of 62,675 tons in the period 2011-2014. Annual catches fluctuated between 14,113 and 16,890 tons. In 2014, Hiiu Kalur had a revenue of €3.3 million, a decrease from a revenue of €4.8 million in 2013 (Hiiu Kalur, 2015, p. 4-5, p. 31). The company had total assets of €14 million (ibid.).

Figure 11. Company structure of Hiiu Kalur



Source: Hiiu Kalur (2015), *Annual Report 2014*, p. 12; Direct Consulting (2015), *Annual Report 2014*, p. 13; E-Business Register (2016, February), *Entrepreneur: Aktsiaselts Direct Consulting (10575472)*, p. 2; E-Business Register (2016, February), *Entrepreneur: Aktsiaselts Tomveld (10419504)*, p. 2; E-Business Register (2016, February), *Entrepreneur: Osaühing Trainera (10649836)*, p. 2 ; E-Business Register (2016, March), *Entrepreneur: Aktsiaselts Krapesk (10220808)*, p. 2; Aktsiaselts Krapesk (2015), *Annual Report 2014*, p. 16; E-Business Register (2016, March), *Entrepreneur: Osaühing Soome Kala (12261319)*, p. 2 ; Soome Kala (2015), *Annual Report 2014*, p. 10; E-Business Register (2016, March), *Entrepreneur: Tiivar Holding OÜ (12346850)*, p. 2; E-Business Register (2016, March), *Entrepreneur: Aktsiaselts Kajax Fishexport (10052883)*, p. 2; E-Business Register (2016, March), *Entrepreneur: European Fish Investment Company OÜ (12029581)*, p. 2; European Fish Investment Company (2015), *Annual Report 2014*, p. 10; Kajax Fishexport (2015), *Annual Report 2014*, p. 12; E-Business Register (2016, March), *Entrepreneur: OÜ Nazin Invest (11613757)*, p. 2; Nazin Invest (2015), *Annual Report 2014*, p. 3; E-Business Register (2016, March), *Osaühing SAARE FISHEXPORT (10723478)*, p. 2.

Hiiu Kalur is member of Eesti Kalapüügiühistu PO. Through its subsidiaries it owns and is also member of the Eesti Traalpüügi Ühistu PO.

Figure 11 provides an overview of the Hiiu Kalur company structure. It shows that the company structure is comparatively complicated. Through a number of intermediary subsidiaries, Toomas Kõuhkna and Tiit Kõuhkna own Hiiu Kalur and a number of other companies. The main investment subsidiary is Direct Consulting. Direct Consulting is the majority investor in Hiiu Kalur. The investment company also owns port service companies Veere Sadam and Vesilahendused, as well as a number of other non-related companies.

Hiiu Kalur owns 40% of Krapesk, a fish processing company with a number of subsidiaries. It is possible that the two other shareholders of Krapesk, Klein Holding Group (Panama) and Netwell Corp (Belize), also have a link to Toomas Kõuhkna and Tiit Kõuhkna. Krapesk owns two fish catching companies and 20% of Eesti Traalpüügi Ühistu PO. The two Krapesk fish catching subsidiaries also own 20% each of the Eesti Traalpüügi Ühist PO. One of the Krapesk fish catching subsidiaries, Menhaden OY, is registered in Finland.

Through its 50% ownership of Soome Kala, Hiiu Kalur has three further fishing subsidiaries in Finland. Hiiu Kalur also has a 40% stake in Kajax Fishexport, a fish processing and trading

company. Kajax Fishexport also has a fish processing subsidiary in the Ukraine, an important export destination for Estonian fish.

It was not possible to access sufficiently detailed company information from the Panamanian company register to determine the ownership structure of Klein Holding. If Klein Holding is related to Toomas Kõuhkna and Tiit Kõuhkna, then the group has further investments in fish processing in Norway.

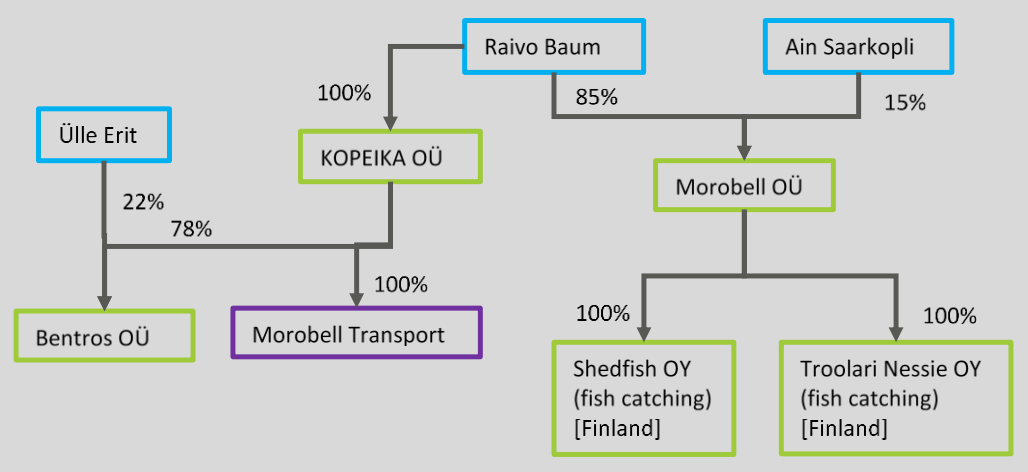
Hiiu Kalur exhibits evidence of both vertical and horizontal integration. Vertical integration is found in its investments in fish catching companies, fish processing, trading, a producer organisation, and port services. Horizontal integration is found in its investments in fish catching companies that are members of different producer organisations, as well as fish catching companies in different countries, particularly in Finland. Horizontal integration is also found at the fish processing level with investments in fish processing in at least two countries.

5.3.1.2. Raivo Baum companies

As seen in Table 18, Raivo Baum companies had an accumulated catch of 26,952 tons in the period 2011-2014. Annual catch volumes fluctuated between 5,430 and 7,892 tons.

Investor Raivo Baum has investments in a number of fishing sector companies. He is the majority shareholder of both Morobell and Bentros. Both these companies are members of the Eesti Kutseliste Kalurite Ühistu PO. The direct parent of Bentros, Kopeika, also owns a freight company, Morobell transport (see Figure 12).

Figure 12. Company structure of Raivo Baum companies



Source: Bentros (2015), *Annual Report 2014*, p. 17; E-Business Register (2016, March), *Entrepreneur: KOPEIKA OÜ (12547011)*, p. 2; Morobell (2015), *Annual Report 2014*, p. 14, 32; Kopeika (2015), *Annual Report 2014*, p. 11.

Subsidiary Morobell generated 70% of its revenue from the wholesale distribution of fish and fish products in 2014. 13% of revenue came from freight transport, and only 11% of revenue was generated by sea fishing (Morobell, 2015, p. 32). As Figure 12 shows, Morobell has two further subsidiaries. Both are fish catching subsidiaries registered in Finland. In 2014, Morobell generated a revenue of €11 million, while in 2013 it had generated €13 million. The company had total assets worth €14 million in 2014 (Morobell, 2015, p. 4).

Subsidiary Bentros generates 100% of its revenue from sea fishing. In 2014, revenues amounted to approximately €363,000, in 2012 revenues were approximately €272,000 (Bentros, 2015, p. 4-5). Bentros had total assets of approximately €994,000 (ibid.).

Morobell has an outstanding loan with Bentros, indicating that although there is no formal relationship between the two companies, there is some form of cooperation due to the common owner (Bentros, 2015, p. 11).

Raivo Baum is also the only listed management board member of the producer organisation Eesti Kutseliste Kalurite Ühistu (Eesti Kutseliste Kalurite Ühistu, 2015, p. 18). He is also related to another fishing sector company: he is the only listed management board member of both Fortem Holding, and its subsidiary Caroline (E-Business Register, 2016f, p. 2; Fortem Holding, 2015, p. 18; Caroline, 2015, p. 15). It is possible that he is also related to the owner of Fortem Holding, Ragnar Baum.

Both Fortem Holding and Caroline are also members of Eesti Kutseliste Kalurite Ühistu. Of the five members of the Eesti Kutseliste Kalurite Ühistu PO, only Abimerk does not seem to have an official relationship with Raivo Baum.

Raivo Baum companies exhibit evidence of both vertical and horizontal integration. Vertical integration is found particularly in Morobell with activities in the wholesale, primary processing and fish catching segments. However, vertical integration is also found in Raivo Baum's role in the Eesti Kutseliste Kalurite Ühistu PO and through his investments in the freight segment.

There is also a degree of horizontal integration. This is found in Raivo Baum's investments in multiple fishing companies with the same producer organisation, as well as investments in fishing companies in Finland.

5.3.1.3. Fortem Holding

As seen in Table 18, Fortem Holding had an accumulated catch of 17,682 tons in the period 2011-2014. Annual catches fluctuated between 3,209 and 5,975 tons, with the highest volume caught in 2014.

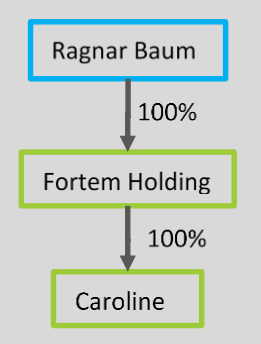
As Figure 13 shows, Fortem Holding is owned by Ragnar Baum. Fortem Holding is also the parent of Caroline. Both companies are members of Eesti Kutseliste Kalurite Ühistu PO.

According to its annual report, Caroline generates 100% of its revenue through the wholesale of fish and fish products (Caroline, 2015, p.15). This is noteworthy, since it is also member of the PO, and allocated a quota, which would imply that it also engages in fish catching. Fortem Holding, on the other hand, reports that 99% of its revenues are generated through fish catching, while 1% is generated through other services (Fortem Holding, 2015, p.27).

In 2014, Fortem Holding generated revenues of approximately €1.2 million, up from approximately €947,000 in 2013 (Fortem Holding, 2015, p.4-5). The company had total assets of approximately €4.7 million in 2014 (ibid.).

Caroline generated revenues of approximately €312,000 in 2014, up from approximately €261,000 in 2013 (Caroline, 2015, p.3-4). In 2014, the company had total assets of approximately €897,000 (ibid.).

Figure 13. Company structure of Fortem Holding



Source: E-Business Register (2016, March), *Entrepreneur: osaühing Fortem Holding (10541642)*, p. 2; Eesti Kutseliste Kalurite Ühistu (2015), *Annual Report 2014*, p. 18; Fortem Holding (2015), *Annual Report 2014*, p. 8; Caroline (2015), *Annual Report 2014*, p. 15

Fortem Holding exhibits evidence of vertical integration through its activities in both fish catching and fish processing. As noted above, it curious that Caroline, the fish processing company, is also member of the PO. This gives Fortem access to a large quota, and would thus imply a degree of horizontal integration.

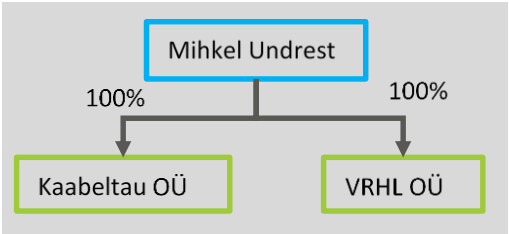
There is probably further cooperation with the Raivo Baum companies described above, and possibly influence in Eesti Kutseliste Kalurite Ühistu through the connection with the investor. Raivo Baum is the only listed management board member of both Fortem Holding, and its subsidiary Caroline (E-Business Register, 2016f, p. 2; Fortem Holding, 2015, p. 8 ; Caroline, 2015, p. 15).

5.3.1.4. Kaabeltau

As seen in Table 18, Kaabeltau had an accumulated catch of 17,589 tons in the period 2011-2014. Annual catch volumes fluctuated between 3,862 and 4,920 tons.

Kaabeltau is owned by Mikhel Undrest. As Figure 14 shows, the investor also owns VRHL, a fish processing company. In 2014 Kaabeltau had a revenue of approximately €1.1 million, in 2013 this was €1.3 million. The company had total assets of €4 million in 2014. 100% of Kaabeltau's revenues are generated through fish catching at sea (Kaabeltau, 2015, p. 4, p. 23). VRHL also had revenues of approximately €1.1 million in 2014, down from €1.2 million in 2013. It had total assets of €1.5 million in 2014. 99% of VRHL's revenues are generated through fish processing and preservation. The remaining revenues are generated through other services (VRHL, 2015, p. 4-5, p. 22).

Figure 14. Company structure of Kaabeltau



Source: Kaabeltau (2015), *Annual Report 2014*, p. 3; E-Business Register (2016, March), *Entrepreneur: osaühing Kaabeltau (10121058)*, p. 2; E-Business Register (2016, March), *Entrepreneur: Osaühing VRHL (10538284)*, p. 2; VRHL (2015), *Annual Report 2014*.

75% of the fish sold by Kaabeltau were sold on the Estonian market, the remaining 25% were sold on the Latvian market. Kaabeltau sold the majority of its fish to affiliate VRHL and producer organisation Eesti Kalapüügiühistu, of which it is a member (Kaabeltau, 2015, p. 3).

Mikhel Undrest has created vertical integration in his portfolio through investments in both fish catching company Kaabeltau and fish processing company VRHL. This is further supported by the clear off-take relationship between the two companies as mentioned by Kaabeltau (Kaabeltau, 2015, p. 3).

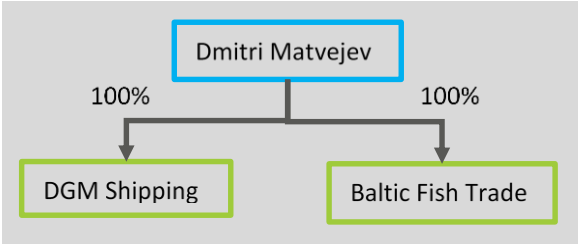
5.3.1.5. DGM Shipping

As seen in Table 18, DGM Shipping's accumulated catch for the period 2011-2014 was 14,907 tons. Catch volumes fluctuated between 3,211 and 4,050.

Figure 15 shows that DGM Shipping is owned by Dmitri Matvejev, who also owns Baltic Fish Trade. 100% of Baltic Fish Trade's revenues are generated through freight transport by road (Baltic Fish Trade, 2015, p. 17). Given its relationship with DGM Shipping, and its name, it is likely that this is cold chain transport to support the fish processing sector. 93% of DGM Shipping's revenues were generated through fish processing, the remaining 7% were generated from fish catching (DGM Shipping, 2016, p. 18).

DGM Shipping's revenue was €2.8 million in both 2015 and 2014 (DGM Shipping, 2016, p. 4-5). In 2015, it had total assets of €8.5 million (ibid.). The company is a member of the same PO as Hiiu Kalur subsidiary Krapesk and its subsidiary, Eesti Traalpüügi Ühistu.

Figure 15. Company structure of DGM Shipping



Source: E-Business Register (2016, March), *Entrepreneur: AKTSIASELTS DGM SHIPPING (10061617)*, p. 2 ; DGM Shipping (2016), *Annual Report 2015*, p. 18; Baltic Fish Trade (2015), *Annual Report 2014*.

The company markets its fish under the brand Briis. DGM Shipping has at least seven shops in Estonia where its products are sold (DGM Shipping, n.d.).

DGM Shipping exhibits evidence of vertical integration through its investments throughout the value chain from fish catching, to fish processing, to marketing. The company structure does not show any evidence of horizontal integration, nor did this research identify any other investments by Dmitri Matvejev in other fisheries sector companies.

5.3.1.6. Monistico

As seen in Table 18, Monistico's accumulated annual catch for the period 2011-2014 was 11,558 tons. Annual catch volumes fluctuated between 1,448 and 2,750 tons.

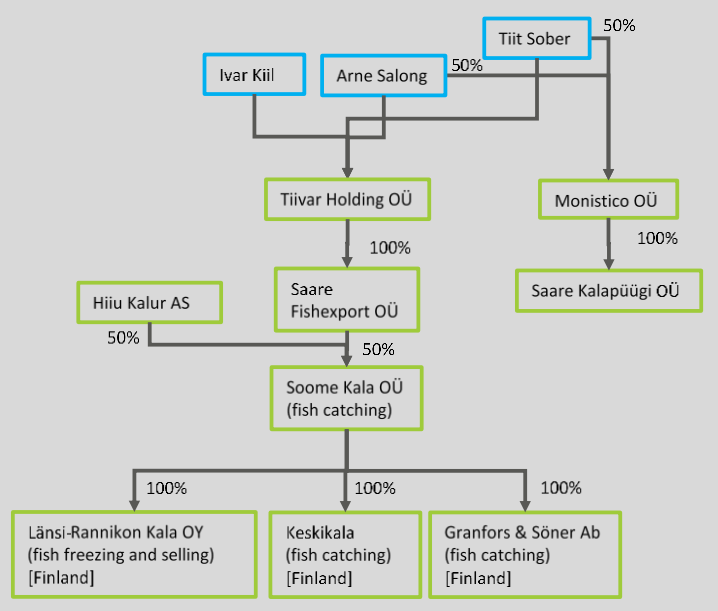
Monistico is owned by Arne Salong and Tiit Sober (see Figure 16). Monistico and its subsidiary Saare Kalapüügi are both members of the Eesti Kalapüügiühistu PO, as is Hiiu Kalur.

The owners of Monistico also own Tiivar Holding together with Ivar Kiil. Kiil is also a member the management board of Saare Kalapüügi. Tiivar Holding is the parent of Saare Fishexport which, together with Hiiu Kalur, owns Soome Kala, a fish catching company with fish catching and fish processing subsidiaries in Finland.

Monistico generated revenues of approximately €920,000 in 2014, down from approximately €1.4 million in 2013 (Monistico, 2015, p. 4-5, p. 31). In 2014, the company had total assets of €5.2 million (ibid.). 75% of Monistico's revenues were generated through fish catching (ibid.). The remaining 25% were generated through retail sales (ibid.).

In 2014, Saare Kalapüügi generated revenues of approximately €270,000, down from €507,000 in 2013 (Saare Kalapüügi, 2015, p. 4-5, p. 21). The company had total assets worth €1.4 million in 2014. 100% of Saare Kalapüügi's revenues came from fish catching (ibid.).

Figure 16. Company structure of Monistico



Source: E-Business Register (2016, March), *Entrepreneur: Osaühing Monistico (10574096)*, p. 2; Monistico (2015), *Annual Report 2014*, p. 3; E-Business Register (2016, March), *Entrepreneur: SAARE KALAPÜÜGI OÜ (10582492)*, p. 2; E-Business Register (2016, March), *Entrepreneur: Osaühing Soome Kala (12261319)*, p. 2; Osaühing Soome Kala (2015), *Annual Report 2014*, p. 10 ; E-Business Register (2016, March), *Entrepreneur: Tiivar Holding OÜ (12346850)*, p. 2; E-Business Register (2016, March), *Entrepreneur: Osaühing SAARE FISHEXPORT (10723478)*, p.2.

Saare Fishexport, the direct parent of Soome Kala which has subsidiaries in Finland, generated revenues of €3.3 million in 2014, down from €5.6 million in 2013 (Saare Fishexport, 2015, p. 4-5, p. 29). The company had total assets of approximately €5.2 million in 2014 (ibid.). 95% of Saare Fishexport's revenues were generated through fish processing (ibid.). 90% of Saare Fishexport's products are exported to Europe, the majority of which is exported to the Ukraine (Saare Fishexport, n.d.).

The owners of Monistico have created a portfolio that exhibits evidence of both vertical and horizontal integration. Vertical integration is found in the fish catching and retail of fish by Monistico and its subsidiary. There does not seem to be any processing activity. The owners also have investments through Tiivar Holding in Saare Fishexport, which does have fish processing activities.

There is also evidence of horizontal integration. Domestically, this is through the membership of Monistico and its subsidiary Saare Kalapüügi of the Eesti Kalapüügiühistu PO. Investments in Finland are evidence of international horizontal integration.

5.3.1.7. Abimerk

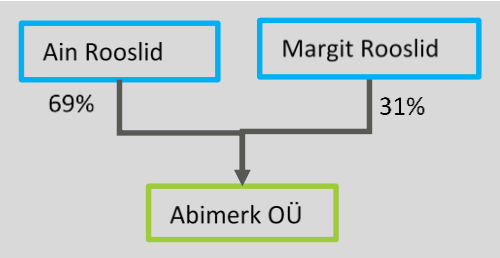
As seen in Table 18, Abimerk had an accumulated catch of 7,599 tons in the period 2011-2014. Annual catch volumes fluctuated between 1,448 and 2,750 tons.

Abimerk is member of the Eesti Kutseliste Kalurite Ühistu PO. It is the only member of that PO for which this research did not identify any links to Raivo Baum.

In 2014, Abimerk had revenues of approximately €340,000, down from €518,000 in 2013 (Abimerk, 2015, p. 3-4, p 22). The company had total assets of €1.6 million in 2014 (ibid.). Nearly 100% of its revenues are derived from sea fishing (ibid.).

As Figure 17 shows, Abimerk is owned by Ain and Magrit Rooslid. It does not have any subsidiaries. This research did not identify any other companies linked to the owners.

Figure 17. Company structure of Abimerk



Source: Abimerk (2015), *Annual Report 2014*, p. 22.

The company structure of Abimerk does not show any signs of formal integration.

5.3.1.8. Keskpunkt

Keskpunkt had an accumulated catch of 7,223 tons in the period 2011-2014 (see Table 18). Annual catches fluctuated between 1,762 and 1,862 tons.

Keskpunkt is a member of the Eesti Kalapüügiühistu PO of which Hiiu Halur, Kabeltau and Monistico are also member.

Table 18 shows that Keskpunkt is owned by entrepreneurs Andro and Henry Ots. Kespunkt, together with owner Henry Ots, is also majority shareholder of Ösel Harvest. Ösel Harvest's parent company, Rembatas, is engaged in an unrelated sector. It generates almost 60% of its revenues from the retail sale of motor vehicle parts and accessories, 19% from freight transport by road, and the remainder from other business activities not related to the fisheries sector (Rembatas, 2015, p. 18).

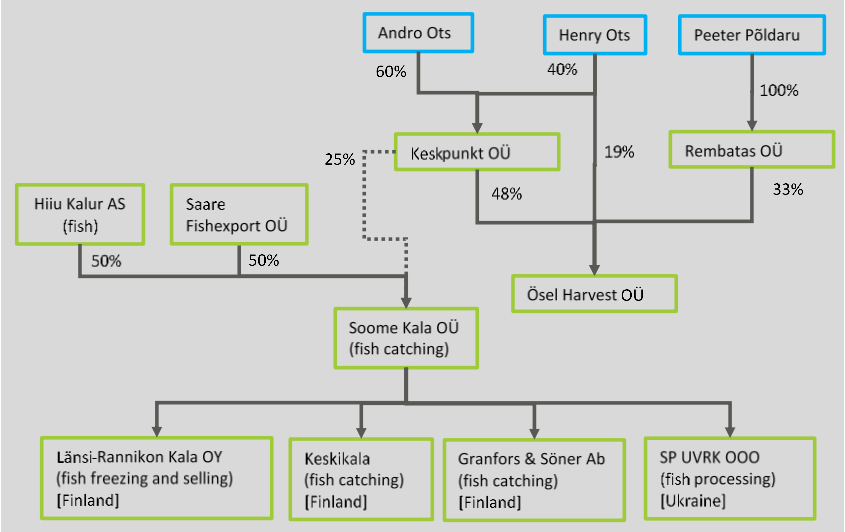
The Keskpunkt annual report claims that Keskpunkt also owns 25% of Soome Kala, with fishing activities in Finland. However, Soome Kala documentation does not verify this. Soome Kala documentation refers to Hiiu Kalur and Saare Fishexport as its shareholders (E-Business Register, 2016i, p. 2).

Keskpunkt derived 64% of its revenues from fish catching in 2014 (Keskpunkt, 2015, p. 4-5, p. 22). A further 34% was generated through the wholesale of fish products (ibid.). In 2014, Keskpunkt achieved revenues of €980,000, down from €1.4 million in 2013 (ibid.). The company had total assets of €5.2 in 2014 (ibid.).

Ösel Harvest is an aquaculture company: 97% of its revenues were attributed to aquaculture in 2014 (Ösel Harvest, 2015, p. 4-5, p. 21). The company had revenues of €228,000 and

€184,000 in 2014 and 2013 respectively (ibid.). Ösel Harvest had total assets of €4.2 million in 2014 (ibid.).

Figure 18. Company structure of Keskpunkt



Source: Keskpunkt (2015), *Annual Report 2014*, p. 8, 22; E-Business Register (2016, March), *Entrepreneur: osaühing Ösel Harvest (10297188)*, p. 2; E-Business Register (2016, March), *Entrepreneur: OÜ Rembatas (11288228)*, p. 2; E-Business Register (2016, March), *Entrepreneur: Osaühing Soome Kala (12261319)*, p. 2; Osaühing Soome Kala (2015), *Annual Report 2014*, p. 10.

Keskpunkt shows evidence of integration. Firstly, there is vertical integration within Keskpunkt itself as it is engaged in both fish catching and the wholesale of fish products. There is also a form of horizontal integration through its investment in Ösel Harvest which is engaged in a different, yet very similar, industry segment. Finally, if the Keskpunkt documentation is correct, then Keskpunkt is also engaged in horizontal and vertical integration through its investments Soome Kala with its activities in the fish catching and fish processing sectors in Finland and Ukraine. However, Soome Kala documentation does not refer to Keskpunkt.

5.3.1.9. Smaller companies

Smaller companies, such as Saare Rand and Novirinia Kalaparadiis, show fewer signs of integration (E-Business Register, 2016c, p. 2; E-Business Register, 2016h, p. 2; E-Business Register, 2016g, p. 2; Novirina Kalaparadiis, 2015, p. 22).

5.3.2. Baltic coastal fishing segment

Table 19 provides an overview of the 15 largest fishing companies in the Baltic coast segment based on total catch between 2012 and 2014. From this it is clear that Japs, Margus Post and Ain Mango are the top three fishing companies in the Baltic coastal fishing segment.

Table 19. Baltic coastal catch by company (tons)

Company	2012	2013	2014	Total
Japs AS	490	285	432	1,206
Margus Post	414	358	420	1,192
Ain Mango	369	312	304	985
Krüger & Mets ÖU	286	286	374	946
Valdo Palu Rannametsa talu	202	223	231	656
Aldo Koppel	108	235	306	649
Tinurek ÖU		5	626	632
Arso EE OÜ	190	261	176	627
Maido Kaja	149	342	130	621
Viktor Niit	152	259	198	610
Võiste Sadama OÜ	295	48	265	608
Peipus ÖU	126	155	300	581
Kalju Vatt	137	155	272	564
Kevadräim OÜ	60	146	288	494
Tahkuranna Kala OÜ	138	146	162	446

Source: Ministry of Rural Affairs (2015, January), *Baltic Coast: Commercial fishing catch by company, 2014*; Ministry of Rural Affairs (2014, January), *Baltic Coast: Commercial fishing catch by company, 2013*; Ministry of Rural Affairs (2013, January), *Baltic Coast: Commercial fishing catch by company, 2012*.

The remainder of this section will provide an analysis of the company structures of the top 5 companies in terms of accumulated catch in the Baltic coastal segment.

5.3.2.1. Japs

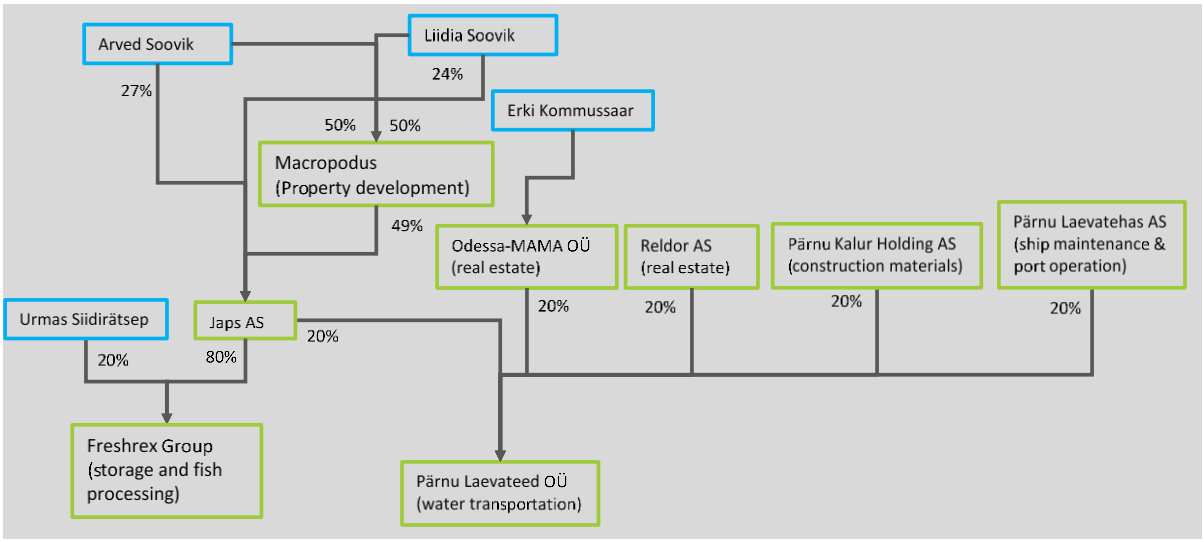
As seen in Table 19, Japs had an accumulated catch of 1,206 tons in the period 2012-2014. Annual catch volumes fluctuated between 285 and 490 tons.

Figure 19 shows the company structure of Japs. Japs is owned by Arved and Liidia Soovik, also through another company they own, Marcopodus. Japs has one fish processing and storage subsidiary, Freshex Group, which is partly owned by Urmas Siidirätsep.

In 2014, Japs generated revenues of €6.2 million, down from €6.3 million in 2013 (Japs, 2015, p. 4-5, p. 22). The company had total assets of €5.6 million in 2014. Nearly all of Japs' revenue is generated through its processing segment (ibid.).

Japs subsidiary Freshex Group generated €976,000 in revenue is 2014, down from €1.1 million in 2013 (Freshex Group, 2014, p. 4-5, p. 22). The company's total assets were approximately €869,000 in 2014 (ibid.). As with Japs, Freshex's revenues were almost all derived from fish processing (ibid.).

Figure 19. Company structure of Japs



Source: Macropodus (2015), *Annual Report 2014*, p. 9; E-Business Register (2016, March), *Entrepreneur: Osaühing Macropodus (10795740)*, p. 2; E-Business Register (2016, March), *Entrepreneur: aktsiaselts Japs (10033414)*, p. 2; Japs (2015), *Annual Report 2014*, p. 9; E-Business Register (2016, March), *Entrepreneur: OÜ FRESHREX GROUP (10483531)*, p. 1-2; E-Business Register (2016, March), *Entrepreneur: Osaühing Pärnu Laevateed (10374730)*, p. 2; E-Business Register (2016, March), *Entrepreneur: Odessa-MAMA OÜ (10951179)*, p. 1; Odessa-MAMMA (2015), *Annual Report 2014*, p. 15; E-Business Register (2016, March), *Entrepreneur: aktsiaselts Pärnu Laevatehas (10124004)*, p. 1; E-Business Register (2016, March), *Entrepreneur: aktsiaselts Pärnu Kalur Holding (10052469)*, p. 1; E-Business Register (2016, March), *Entrepreneur: Aktsiaselts Reldor (10007753)*, p. 1.

Japs shows signs of vertical integration through its investments in both fish catching and fish processing segments. The owners also have a diversified portfolio of investments likely designed to spread risk.

5.3.2.2. Margus Post

In the period 2012-2014 Margus Post had an accumulated catch of 1,192 tons. Yearly catch volumes fluctuated between 358 and 420 tons (see Table 19). Margus Post is registered as a sole trader, or individual entrepreneur (E-Business Register, 2016e, p. 1).

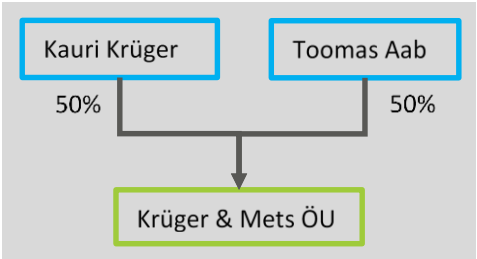
5.3.2.3. Ain Mango

As seen in Table 19, Ain Mango had a total accumulated catch of 985 tons in the period 2012-2014. Annual catches varied between 304 and 369 tons. Ain Mango is registered as a sole trader, or individual entrepreneur (E-Business Register, 2016a, p. 1).

5.3.2.4. Krüger & Mets

In the period 2012-2014, Krüger & Mets had an accumulated catch of 946 tons, with fluctuations between 286 and 374 tons (see Table 19). As Figure 20 shows, Krüger & Mets is owned by Kauri Krüger and Toomas Aab, it does not have any registered subsidiaries.

Figure 20. Company structure of Krüger & Mets



Source: E-Business Register (2016, March), *Entrepreneur: Osaühing Krüger & Mets (10314834)*, p. 2.

In 2014, Krüger & Mets generated revenues of €130,000, up from €108,000 in 2013 (Krüger & Mets, 2015, p. 4-5, p. 16). Total assets were €273,000 in 2014 (ibid.). 84% of revenues were derived from fish catching, the remaining 16% were generated through maintenance services (ibid.).

5.3.2.5. Valdo Palu Rannametsa talu

As seen in Table 19, Valdo Palu Rannametsa talu had an accumulated catch of 656 tons in the period 2012-2014.

Valdo Palu Rannametsa talu is registered as a sole trader, or individual entrepreneur (E-Business Register, 2016j, p. 1).

5.4. Integration

There are pronounced differences in the levels and forms of integration in the two main sea fishing segments in Estonia. In the Baltic coastal fishing segment, there is far less integration. The majority of the fishing companies are in fact sole traders or individual entrepreneurs. Only Japs AS is an example of a degree of vertical integration within the Baltic coastal fishing segment.

In the Baltic Sea and Gulf of Riga fishing segment, both vertical and horizontal integration are more common. Vertical integration is found most commonly in the form of integration in the fish catching and fish processing sectors, and slightly less commonly also in distribution.
Horizontal integration is common in three forms. Firstly, through investments in companies belonging to the same PO. Secondly, through investments in fish catching companies in other POs. Finally, investments in companies active in the fisheries of another country.

In an interview, Mart Undrest, executive director of Eesti Kalapüügiühistu, stated that vertical integration in Estonian fisheries had reached its limits after 15 years. Most fishing companies own their own processing and storage facilities. Additionally, the PO also has processing and storage facilities (Undrest, 2016). Mauno Leppik, CEO of Eesti Traalpüügi Ühistu, also states that his PO has processing and production facilities. The PO further provides trade and distribution services to its members (Leppik, 2016).

Within POs there is also integration. Both Undrest and Leppik report that their POs have processing and storage facilities. Leppik, of Eesti Traalpüügi Ühistu, states that the PO also markets the fish. It does so under the Krapesk brand which belongs to Krapesk, and ultimately Hiiu Kalur. He argues that this is because Krapesk has a traditionally strong brand name. The prices for fish sold by the fish catching companies to the PO are a matter of negotiation, essentially a "friendly discussion with yourself", according to Leppik. He states that the PO was created to produce more efficiently and to improve sales. It was created by fishermen for fishermen. Profits are split between the members, although the PO has not made significant profits to date according to Leppik (Leppik, 2016). In fact, in 2014 the PO made a loss of €61,000, and in 2013 it made a loss of €46,000 (Eest Traalpüügi Ühitsu, 2015).

The producer organisation Eesti Traalpüügi Ühistu is majority owned by Krapesk (see section 5.3.1.1), and by extension its parent Hiiu Kalur. Leppik could not comment on what this ownership structure implied for the running of the PO, beyond stating that the PO was created by and for the fishermen (Leppik, 2016).

Regarding investments by fishing companies in more than one PO, Undrest states that companies that are a member of one PO cannot be a member of another PO in Estonia. There are historical and legal reasons for this. However, the owners can have companies active in

more than one PO. Hiiu Kalur is the only example Undrest is aware of where the owner makes use of such a construction (Undrest, 2016).

The dominant form of horizontal integration in the Estonian fisheries sector is international investment, particularly Estonian fisheries sector companies investing in Finland. Finnish companies do not invest in the Estonian fisheries sector (Leppik, 2016). This is because it is cheaper for Estonian companies to invest in the Finnish fisheries sector than vice-a-versa (Undrest, 2016).

Both Undrest and Leppik state that investments in the Finnish fisheries sector can be attributed to a number of factors. Firstly, Leppik reports that there has been a reduction in quotas available in Estonia, while there has been an increase in market demand. Fish catching companies are therefore investing in Finland in order to gain access to more quotas. Additionally, fish processing companies (often part of the same group of companies) are concerned by the surplus capacity caused by a reduction in Estonian quotas which would decrease the economic efficiency of the processing and distribution facilities (Leppik, 2016).

Undrest adds that Estonian quotas have sold out, whereas in Finland they have not. Investments are made into existing Finnish fishing companies in order to gain access to the quotas. Finland still operates what is known as the Olympic fisheries management system, also known as the "race for fish". This refers to a management system that sets a quota and start date for the entire fishery and then individual boats "race" to get as much of the Total Allowable Catch as possible before the fishery closes. It is therefore an attractive investment opportunity for Estonian fishing companies (Undrest, 2016).

However, as of 2017 Finland will no longer use the Olympic system. Undrest believes that this will have a positive impact on the Estonian fishing companies active in Finland. There will be less pressure, better management of the fishing vessels, and the companies will become more cost effective (Undrest, 2016).

In terms of non-structural forms of vertical integration, Leppik states that a number of Finnish fish catching companies have off-take contracts with Estonian fish processing companies. He says that often these Finnish fish catching companies are actually owned by Estonian parent companies (Leppik, 2016).

Further non-structural forms of integration include the renting and swapping of quotas. Undrest states that quotas are not often bought and sold anymore. However, swapping and renting quotas is quite common. There is no formal system of swapping and renting. A system known as FishQ will be launched to provide such a service. Initially it will focus on the Baltic region, facilitating quota flexibility both nationally and internationally. Undrest reports that quota swaps and renting can currently take place at three different levels: inter-governmental, inter-company, or between individuals. There is no financial compensation for quota swaps. Differences in tonnage are used to represent the values of the different species of quota being swapped (Undrest, 2016).

In sum, there is both vertical and horizontal integration in the fisheries industry in Estonia. Vertical integration is already well-established with investments in fish catching, fish processing, and trade. Horizontal integration is driven by access to quotas. One key form this has taken is investment in the Finnish fish catching segment due to its attractive fish management system.

6. FRANCE

KEY FINDINGS

- Approximately 43,000 people employed in fish catching and processing sectors
- Fish and seafood market estimated to be worth US$ 10 billion, 3rd largest in Europe
- Limited structural vertical integration
- Structural horizontal integration mainly domestic, increased investments by Spanish fishing companies
- Limited non-structural vertical integration due to varied catch composition
- Quota leasing is illegal, quota swapping is common

6.1. Composition of the French fishery industry

The French fish and seafood market was estimated to be worth US$ 10 billion in 2015, and forecast to reach US$ 11 billion by 2020 (Infinity Research, 2015a, p. 27). France is the third-largest fish and seafood market in Europe, accounting for 12.56% of total European revenue in 2015 (ibid.). Fish and seafood products originating in Norway compose approximately 13% of French fish and seafood imports (ibid.). The main imports are frozen fish and seafood products, followed by prepared fish and seafood products (ibid.). The main distribution channels are supermarkets and hypermarkets (ibid.).

France has a coastline of 18,000 km, representing 17% of the total EU-23 coastline (European Commission - Maritime affairs and Fisheries, 2016, p. 1). In total, it has 65 fishing harbours with access across the Atlantic Ocean, the Channel, the North Sea and the Mediterranean Sea (ibid.).

Table 20. Overview of fish industry in France

Segment	Measure	Value	Proportion of total fishing enterprises / GDP / workforce
Fish catching	Enterprises with more than one vessel (2014)	738	12%
	Landing income (2013, € mlns)	1,093	0.05%
	Employment in the fish catching sector (2013)	10,262	0.04%
Processing	Employment in the fish processing sector (2013)	32,368	0.13%
	Processing production (2013, € mlns)	9,723	0.48%
Trade	Imports of fish (2015, € mlns)	4,122	0.19%
	Exports of fish (2015, € mlns)	1,487	0.06%

Source: Scientific, Technical and Economic Committee for Fisheries (2015, July), *The 2015 Annual Economic Report on the EU Fishing Fleet: Electronic Appendices*, Publications Office of the European Union, Luxembourg; EUROSTAT (2015, November), "GDP and main components - Current prices [nama_gdp_c]", online: http://ec.europa.eu/eurostat/data/database, viewed in January 2016; EUROSTAT (2015, October), "Employment (main characteristics and rates) - annual averages [lfsi_emp_a]", online: http://ec.europa.eu/eurostat/data/database, viewed in January 2016; TradeMap (n.d.), "List of importers for the selected product: Product: 03 Fish, crustaceans, molluscs, aquatic invertebrates nes", online: http://www.trademap.org/, viewed in January 2016; TradeMap (n.d.), "List of exporters for the selected product: Product: 03 Fish, crustaceans, molluscs, aquatic invertebrates nes", online: http://www.trademap.org/, viewed in January 2016.

Table 20 gives an overview of the French fishing industry. As we can see from Table 20, in terms of revenue and employment, fish processing plays the most significant role. The fish catching and processing segments together accounted for 0.5% of the country's GDP in 2013.

The French fleet is highly diversified as it not only targets different species but also covers 103 types of vessels of different lengths and fishing techniques (European Commission - Maritime affairs and Fisheries, 2016, p. 1). In total the French fleet had 7,121 vessels in 2013, of which 17% were inactive (ibid.). The number of fishing enterprises was estimated in 2013 at 6,059, with the vast majority of them owning a single vessel (ibidMost of the French fishermen were employed in small-scale fishing, while the total workforce had reached 21,631 workers in 2013 (ibid.).

The French fish processing industry is highly diversified, as it covers a wide range of products (fresh and refrigerated fish fillets; the production of prepared dishes with fish, crustaceans and molluscs; smoked salmon; processing of crustaceans and molluscs; surimi; and canning) (European Commission - Scientific, Technical and Economic Committee for Fisheries (STECF), 2015, p. 23-24). Total revenue from the fish processing sector was €9.7 billion in 2013 (see Table 20).

In 2015, France exported €1.2 billion in fish and fish products (TradeMap, n.d.). 77% of this was destined for EU member countries (ibid.). Spain, Italy and Belgium were the three largest export destinations, accounting for 19%, 16%, and 12% of the country's total exports respectively (ibid.).

France had fish imports of €4.1 billion in 2015 (TradeMap, n.d.). 67% of these imports originated from EU member countries (ibid.). The United Kingdom, Sweden and the Netherlands were the three largest importers of fish to France, accounting for 14%, 12% and 9% of the country's total imports respectively (ibid.).

6.2. Producer organisations

Table 21 gives an overview of the producer organisations in France. Due to a lack of available data, the number of vessels and members could not be provided.

Table 21. Producer organisations in France

Producer Organisations
Coopérative Bretagne Nord (Cobrenord)
Coopérative ARCOBA
Coopérative des artisans pêcheurs du Sud Organisation des producteurs (CAP SUD)
Coopérative Gure Lana
Coopérative La Basquaise
Coopérative Maritime Etaploise (CME)
FROM Nord (Fond Régional d'Organisation du Marché du poisson)
FROM Sud Ouest (Fonds régional d'organisation du marché du poisson dans le Sud-Ouest)
Les Pêcheurs de Bretagne
Op de Sud

Producer Organisations
Op Pêcheurs d'Aquitaine
Organisation de producteurs de Basse Normandie (OPBN)
Organisation de producteurs des pêcheurs artisans de Noirmoutier (OPPAN)
Organisation de producteurs des ports du littoral de Provence-Côte d'Azur-Corse (PROCACO)
Organisation de producteurs des ports du quartier de Port-Vendres (PROQUA PORT)
Organisation de producteurs La Côtinière
Organisation des Producteurs des Produits de la Mer de Guyane (OPMG)
Organisation des producteurs de thon tropical congelé et surgelé (ORTHONGEL)
Société anonyme coopérative COPEMART — Provence-Côte d'Azur
Société coopérative maritime des pêcheurs de Sète-Mole (SA.THO.AN)

Source: Official Journal of the European Union (2013, March), "Information and notices", 56, p. 68/28-31.

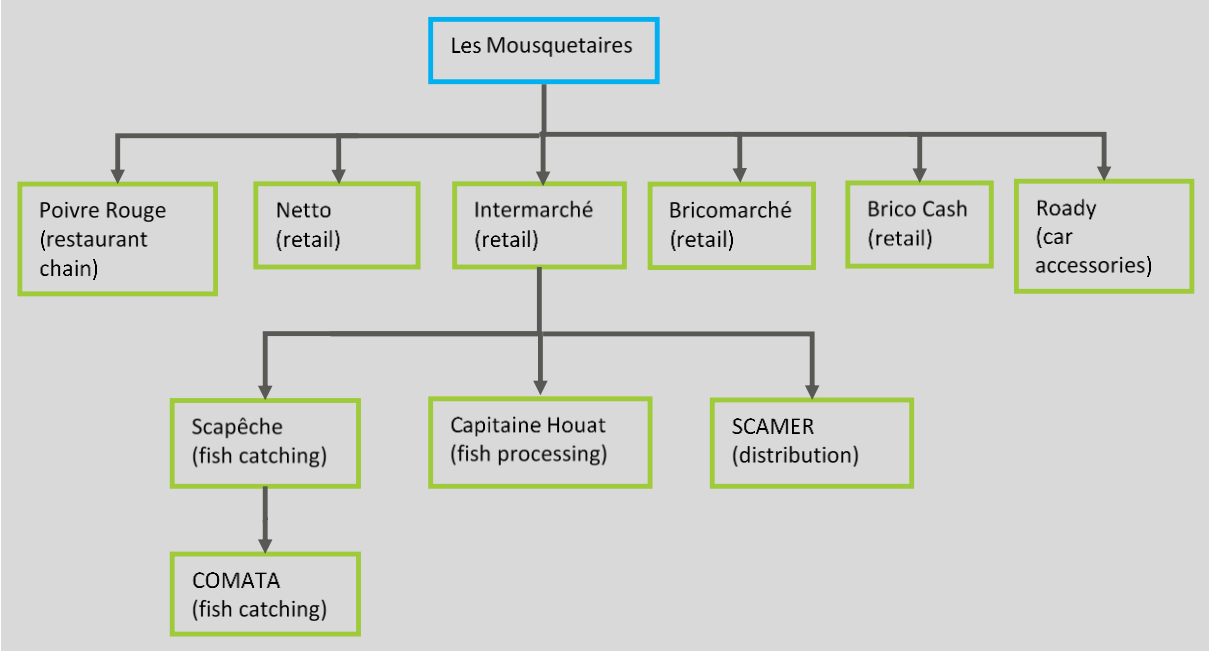
6.3. Company analysis

This section provides an analysis of the company structures of five major French fish catching companies.

6.3.1. Intermarché

Figure 21 provides an overview of the Intermarché company structure. The company is part of the Les Mousquetaires group and engages in food retail. Intermarché has 2,400 outlets in France, Portugal, Poland and Belgium (Les Mousquetaires, n.d.). In 2015, Intermarché, together with Netto (low cost supermarket chain also owned by Les Mousquetaires group), had €25.5 billion in turnover (ibid.). Bricomarché and Brico Cash are also part of the Les Mousquetaires group specialising in home equipment retail, while Roady and Poivre Rouge are a car accessories retail company and a restaurant chain respectively (ibid.).

Figure 21. Company structure of Intermarché



Sources: Les Mousquetaires (n.d.), "Acuueil - Résultas Annuels 2015", online: http://www.mousquetaires.com/resultats-annuels-2015/, viewed in March 2016; Scapêche (n.d.), "Qui sommes-nous - Notre histoire", online: http://www.scapeche.fr/qui-sommes-nous/notre-histoire/, viewed in March 2016 ; Les Mousquetaires (n.d.), "Acuueil - Agroalimentaire - Nos Filieres - Filiere Mer", online: http://www.mousquetaires.com/agroalimentaire/nos-filieres/filiere-mer/, viewed in April 2016; Capitaine Houat (n.d.), "Qui sommes-nous - Le groupement", online: http://www.capitainehouat.fr/qui-sommes-nous/groupement/, viewed in April 2016; *ORBIS database*, viewed in April 2016.

Scapêche (Société Centrale des Armements des Mousquetaires à la Pêche), a subsidiary company of Intermarché, is a fishing company which currently owns 22 vessels and operates in five different fishing zones (Atlantic Ocean, North East Atlantic, French Southern and Antarctic Lands, North, and West of Scotland) (Scapêche, n.d.). The company has a 14,600 gross annual fishing tonnage, which covers 65% of the Les Mousquetaires group's needs (Les Mousquetaires, n.d.). COMATA, a subsidiary of Scapêche, present in French Southern and Antarctic Lands (TAAF), is a one vessel holding company (Kerguelen de Trémarec trawler) (Scapêche, n.d.; FIS, 2012).

Capitaine Houat is a fish processing company with an annual fresh fish and shrimp processing capacity of 25,000 tonnes. The company operates two processing facilities located in Boulogne-sur-Mer, France and Lanester, France (Capitaine Houat, n.d.).

SCAMER is responsible for the distribution of sea products for the Les Mousquetaires group and its retail outlets Intermarché and Netto (Les Mousquetaires, n.d.). The company distributes 40,000 tonnes of seafood per year (ibid.).

Scapêche is a vertically integrated fishing company. According to a PO representative and Scapêche director Romain Fageot, Scapêche is the only completely vertically integrated fishing company in France (Fageot, 2016). The founders of Scapêche had envisioned that the supermarket chain would be vertically integrated in all sectors, including meat, water and soda (ibid.). The motivation was to control the quality of the raw materials and the final product (ibid.). The founders of Scapêche also believed that it would become increasingly difficult to access raw materials (ibid.).

Originally Scapêche focused on fresh fish (Fageot, 2016). According to Fageot, if there was no vertical integration with the processing company and supermarket chain then the company

would focus on the frozen segment (ibid.). Scapêche lands its harvests in France, the UK and Ireland. This is then transported to France through cold chain logistics partners (ibid.).

Scapêche has engaged in a process of horizontal integration (Fageot, 2016). It currently has 22 active vessels (ibid.). It carried out horizontal integration through purchasing vessels and taking over companies (ibid.). Horizontal integration was motivated partly as a means to expand production capacity, but also to gain access to different fish species in order to diversify the product portfolio and meet the needs of Intermarché consumers (ibid.). The company has considered investing in fish catching companies in the UK and Ireland, for example, in order to expand its product portfolio and capacity (ibid.). However, it decided that the barriers to entry were too high and the company was already meeting consumer demand sufficiently (ibid.).

Given the company's structural vertical integration, there is no need for the company to engage in non-structural vertical integration through off-take arrangements with processors (Fageot, 2016). However, Fageot reports that the company does engage in quota swapping with other producers in the POs of which it is a member, other POs in France and internationally (ibid.). He states that this is largely to compensate for by-catch (ibid.). The company does not engage in quota leasing, or in the buying and selling of quota, as these activities are illegal in France (ibid.).

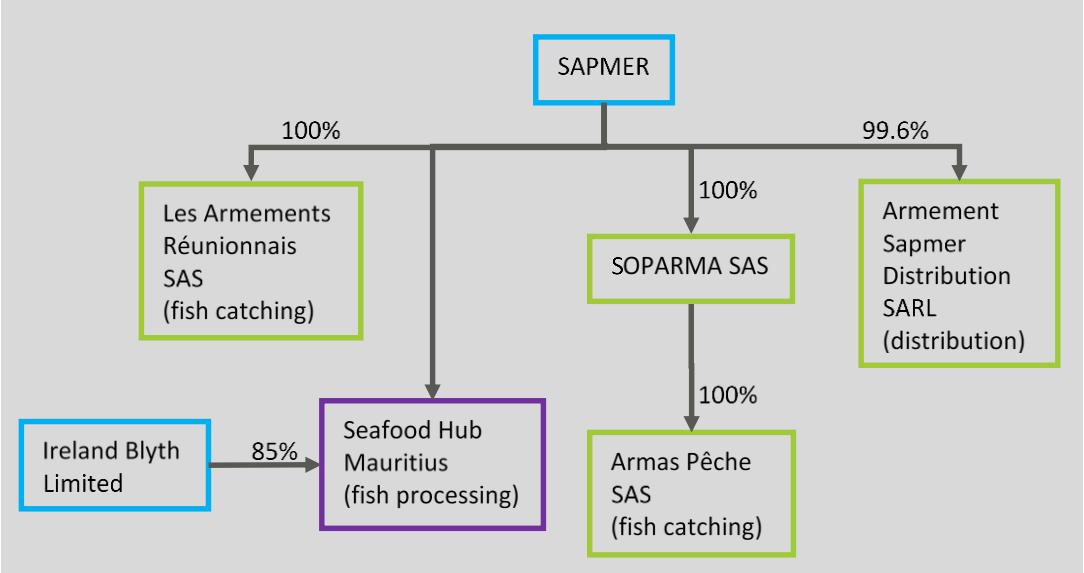
As can be seen from the analysis above, Scapêche shows evidence of both vertical and horizontal integration. Structurally, Scapêche is part of a fully-integrated value chain from fishing company, to processor, and on to retail outlets. Structurally, Scapêche also shows evidence of horizontal integration, through investments in fishing vessels and companies in France. The company has not carried structural horizontal integration at the international level. In terms of non-structural forms of vertical and horizontal integration, Scapêche only engages in horizontal integration through quota swapping, mainly to compensate for by-catch (Fageot, 2016).

6.3.2. SAPMER

SAPMER was established in 1947 on Réunion Island (SAPMER, n.d.). The company currently fishes in the Indian Ocean and Southern seas, while it also has storage units on Réunion Island and in Mauritius (ibid.). At the moment, SAPMER owns 12 fishing vessels and manages one patrol boat (ibid.). The company also fully owns one tuna processing factory and participates in a 50% joint venture with Seafood Hub (subsidiary of the Ireland Blyth Group) in another one, both located in Mauritius (ibid.). In 2014, the company's total assets amounted to €173 million, while its revenue reached €88 million (SAPMER, 2015, o. 24-25).

Figure 22 provides an overview of the SAMPER company structure. The company's subsidiaries, Les Armements Réunionnais and Armas Pêche are the owners and operators of toothfish longliners, while Armement Sapmer Distribution controls the company's sales in mainland France. SOPARMA's sole purpose is to manage Armas Pêche (SAPMER, 2015, p. 6). Thus, SAPMER is a vertically integrated company engaging in fishing, processing and the distribution of seafood products.

Figure 22. Company structures of SAPMER



Source: SAPMER (2015, March), *Financial Annual Report 2014,* p. 6; *ORBIS database*, viewed in March 2016; SAPMER (n.d.), "Corporate Area - Our logistics - Factory", online: http://www.sapmer.com/en/factory.html, viewed in March 2016.

The SAMPER's company structure shows a degree of both vertical and horizontal integration. The company has investments in both the upstream and midstream segments, in fish catching, processing and distribution. The company does not, however, have investments further downstream in retail.

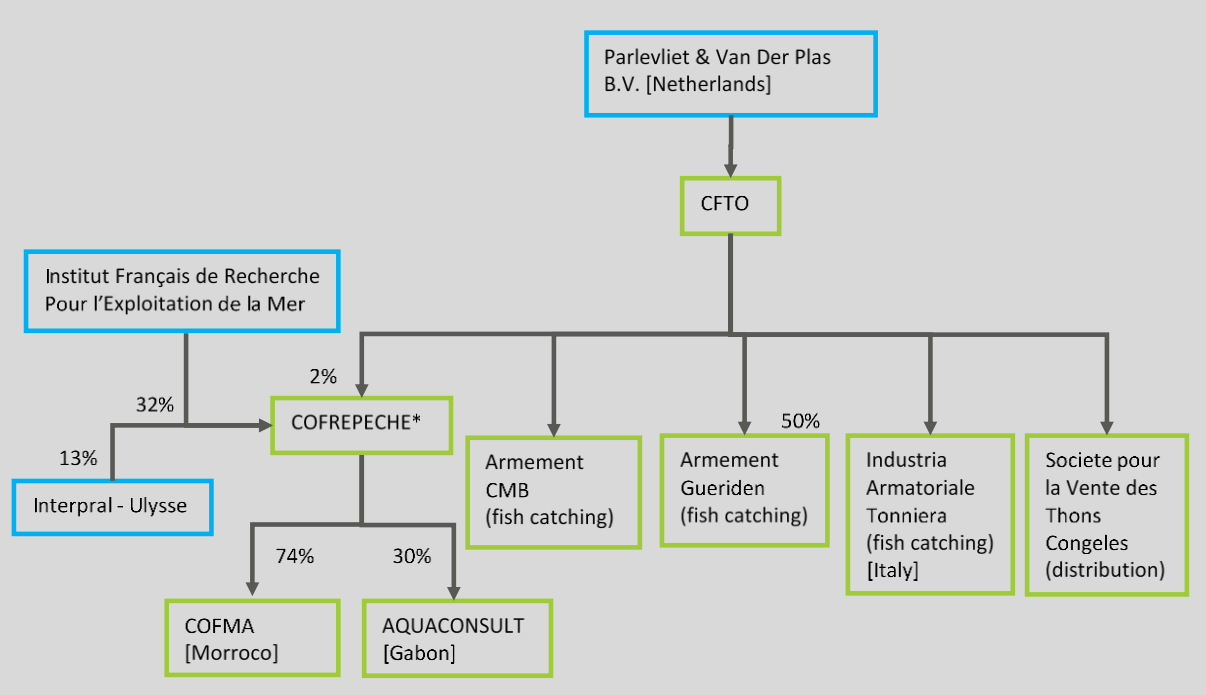
6.3.3. Compagnie Francaise du Thon Oceanique (CFTO)

Compagnie Francaise du Thon Oceanique (CFTO) was established in 2011, after the merger of Cobrecaf and France-Thon. Currently, CFTO is the largest tuna fishing company in France with 65,000 tonnes of catch annually (CFTO, n.d.). The company owns 13 vessels operating in the Atlantic and Indian Oceans catching tropical tuna (ibid.). In 2014, the company's total assets amounted to €130 million, while its revenue reached €104 million (ORBIS, 2016).

Figure 23 provides an overview of the CFTO company structure. The company's subsidiaries Armement CMB and Armement Gueriden are vessel holding companies, while Industria Armatoriale Tonniera is engaged in catching finfish (Ministere de l'Agriculture et de l'Agroalimentaire et de la Foret, 2016 and Bloomberg, n.d.). CFTO also holds 2.38% of COFREPECHE, a consultancy company specialised in the fisheries and aquaculture sector (ORBIS, 2016 and COFREPECHE, n.d.).

In 2016, it was announced that CFTO will be acquired by Parlevliet & Van der Plas (Netherlands). In this way the Dutch company will increase its number of vessels 39; however CFTO's vessels will continue to operate under the French flag (Parlevliet & Van der Plas, 2016).

Figure 23. Company structure of Compagnie Francaise du Thon Oceanique (CFTO)



Sources: *ORBIS database*, viewed in March 2016; COFMA (n.d.), "Qui sommes-nous?", online: http://www.cofma.ma/, viewed in March 2016; Infolegale (2015, March), *Fiche d'identité Entreprise - Compagnie Francaise du Thon Oceanique;* COFREPECHE (n.d.), "Who We Are", online: http://www.cofrepeche.fr/index.php/, viewed in April 2016; Gidi Pols (2016, May 23), "Katwijkse visser koopt Bretonse tonijnvloot", *de Volkskrant.*

* CIC Ouest SA, Cogesal-Miko, Dimer, Nord Pêcheries, Societe Cooperative de Developpement des Industries Maritimes and Societe d'etudes et de Participations Maritimes are also each holding 2.38% of COFREPECHE

The company structure of CFTO shows evidence of particularly horizontal integration. This is evident both at the CFTO level as well as at that of the ultimate parent. CFTO has investments in a number of fish catching companies located in Europe and Africa. Parlevliet and van der Plas has investments in fish catching and fish processing all over the world. The company structure of CFTO shows a low level of vertical integration. There is only one company active in distribution, with no subsidiaries active in processing.

6.3.4. Comptoir des Pêche d'Europe du Nord (EURONOR)

Comptoir des Pêches d'Europe du Nord (EURONOR) was established in 2006 as a joint venture by two large fishing vessels owners of Boulogne-sur-Mer, the Société Boulonnaise d'Armement Le Garrec, and Nord Pêcheries. The company owns six trawlers and operates in the North Sea, West Scotland, Faeroe Island Waters, the Norwegian Sea and Spitsbergen waters (EURONOR, n.d.). In 2013, the company's total assets amounted to €15 million while its revenue reached €24 million (ORBIS, 2016).

Figure 24 provides an overview of the EURONOR company structure. The company has two subsidiaries in France, Boulogne Plasticoffre (73%) and EURONOR Distribution (50.01%). The company also holds 16.67% of the French company Société de Facturation et d'Encaissement relative aux Transactions commerciales en halle de Boulogne-sur-Mer (SOFETRA) (ORBIS, 2016).

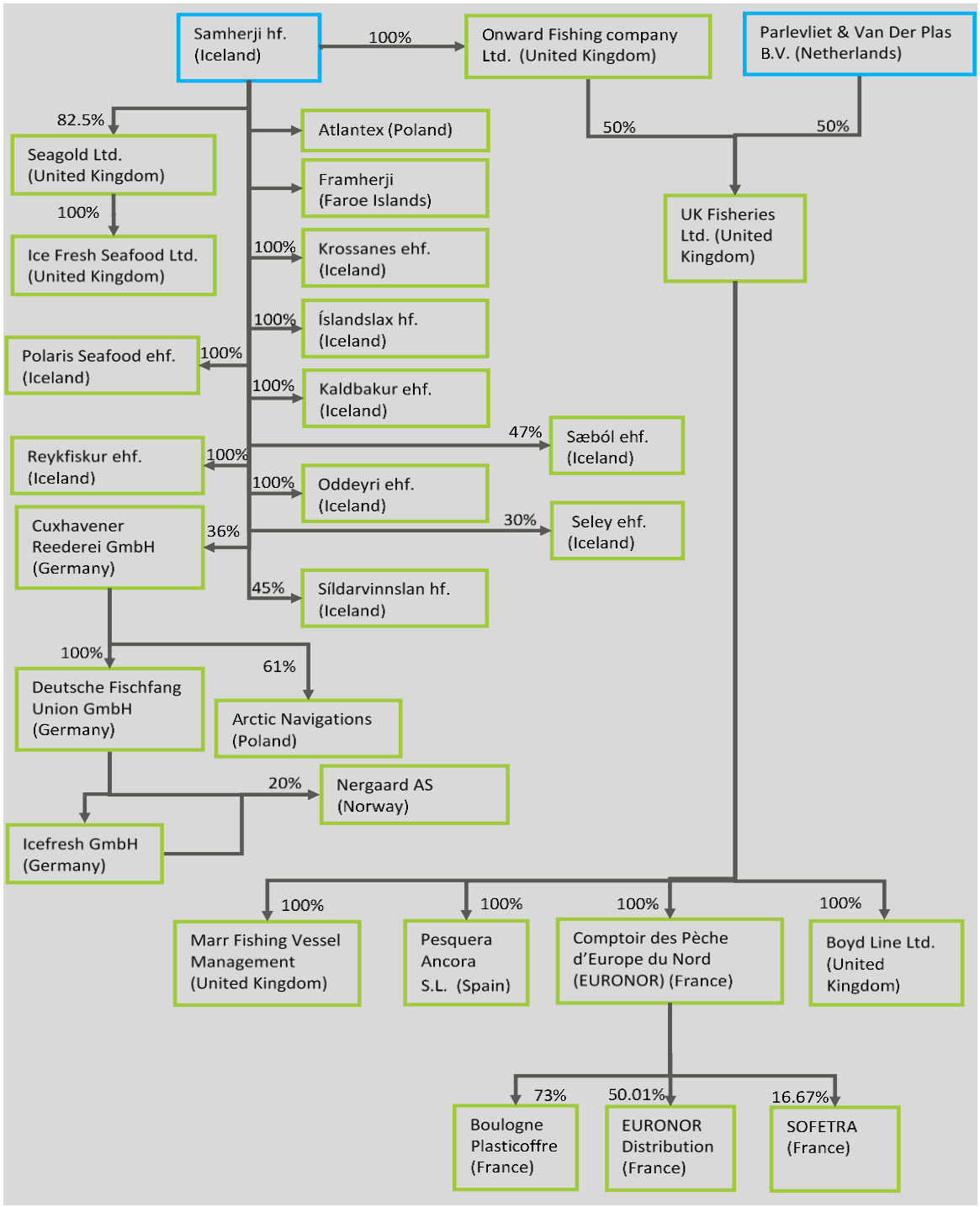
Comptoir des Pêches d'Europe du Nord is a subsidiary of UK Fisheries Ltd (United Kingdom), while UK Fisheries Ltd is in joint ownership by Onward Fishing Company (United Kingdom) and a daughter company of Parlevliet & Van der Plas B.V. (The Netherlands). UK Fisheries has two more subsidiaries in the United Kingdom, Marr Fishing Vessel Management and Boyd Line Ltd., which operate two freezer trawlers and one fresh fish trawler (Samherji, n.d.). Pesquera Ancora

(Spain) is also a subsidiary of UK Fisheries. The Spanish company operates three vessels in the Barents Sea and off the coast of Canada (ibid.).

The parent company of Onward Fishing Company (United Kingdom) is Samherji hf (Iceland). Samherji is a vertically integrated seafood company holding multiple subsidiaries in Iceland, the United Kingdom, Germany, Poland and the Faroe Islands, controlling a significant volume of the fishing quota and operating a fleet of fishing vessels, freezer and fresh fish trawlers, as well as multipurpose vessels. The company is also engaged in fish processing and fish farming, and has its own distribution and marketing centres (ORBIS, 2016). In 2014, Samherji's total assets amounted to €0.7 billion, while its revenue reached €0.5 billion (ORBIS, 2016).

UK Fisheries Ltd. parent company, Parlevliet & Van der Plas, is also a vertically integrated company with investments in fish catching, processing, and distribution all over the world. The company does not, however, have investments in fish retail.

Figure 24. Company structure of Comptoir des Pêche d'Europe du Nord (EURONOR)



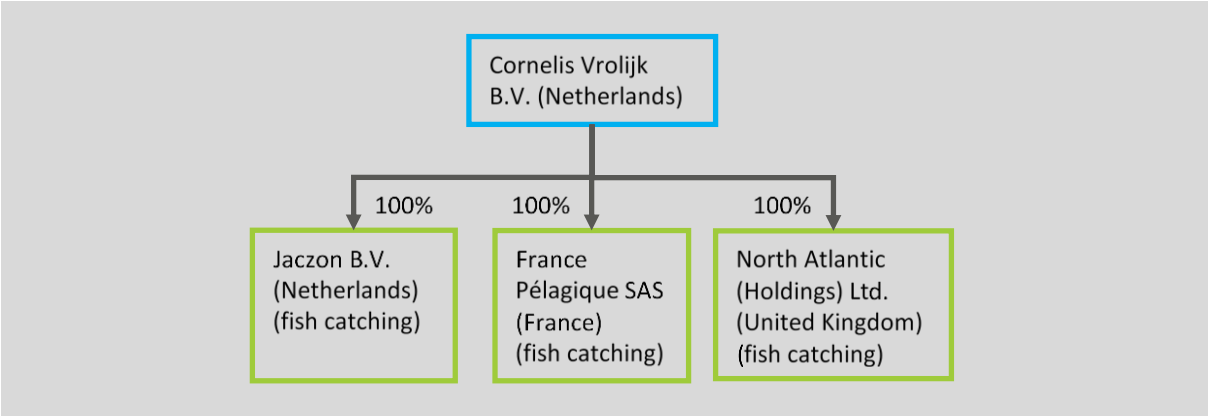
Sources: *ORBIS database,* viewed in April 2016; Samherji (n.d.), "Home - Operations Abroad - U.K. - UK Fisheries", online: http://www.samherji.is/en/operations-abroad/u.k./uk-fisheries/, Samherji (n.d.), "Home - Erlend Starfsemi - Bretland - UK fisheries", online: http://www.samherji.is/is/erlend-starfsemi/bretland/uk-fisheries/, viewed in April 2016; Undercurrentnews (2016, March), "Samherji, P&P-owned Spanish firm orders new 80m trawler", online: https://www.undercurrentnews.com/2016/03/22/samherji-pp-owned-spanish-firm-orders-new-80m-trawler/, viewed in April 2016; Samherji (n.d.), "Home - Operations Abroad - U.K. - Seagold", online: http://www.samherji.is/en/operations-abroad/u.k./seagold/, viewed in April 2016; Samherji (n.d.), "Home - Operations Abroad - Germany - DFFU", online: http://www.samherji.is/en/operations-abroad/germany/dffu/, viewed in April 2016; Icefresh (2016, December), "Icefresh GmbH und CR GmbH kaufen Anteile der norwegischen Fischereigesellschaft Nergaard AS", online: http://www.icefreshseafood.de/de/ber/nachrichten/icefresh-gmbh-und-cr-gmbh-kaufen-anteile-der-norwegischen-fischereigesellschaft-nergaard-as/, viewed in April 2016; Samherji (n.d.), "Home - Operations Abroad - Poland - Arctic Navigations", online: http://www.samherji.is/en/operations-abroad/poland/arctic-navigations/, viewed in April 2016; Samherji (n.d.), "Home - Operations Abroad - Poland - Atlantex", online http://www.samherji.is/en/operations-abroad/poland/atlantex/, viewed in April 2016; Samherji (n.d.), "Home - Operations in Iceland - see here - Shares in Icelandic Companies", online: http://www.samherji.is/en/moya/page/shares_iceland/, viewed in May 2016.

6.3.5. France Pélagique

France Pélagique was established in 1988. The company engages in the catching of pelagic species such as mackerel, herring, horse mackerel, blue whiting and sardines. The company owns two freezer trawler vessels, both registered in Fécamp, France (Cluster Maritime Français, n.d). In 2014, France Pélagique's total assets amounted to €18 million while its revenue was €24 million (ORBIS, 2016a).

Figure 25 presents the company structure of France Pélagique. As we can see from the figures, Cornelis Vrolijk is the parent company of France Pélagique. Cornelis Vrolijk is a Dutch family company established in 1880. The company, through its subsidiaries in France, the United Kingdom and the Netherlands, engages in fish catching and in the trading of pelagic fish. The company owns and operates freezer trawlers, as well as beam trawlers. The company also operates cold storage facilities in IJmuiden and Scheveningen, the Netherlands (Cornelis Vrolijk, n.d.). Cornelis Vrolijk distributes its products to the markets of Nigeria, Ivory Coast, Egypt, Eastern Europe, China and Japan (Cornelis Vrolijk, n.d.).

Figure 25. Company structure of France Pélagique



Sources: *Orbis* "Cornelis Vrolijk", viewed in May 2016; Cornelis Vrolijk (n.d.), "About us", online: http://www.cornelisvrolijk.eu/about-us/, viewed in May 2016; Cluster Maritime Français "Home - Downloads - List of members by sectors - Fish and fish farming - France Pélagique", online: http://www.cluster-maritime-francais.fr/membres_peche_en.php/, viewed in May 2016.

The company structure of France Pélagique, particularly of parent company Cornelis Vrolijk (see section 9.3.5), shows a high level of structural horizontal integration. Cornelis Vrolijk has investments in fish catching in a number of European countries. Additionally, due to the fact that France Pélagique operates freezer trawlers, there is also a degree of primary processing being carried out by the fishing vessels.

6.4. Integration

From the company analysis in section 9.3 we can conclude that there is a degree of structural vertical integration in a number of fish catching companies in France. Only one company has investments through the whole value chain from fish catching to retail. There is a higher degree of structural horizontal integration, particularly in the form of investments from foreign fish catching companies in France.

Jacques Pichon of fish producer organisation Les Pêcheurs de Brettagne states that there is little vertical or horizontal integration in his PO, and in France in general (Pichon, 2016). He reports that more horizontal integration takes place at the level of the processing companies (ibid.). Pichon notes that there are more than 800 vessels in his PO, but these are mostly owned by individuals (ibid.). Scapêche (see section 6.3.1) is a member of the Les Pêcheurs de

Brettagne PO. However, other examples of vertical integration tend to be very small-scale (ibid.). In such cases a fishermen may own at the most 2-3 vessels, and a shop from which to sell the produce (ibid.).

Pichon attributes this lack of vertical integration, particularly in his PO, due to the fact that the fisheries are very mixed (Pichon, 2016). For example, in the Les Pêcheurs de Brettagne PO approximately 40 different species, in 4-5 different sizes, and three grades of quality are marketed each day (ibid.). The majority of the vessels in the PO are bottom trawlers, therefore it is difficult for the fishermen to forecast their harvest (ibid.). The small number of small pelagic vessels in the Les Pêcheurs de Brettagne PO engage in more targeted fishing (ibid.). This enables them to enter off-take arrangements. Bottom trawlers, on the other hand, are less targeted and therefore sell their produce at auction (ibid.).

There is a degree of horizontal integration in the fish catching sector domestically in France. Fishermen tend to buy vessels that have the licenses they are interested in, and are active in areas where the fisherman is already active (Pichon, 2016). French fishing licences are vessel, species, fishing area, and fishing gear specific (ibid.). Licences from old boats can be moved to new boats to expand the quota capacity (ibid.).

In France, horizontal integration within the fish catching and processing sectors is not observed in terms of the international expansion of French fishing companies. On the other hand, horizontal integration is present in the wholesale sector of the fish industry (distribution of fish products). In other words, French companies are most likely to fish within French waters, then process the catch in their nationally held subsidiaries but in the end distribute it internationally within the EU. The most representative example of this form of integration is Les Mousquetaires group with its vast European retail presence.

A recent trend noted by the French respondents was the increased investments of Spanish fishing companies in the French fishing sector. Pichon states that this is due to a number of factors. Firstly, the national fixed percentage of total allowable catch (TAC), known as the relative stability key, is very low for Spain (Pichon, 2016). This has historical reasons. When Spain joined the EU and became subject to the CFP it was allocated its relative stability key on the basis of its historic track record of fish harvests (ibid.). However, at that time the capacity of its fleet was very low (ibid.). Secondly, there is now overcapacity in the Spanish fishing fleet (ibid.). This puts a lot of pressure on fishing companies to access more quotas (ibid.). There have been a number of decommissioning schemes to reduce the size of the fleet (ibid.). However, there is still overcapacity in the fleet (ibid.). A number of Spanish fishermen have used the money they received from decommissioning their vessels in Spain to purchase French licences, move these on to the old Spanish vessel which is then flagged in France while the old French vessel is sold on without a fishing licence (ibid.). The Spanish companies then try to join French POs with their newly flagged French vessels. As with French companies, Spanish fishermen try to join POs that have a large proportion of the total French quota of the species that they wish to market (ibid.).

Non-structural methods of horizontal integration are not very commonly utilised, according to Pichon. France does not employ the ITQ fisheries management system. In France, fish resources are considered public goods, and the government plays a leading role in allocating fishing licences and catch quotas (Pichon, 2016). Quotas are non-transferrable, and are based on historic track-records (ibid.). Quota allocation is determined at the national level and then handed down to the POs which further subdivide the quota allocations (ibid.). Given that quotas are non-transferable, there is no buying and selling of quota in France (ibid.). Romain Fageot of Scapêche states that quota leasing is illegal in France, however there is a degree of quota swapping (Fageot, 2016).

7. PORTUGAL

KEY FINDINGS

- Blue economy, i.e. the use of the sea and its resources, accounts for 3% of GDP
- 95% of fishing enterprises single vessel operations
- Fish product imports more than twice the value of exports
- Structural vertical integration is evident
- Limited structural horizontal integration

7.1. Composition of the Portuguese fishing industry

Although the Portuguese fisheries industry only makes a limited contribution to GDP, the sector is of great socioeconomic significance to the country as a whole, and particularly to coastal areas (European Maritime and Fisheries Fund, 2016, p. 1). The fish catching sector alone employs 17,877 people, approximately 9,307 full-time equivalents (FTEs) (see Table 22). The fish processing industry further employs approximately 13,646 workers, approximately 6,308 FTEs. The blue economy accounts for approximately 3% of Portuguese GDP (ibid.).

Portugal has a fleet of 8,216 fishing vessels, with a combined gross tonnage of 99,700 gross tonnage (GT). 95% of the fishing enterprises are single vessel enterprises (see Table 22). In 2013, 51% of the fishing fleet in number and 22% in terms of capacity was considered inactive. One explanation for this is the poor state of some pelagic and demersal fish stocks which has led to low fishing production and low landing income (European Maritime and Fisheries Fund, 2016, p. 1-2).

The per capita consumption of fish products in Portugal is the highest in Europe at 56.5 kilograms. It is more than twice the average EU per capita consumption of 22.7 kilograms (European Commission: DG Fisheries and Maritime Affairs, 2007, p. 1). As Table 22 shows, Portugal has a negative trade balance for fish and fish products. It imports more than twice the value of fish products that it exports. This indicates that domestic demand exceeds domestic production. Spain, Sweden and the Netherlands were the largest suppliers of fish products imported by Portugal, accounting for 37%, 15% and 10% respectively of total imports of fish products in 2015 (TradeMap, n.d.). 65% of all fish products exported by Portugal in 2015 was destined for Spain. Italy, Brazil, France, and Angola completed the top five, accounting for between 3% and 9% of total fish products exported by Portugal (TradeMap, n.d.).

Table 22. Overview of fisheries industry in Portugal

Segment	Measure	Value	Proportion of total fishing enterprises / GDP / workforce
Fish catching	Enterprises with more than one vessel (2013)	176	5%
	Landing income (2013, € mlns)	358	0.22%
	Employment in the fish catching sector (2013)	17,877	0.40%
Processing	Employment in the fish processing sector (2013)	13,646	0.30%
	Processing production (2013, € mlns)	2,156	1.31%
Trade	Imports of fish (€ mlns)	1,392	0.88%
	Exports of fish (€ mlns)	684	0.38%

Source: Scientific, Technical and Economic Committee for Fisheries (2015, July), *The 2015 Annual Economic Report on the EU Fishing Fleet: Electronic Appendices*, Publications Office of the European Union, Luxembourg; EUROSTAT (2015, November), "GDP and main components - Current prices [nama_gdp_c]", online: http://ec.europa.eu/eurostat/data/database, viewed in January 2016; EUROSTAT (2015, October), "Employment (main characteristics and rates) - annual averages [lfsi_emp_a]", online: http://ec.europa.eu/eurostat/data/database, viewed in January 2016; TradeMap (n.d.), "List of importers for the selected product: Product: 03 Fish, crustaceans, molluscs, aquatic invertebrates nes", online: http://www.trademap.org/, viewed in April 2016; TradeMap (n.d.), "List of exporters for the selected product: Product: 03 Fish, crustaceans, molluscs, aquatic invertebrates nes", online: http://www.trademap.org/, viewed in April 2016.

7.2. Producer organisations

Table 23 provides an overview of the producer organisations in Portugal currently recognized by the European Union authorities.

Table 23. Producer organisations in Portugal

Producer Organisations
Associação da Pesca Artesanal da Região de Aveiro (APARA) (OP-20)
Associação de Produtores de Atum e Similares dos Açores (APASA) (OP-14)
Cooperativa de Comercialização, C.R.L. (PORTO DE ABRIGO) (OP-16)
Cooperativa de Pesca de Setúbal, Sesimbra e Sines, C.R.L. (SESIBAL) (OP-10)
Cooperativa de Pesca do Arquipélago da Madeira (COOPESCAMADEIRA) (OP-2)
Cooperativa de Pesca Geral do Centro (OPCENTRO) (OP-8)
Cooperativa de Produtores de Peixe do Centro Litoral, C.R.L. (CENTRO LITORAL (OP-18)
Cooperativa de Produtores de Peixe, C.R.L. (VIANAPESCA) (OP-12)
Cooperativa de produtors de peixe do Norte (PROPEIXE) (OP-6)

Producer Organisations
Cooperativa dos Armadores da Pesca Artesanal, C.R.L. (CAPA) (OP-13)
Cooperativa dos Armadores de Pesca do Barlavento, C.R.L. (BARLAPESCAS) (OP-7)
Organização de Produtores da Pesca, C.R.L. (ARTESANALPESCA) (OP-11)
Organização de Produtores de Pesca do Algarve, C.R.L. (OLHÃOPESCA) (OP-19)
Organização de Produtores de Pexsca Artesanal (APROPESCA) (OP-9)
Organização de Produtores, ACE (FENACOOPESCAS) (OP-5)
Pesca de Bivalves, CRL (BIVALMAR) (OP-21)

Source: Official Journal of the European Union (2013, March), "Information and notices", 56, p. 68/40-42; DG Maritime Affairs and Fisheries (2008, July), *Intermediate Evaluation of the Advisory Committee for Fisheries and Aquaculture*, p. 19-20.

7.3. Company analysis

The Department for Natural Resources, Security and Maritime (DGRM) of the Portuguese Ministry of Agriculture, Rural Development and the Sea lacked company-specific catch and quota data. Data were available regarding approved factory ships and freezer vessels. An analysis of the corporate structures was carried out for seven of the nine companies with more than one approved factory ship or freezer vessel. There was insufficient data regarding the remaining two companies to determine their corporate structures.

Table 24. Top vessel owners Portugal

Parent company	Vessel type	Number of vessels
Largispot	Factory ship	3
	Freezer vessel	2
Aquavita	Freezer vessel	3
Pedro França	Factory ship	3
Pescarade	Freezer vessel	2
Hydrex	Factory ship	2
Anfersa Pescas	Freezer vessel	2
Pesquera Downey	Freezer vessel	2

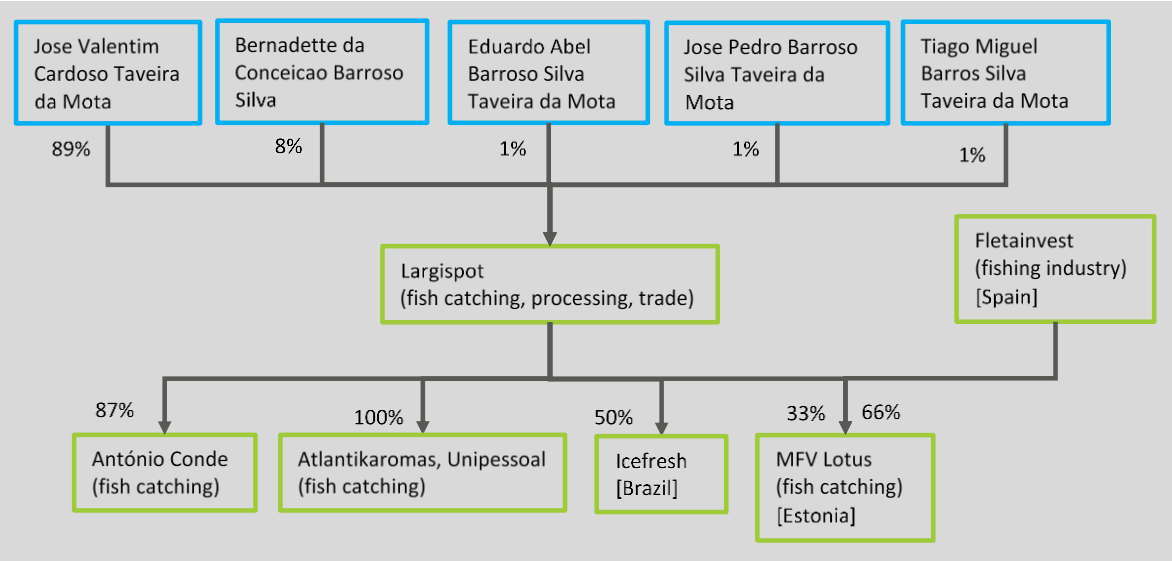
Source: Department for Natural Resources, Security and Maritime (2016, January), *Navios-Fábrica Aprovados*; Department for Natural Resources, Security and Maritime (2016, January), *Navios Congeladores Aprovados*.

7.3.1. Largispot

As Table 24 shows, Largispot has three approved factory ships and two freezer vessels. It is possible that Largispot also has other, smaller, fish catching vessels. Figure 26 provides an overview of the Largispot company structure. It shows that Largispot has two fish catching subsidiaries in Portugal, António Conde and Atlantikaromas. It further has a subsidiary in Brazil, and an associate fish company in Estonia whose ultimate parent is a Spanish fishing industry company, Fletainvest.

In 2014 Largispot generated a revenue of €20 million, down from €33 million in 2013. In 2014, the company had total assets of €18 million. 53% of Largispot's products were exported in 2014, the remainder was destined for the domestic market (Largispot, n.d).

Figure 26. Company structure of Largispot



Source: *Orbis*, "Largispot", viewed in April 2016; Largispot (n.d.), "Home", online: http://largispot.com/en/, viewed in April 2016; MFV Lootus (2015), *Annual Report 2014*, p. 18.

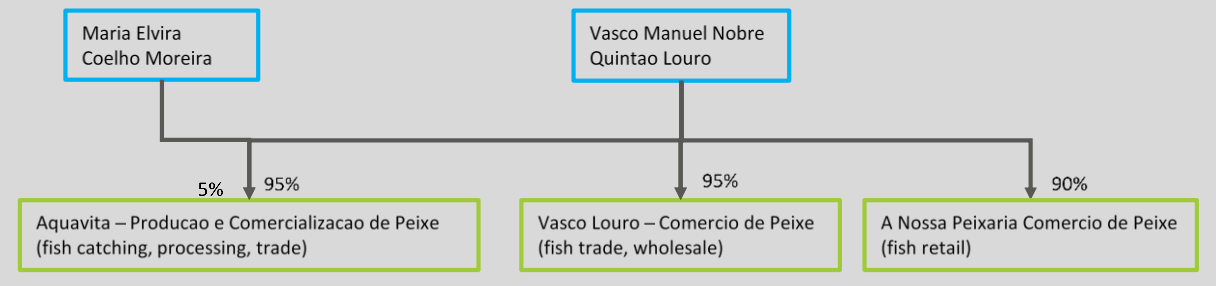
Largispot shows evidence of both vertical and horizontal integration. It has investments in both upstream fish catching, midstream processing and downstream trade. Horizontal integration is seen in its investments in fish catching companies both domestically, as well as investments in fish catching companies in other countries. Such investments are likely to be driven, at least in part, by an access to quota motivation.

7.3.2. Aquavita

As Table 24 shows, Aquavita has three approved freezer vessels. It is possible that Aquavita also has other, smaller, fish catching vessels. Figure 27 provides an overview of the Aquavita company structure. It shows that Aquavita does not have any subsidiary companies. However, the owners of Aquavita also have investments in two other related companies. These companies are active in the fish trade, and in wholesale and retail activities.

No information on Aquavita's turnover could be found. The company had total assets of €890,000 in 2014.

Figure 27. Company structure of Aquavita



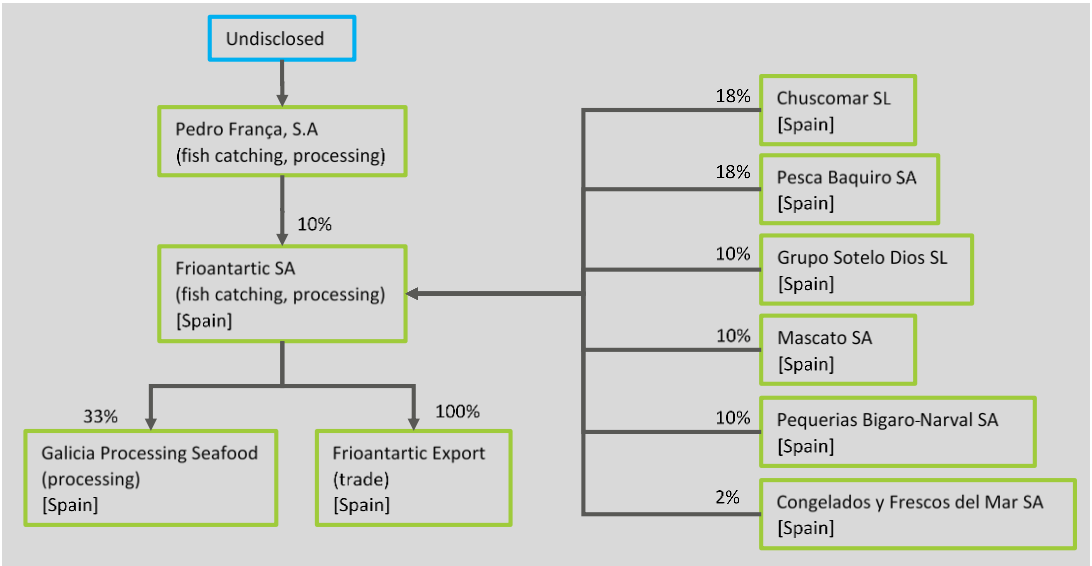
Source: *Orbis*, "Aquavita – Producao e Comercializacao de Peixe", viewed in April 2016.

The company structure of Aquavita does not show evidence of either vertical or horizontal integration. However, companies also owned by the owners of Aquavita are active in various stages in the fisheries supply chain. This indicates that the owners of Aquavita employ a vertical integration business strategy.

7.3.3. Pedro França

As Table 24 shows, Pedro França has three approved factory ships. It is possible that Pedro França also has other, smaller, fish catching vessels not detailed in the DGRM data. Figure 28 provides an overview of the Pedro França company structure. It shows that the company has a minority stake in the Spanish fish catching and processing company Frioantartic. Six Spanish companies have the remaining stakes in Frioantartic. In 2014, Pedro França generated a turnover of €12 million, with similar levels in 2013. The company had total assets of €13 million in 2014 (ORBIS, 2016).

Figure 28. Company structure of Pedro França



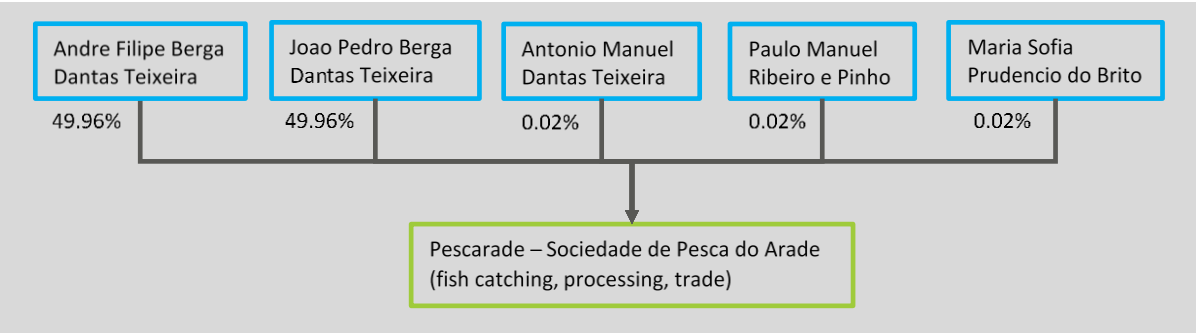
Source: *Orbis*, "Pedro França, S.A", viewed in April 2016; *Orbis*, "Frioantartic SA", viewed in April 2016.

Pedro França's company structure indicates a degree of both vertical and horizontal integration. Vertical integration is found in the investments throughout the fish product supply chain, particularly in catching, processing and trade. Horizontal integration is evidenced by the company's investments in Spanish Frioantartic. This indicates a desire to access both quotas as well as extra processing and distribution channels.

7.3.4. Pescarade

As Table 24 shows, Pescarade has two approved freezer vessels. It is likely that Pescarade also has other, smaller, fishing vessels not detailed in the DGRM data. Figure 29 provides an overview of the Pescarade company structure. It shows that Pescarade is a family-owned fully-integrated fishing company. It does not have any identified subsidiaries or affiliates. The company generated a turnover of €3 million in 2014, down from €3.5 million in 2013. In 2014, Pescarade had total assets of €6.7 million (ORBIS, 2016).

Figure 29. Company structure of Pescarade



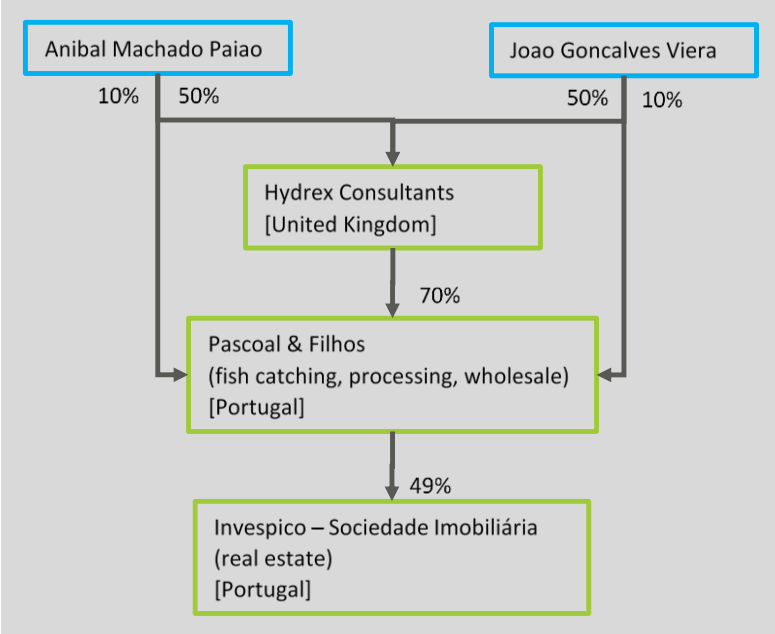
Source: Orbis, "Pescarade – Sociedade de Pesca do Arade", viewed in April 2016.

Pescarade shows evidence of vertical integration. Based on the company's business activities, Pescarade is a fully-integrated fisheries company.

7.3.5. Hydrex

As Table 24 shows, Hydrex has two approved factory ships. It is possible that Hydrex, and its subsidiaries, also own other smaller fishing vessels not detailed in the DGRM data. Figure 30 provides an overview of the Hydrex company structure. The company is the majority shareholder of Pascoal & Filhos. The owners of Hydrex also directly own minority shares in Pascoal & Filhos. The subsidiary's main activities are in the integrated fisheries industry, including fish catching, processing and wholesale. Pascoal & Filhos also owns one subsidiary engaged in real estate. In 2014, Pascoal & Filhos generated revenue of €49 million, down from €60 million the previous year. The company had total assets of €78 million in 2014 (ORBIS, 2016).

Figure 30. Company structure of Hydrex



Source: *Orbis*, "Hydrex Consultants Limited", viewed in April 2016; *Orbis*, "Pascoal & Filhos, S.A", viewed in April 2016

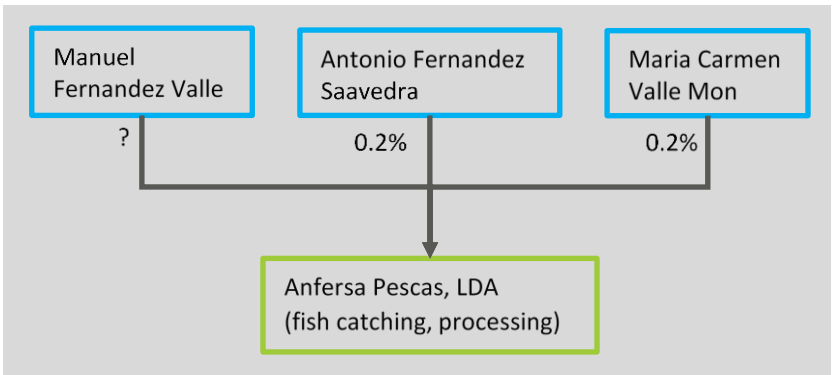
The Hydrex company structure indicates vertical integration, as Pascoal & Filhos is a fully-integrated fisheries company.

7.3.6. Anfersa Pescas

As Table 24 shows, Anfersa Pescas has two approved freezer vessels. It is likely that the company also owns smaller fishing vessels not detailed in the DGRM data. Figure 31 provides an overview of the Anfersa Pescas company structure. It shows that the company has both fish catching and processing activities.

Anfersa Pescas generated revenue of €1 million in 2014, up from €733,000 in 2013. In 2014 the company had total assets of €716,000 (ORBISk, 2016).

Figure 31. Company structure of Anfersa Pescas



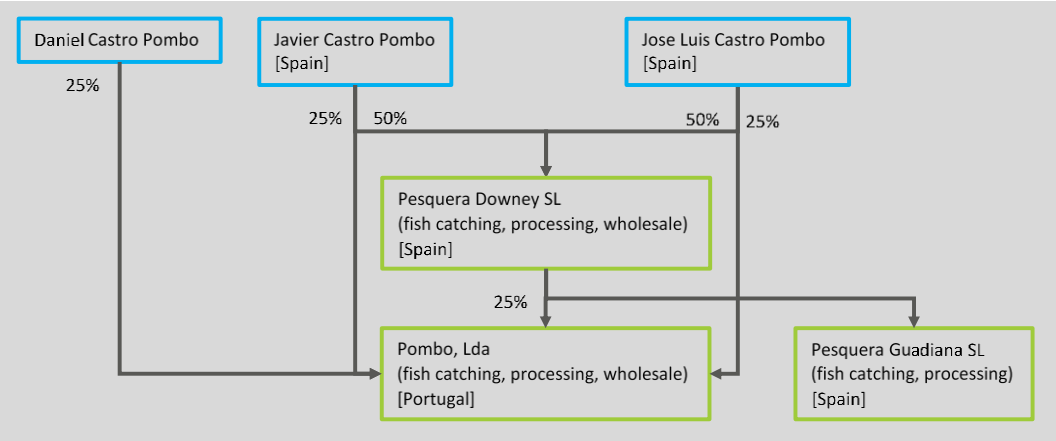
Source: *Orbis*, "Anfersa Pescas", viewed in April 2016.

Anfersa Pescas only shows evidence of a degree of vertical integration through its business activities in both fish catching and processing.

7.3.7. Pesquera Downey

Table 24 shows that Pesquera Downey has two approved freezer vessels. It is likely that the company also owns smaller fishing vessels not detailed in the DGRM data. Figure 32 provides an overview of the Pesquera Downey company structure, showing that it is Spanish owned. It shows that the Spanish company has a significant investment in the Portuguese fishing industry through Pombo, to whom the freezer vessels in Portugal are registered. The owners of the Pesquera Downey also have direct ownership stakes in Pombo. Pesquera Downey further has a fish catching and processing subsidiary in Spain. In 2014, Pesquera Downey generated revenue of €1.3 million with similar levels in 2013. In 2014, the company had total assets of €3 million (ORBISl, 2016).

Figure 32. Company structure of Pesquera Downey



Source: *Orbis*, "Pombo", viewed in April 2016; *Orbis*, "Pesquera Downey", viewed in April 2016; *Orbis*, "Pesquera Guadiana", viewed in April 2016.

The Pesquera Downey company structure shows evidence of both vertical and horizontal integration. Vertical integration is found in the fact that the company has activities in fish catching, processing and wholesale. Horizontal integration is found in the investments in fish catching companies in both Portugal and Spain. This is most likely motivated by the desire for access to both quotas and processing facilities.

7.4. Integration

In general, the analysed fish catching companies active in Portugal are vertically integrated. This is probably due in part to the selection bias, as the only available and reliable list of fishing companies active in Portugal with an indicator of size was the DGRM list of approved freezer vessels and factory ships. Freezer vessels and factory ships are mostly used by integrated companies as part of the processing is conducted on-board.

A number of analysed companies also show evidence of horizontal integration. Only one, Largispot, had investments in more than one fish catching company in Portugal. Other companies that showed evidence of horizontal integration were either owned by Spanish companies or had investments in Spanish companies. This shows the close ties between the fisheries industries in both these countries, as reflected also in the fisheries trade relations (see section 8.1). There does not seem to be a strong motivation to increase quota through investments in other Portuguese fishing companies, or fishing companies in other countries. This seems counter intuitive given the situation of fish stocks in Portuguese waters (see section 7.1).

8. SPAIN

KEY FINDINGS

- Fish processing industry largest in Europe
- Largest importer of fish products in Europe
- High levels of structural vertical integration
- Limited domestic structural horizontal integration, significant international investments
- Non-structural vertical integration more common than structural
- No quota trade due to overcapacity, quota swapping common

8.1. Composition of Spanish fishery industry

Spain has the biggest fishing industry in the EU. The country's location is of geostrategic importance, as it is positioned in the far south-west of Europe, enjoying entry points into both the Atlantic and the Mediterranean, while also offering good conditions for marine and fresh water aquaculture. The country's coastline is 8,000 km long, representing 7.4% of the total EU-23 coastline (European Commission - Maritime affairs and Fisheries, 2016, p. 1).

In 2013, the Spanish fleet amounted to 19,720 vessels, of which 13% were inactive. Total employment in the fish catching sector was estimated at 31,166 full-time workers, while the total volume of fish landings was approximately 882 thousand tonnes of seafood, corresponding to a total value of €1,982 million (European Commission - Maritime affairs and Fisheries, 2016, p. 1). Half of the Spanish fishing fleet (50%) is located in the Galicia region, while Andalusia (15%) and Catalonia and the Canary Islands (9% together) follow (Eurofish, 2015c). 94% of the fishing enterprises in Spain own only one vessel (see Table 25). The most important fished species are tuna, albacore and needlefish, cod, hake, herring, sardines, and anchovies (Eurofish, 2015c).

The Spanish fish processing industry is the largest in Europe. In 2013, its turnover reached €4.6 billion, while total employment, in the same year, was estimated at 17,702 full-time workers (or 18,390 jobs) (European Commission - Maritime affairs and Fisheries, 2016, p. 1). The industry is diverse. It is focused mainly on canning but also on frozen and fresh processed seafood. The canning sector has a production volume of 348,000 tonnes and a value of nearly €2 billion and it is composed mostly of medium-sized companies (Eurofish, 2015c). Tuna is the most important species in the sector, amounting to 69% of the total production volume, while other key species include sardines and anchovies (ibid.).

Leading vendors of fish and seafood products in Spain include: Grupo Freiremar, Grupo Calvo, Pescanova. Supermarkets and hypermarkets account for more than 50% of the distribution of fish and seafood products in Spain (Infinity Research, 2015a, p.25).

The Spanish fish and seafood market was, in 2015, estimated to be worth €13 billion (Infinity Research, 2015a, p.25). Indications suggest it will grow to €16 billion by 2020. Spain accounted for 19.6% of European fish and seafood revenue in 2015 (ibid.). Globally, Spain is the fourth-largest market for imported fish and seafood, following the US, Japan and China (ibid.). It is the largest European importer of fish (ibid.). Spanish per capita annual fish consumption was estimated to be 26.4 kg per person in 2014 (ibid.).

In 2015, Spain exported €2.6 billion in fish and fish products (TradeMap, n.d.). 75% of this was destined for EU member countries (ibid.). Italy, Portugal and France were the three largest export destinations, accounting for 32%, 20%, and 12% of the country's total exports respectively (ibid.).

Spainish fish imports had a value of €5 billion in 2015. 61% of these imports originated in non-EU member countries (TradeMap, n.d.). The largest exporter of fish to Spain is Morocco, accounting for 9% of the country's total imports. Argentina, France, Portugal, the Netherlands, and China all exceeded the 5% barrier (ibid.).

Table 25 gives an overview of the fish industry in Spain. The fish catching and processing segments together accounted for 1% of the country's GDP, while 0.4% of the country's workforce is employed in the fish industry.

Table 25. Overview of fish industry in Spain

Segment	Measure	Value	Proportion of total fishing enterprises / GDP / workforce
Fish catching	Enterprises with more than one vessel (2014)	607	7%
	Landing income (2013, € mlns)	1,900	0.19%
	Employment in the fish catching sector (2013)	33,129	0.19%
Processing	Employment in the fish processing sector (2013)	36,648	0.21%
	Processing production (2013, € mlns)	9,066	0.88%
Trade	Imports of fish (2015, € mlns)	5,038	0.47%
	Exports of fish (2015, € mlns)	2,595	0.24%

Source: Scientific, Technical and Economic Committee for Fisheries (2015, July), *The 2015 Annual Economic Report on the EU Fishing Fleet: Electronic Appendices*, Publications Office of the European Union, Luxembourg; EUROSTAT (2015, November), "GDP and main components - Current prices [nama_gdp_c]", online: http://ec.europa.eu/eurostat/data/database, viewed in January 2016; EUROSTAT (2015, October), "Employment (main characteristics and rates) - annual averages [lfsi_emp_a]", online: http://ec.europa.eu/eurostat/data/database, viewed in January 2016; TradeMap (n.d.), "List of importers for the selected product: Product: 03 Fish, crustaceans, molluscs, aquatic invertebrates nes", online: http://www.trademap.org/, viewed in January 2016; TradeMap (n.d.), "List of exporters for the selected product: Product: 03 Fish, crustaceans, molluscs, aquatic invertebrates nes", online: http://www.trademap.org/, viewed in January 2016.

8.2. Producer organisations

Table 26 gives an overview of the producer organisations in Spain. Due to lack of data availability the number of vessels and members is not provided.

Table 26. Producer organisations in Spain

Producer Organisation
Asociación de Productores de Pesca de Carboneras, S.A.
Asociación de Productores de Rodababallo
Asociacion Empresarial de Productores de Cultivos Marinos (APROMAR)
Asociación Española de Ciprinicultores y de Acuicultura continental de Aguas Templadas (AECAC)
Organització de Productors del Peix Blau de Tarragona
Organizacion de Productores Anacef
Organización de Productores Artesanales de Cantabria (OPACAN)
Organización de Productores Artesanales de Galicia (OPAGA)
Organizacion de Productores Artesanales del Estrecho
Organizacion de Productores Asociados de Grandes Atuneros Congeladores (OPAGAC)
Organización de Productores de Acuicultura en Mar Abierto de Conil
Organización de Productores de Adsg Atrugal
Organización de Productores de Atún Rojo con Artes Decerco
Organizacion de Productores de Buques Congeladores Demerlúcidos Cefalópodos y Especies Varias
Organizacion de Productores de la Atunara
Organizacion de Productores de Marisco y Cultivos Marinos de la Provincia de Pontevedra
Organizacion de Productores de Mejillon de Galicia (OPMEGA)
Organización de Productores de Palangreros Guardeses
Organizacion de Productores de Pesca de Altura de Cantabria (OPECA)
Organización de Productores de Pesca de Altura del Puertode Ondárroa (OPPAO)
Organizacion de Productores de Pesca de Bajura de Guipuzcoa (OPEGUI)
Organizacion de Productores de Pesca de Bajura de Vizcaya (OPESCAYA)
Organizacion de Productores de Pesca de Palangre (ORPAL)
Organizacion de Productores de Pesca Fresca del Puerto de la Coruña
Organización de Productores de Pesca Fresca del Puerto de Vigo
Organizacion de Productores de Pesca Fresca del Puerto y Ria de Marin (OPROMAR)

Producer Organisation
Organización de Productores de Piscicultura Marina de Andalucía
Organizacion de Productores de Túnidos Congelados (OPTUC)
Organización de Productores de Túnidos y Pesca Fresca de Laisla de Tenerife (ISLATUNA)
Organizacion de Productores de Túnidos y Pesca Fresca de la Provincia de las Palmas
Organización de Productores Pescadores de Carboneras, Sociedad Cooperativa Andaluza
Organizacion de Productores Pescagalicia
Organización de Productores Pesqueros Artesanales Lonjade Conil
Organizacion de Productores Pesqueros Chirlas Deandalucía
Organización de Productores Pesqueros de Almadraba
Organización de Productores Pesqueros de Almeria, S.L.
Organización de Productores Pesqueros de la Marina Alta
Organización de Productores Pesqueros de Sant Carles de Larápita OPP Rápita
Organización de Productores Pesqueros Opmallorcamar
Organizacion de Productores Piscicultores
Organizacion de Productores Puerto de Celeiro, S.A.

Sources: Ministerio de Agricultura, Alimentación y Medio Ambiente (2015, March), *Directorio de Organizaciones de Productores y Asociaciones de Organizaciones de Productores*.

8.3. Company analysis

This section provides an analysis of the company structures of seven major Spanish fish catching companies. These companies have been described as significant players in recent market research, with additional companies referred to by interviewees (Infinity Research, 2015a, p.25).

8.3.1. Grupo Freiremar

Grupo Freiremar was established in 1974 in Gran Canaria, Spain. The company owns and operates 35 freezer vessels including longliners and trawlers. Grupo Freiremar's registered gross tonnage is over 13,000 metric tons. The group harvests globally - in Europe, Africa, Argentina and Canada (Infinity Research, 2015a, p.42-43). Grupo Freiremar has processing plants on the Canary Islands, and in Valencia and Ria Vigo, Spain. Freiremar has been under insolvency since 2013 (ORBISm, 2016). The company's total fishing quota in the waters adminstered by Northwest Atlantic Fisheries Organization (NAFO) was passed on to two other Spanish companies, namely Moradiña and Hermanos Gandon (FIS, 2014).

Table 27 gives an overview of the Grupo Freiremar company structure, reporting on the company's main subsidiaries and associated companies. (A company is considered a subsidiary company if the parent's shareholding exceeds 50%). All identified subsidiaries are outside the EU. Vertical and horizontal integration thus occurs domestically in Spain and outside the EU.

Table 27. Company structure of Grupo Freiremar

Subsidiary / Associated company	Country	Shareholding
Beecon Marine	Panama	100%
Bonfred	Spain	98%
Bouza Mauritania de Peche	Mauritania	49%
Centropesca	Spain	77%
Cephapeche	Morocco	50%
Comercial d' Argoni	Panama	50%
Conpesa Mercado	Spain	99%
Credelmar	Uruguay	25%
Elaborados Freiremar	Spain	96%
Elaborados Freiremar Vigo	Spain	78%
Fonseca	Argentina	100%
Freirefrio	Spain	94%
Freiremar Comercial	Spain	n.a.
Freiremar Maroc	Morocco	89%
Freirewin Limited	n.a.	75%
Isla Alegranza	Uruguay	25%
Maruxia	Spain	100%
Societe de Peche Canario Senegalaise	Senegal	49%
Urtizberea Anaiak	Argentina	25%

Source: *ORBIS database*, viewed in April 2016.

The Grupo Freiremar shows a high degree of horizontal integration with investments in a large number of fish catching companies. These companies are largely located outside the EU.

8.3.2. Grupo Calvo

Grupo Calvo (Luis Calvo Sanz, S.A,) was established in 1940 and it is based in La Coruña, Spain (Bloomberg, n.d.). Currently, the company is engaged in fishing, processing (canning) and commercialisation of fish products. It owns a fleet consisting of six purse seiners, two reefer vessels and one auxiliary vessel. The company mainly fishes and processes tuna (Grupo Valvo, n.d.). The company also owns two canning factories in Spain, one tuna loin processing and canning factory in El Salvador, and one multi-product canning factory in Brazil (Grupo Calvo, 2014, p. 15). Its main brands include Gomes da Costa, Calvo, and Nostromo (Grupo Calvo, n.d.). In 2014, the company's total assets amounted to €372 million, while its revenue was €572 million (ORBISn, 2016).

Table 28 gives an overview of the Grupo Calvo company structure, reporting on the company's main subsidiaries and associated companies. (A company is considered a subsidiary company if the parent's shareholding exceeds 50%). As we can see from the Table, Grupo Calvo, through its subsidiaries and associated companies' activities, is vertically integrated, covering all activities within the fish industry (fishing, processing, and distribution of fish products). Groupo Calvo holds subsidiaries in Europe, Central America and Africa; thus the company is internationally horizontally integrated. However, Grupo Calvo fish catching companies are either located in Spain or outside the EU.

Table 28. Company structure of Grupo Calvo

Subsidiary / Associated company	Country	Activity	Shareholding
Calvo Conservas El Savador	El Salvador	Food production	100%
Calvo Consignataria Centroamericana	El Salvador	Fishing	100%
Calvo Distribucion Alimentaria Costa Rica	Costa Rica	Distribution	100%
Calvo Distribucion Alimentaria El Salvador	El Salvador	Distribution	100%
Calvo Distribucion Alimentaria	Spain	Distribution	100%
Calvo Envases	Spain	Can production	100%
Calvoconservas El Salvador	El Salvador	Food production	100%
Calvopesca Atlántico	Cape Verde	Fishing	100%
Calvopesca El Salvador	El Salvador	Fishing	100%
Calvopesca	Spain	Fishing	100%
Cantábrica de Túnidos	Spain	Fishing	100%
Conservas Premium	Spain	Distribution	75%
Conservera de Esteiro	Spain	Food production	100%
GDC Alimentos	Brazil	Food production; can production	100%
GDC Argentina	Argentina	Distribution	3%
Gestra Corporation	Panama	Fishing	100%
Luis Calvo Sanz de El Salvador	El Salvador	General services	58%
Nostromo	Italy	Distribution	100%

Sources: Grupo Calvo (2014, August), *Grupo Calvo Corporate Report 2012-13,* p. 25; *ORBIS database*, viewed in April 2016.

The company structure of Grupo Calvo shows evidence of both structural vertical and structural horizontal integration. The company has activities in both the upstream and midstream

segments through its investments in fish catching, processing and distribution. Grupo Calvo also shows evidence of structural horizontal integration through its investments in a large number of fish catching companies, predominantly located in South America.

8.3.3. Pescanova

Pescanova was established in 1960 by José Fernández López. At the moment, the company owns more than 100 vessels, almost 50 fish-farming plants and more than 30 processing plants. Pescanova is a vertically integrated company, present in five continents and more than 20 countries (Pescanova, n.d.). At the end of the 2014 fiscal year, the company's total assets amounted to €1.2 billion, while its revenue was €901 million (Pescanova, 2015, p. 3, p. 12).

The company's structure is comparatively complicated as the Pescanova Group comprises more than 160 companies (Pescanova, n.d.). Table 29 gives an overview of the Pescanova company structure, reporting on the company's main subsidiaries and associated companies. (A company is considered a subsidiary company if the parent's shareholding exceeds 50%).

Pescanova, through its subsidiaries and associated companies, engages in activities within the primary (aquaculture, fishing), secondary (processing of products) and tertiary (marketing of products) sectors of the fish industry. Thus, Pescanova can be considered a highly vertically integrated company. Due to the company's vast presence across many countries, Pescanova is also a horizontally integrated company. However, as with Grupo Calvo, Pescanova's fish catching companies are located either in Spain or outside the EU.

Table 29. Company structure of Pescanova

Subsidiary / Associated company	Country	Activity	Shareholding
Abad Exim Private	India	Fish processing	32%
Abad Overseas Private	India	Fish processing	45%
Acuicola el Rincón	Guatemala	Other	50%
Acuinova - Actividades Piscícolas	Portugal	Aquaculture	100%
American Shipping	Uruguay	Other	100%
Argenova	Argentina	Fishing; fish processing	100%
Arkofish	Argentina	Jigging	100%
Asociación Pesqueira Edipesca (Marnova)	Angola	Fishing	50%
Bajamar Séptima	Spain	Fish processing; marketing food products	100%
Eiranova Fisheries Limited	Ireland	Fish processing	100%
Entreposto Frigorífico de Pesca (Efripel) de Mozambique	Mozambique	Other	97%
Fricatamar	Spain	Other	100%
Frigodis	Spain	Other	100%
Frinova	Spain	Fish processing	90%
Frivipesca Chapela	Spain	Fish processing	100%

Subsidiary / Associated company	Country	Activity	Shareholding
Fukucho	Argentina	Jigging	100%
Harinas y Sémolas del Noroeste	Spain	Processing food products (other than seafood)	50%
Insuiña	Spain	Aquaculture	100%
Ittinova	Italy	Other	100%
Nova Guatemala	Guatemala	Aquaculture	100%
Novaocéano	Mexico	Fish processing	100%
Novaperu	Peru	Fish processing	100%
Novapesca Italia	Italy	Other	100%
Novapesca Trading	Spain	Other	100%
Pescafina Bacalao	Spain	Fish processing	100%
Pescafina	Spain	Marketing food products	99%
Pescafina Tampico	Mexico	Other	99%
Pescafresca	Spain	Marketing food products	100%
Pescanova (Portugal) - Produtos Alimentares	Portugal	Marketing food products	100%
Pescanova Alimentación	Spain	Marketing food products	100%
Pescanova Brasil	Brazil	Aquaculture	95%
Pescanova France	France	Marketing food products	100%
Pescanova Hellas	Greece	Marketing food products	100%
Pescanova	United States	Marketing food products	100%
Pescanova Italia	Italy	Marketing food products	100%
Pescanova Japan	Japan	Marketing food products	100%
Pescanova Polska	Poland	Marketing food products	99%
Pescanova Real Estate	USA	Other	100%
Pesquera Arnippo	Argentina	Jigging	100%
Pesquera Latina	Argentina	Jigging	100%
Pesquerias Belnova	Uruguay	Fishing	100%
Servicios y Contrataciones	Nicaragua	Aquaculture	67%

Subsidiary / Associated company	Country	Activity	Shareholding
Subgrupo Camanica	Nicaragua	Aquaculture	100%
Camarones de Nicaragua	Nicaragua	Aquaculture	100%
Camanica Zona Franca	Nicaragua	Aquaculture	100%
Pescanova Nicaragua	Nicaragua	Aquaculture	100%
Zona Franca Rio Real	Nicaragua	Aquaculture	100%
Subgrupo Nova Honduras	Honduras	Aquaculture	100%
Nova Honduras	Honduras	Aquaculture	100%
Camarones y Derivados Marinos	Honduras	Aquaculture	100%
Elizmar	Honduras	Aquaculture	100%
Lorette	Honduras	Aquaculture	100%
Nova Honduras Zona Libre	Honduras	Aquaculture	100%
Subgrupo Novagroup	South Africa	Fishing; other	92%
Novagroup	South Africa	Fishing; other	92%
Novacargo Namibia	South Africa	Fishing; other	42%
Novaship Logistics	South Africa	Fishing; other	92%
Novaship Namibia	South Africa	Fishing; other	92%
Novaspace	South Africa	Fishing; other	92%
Novatech	South Africa	Fishing; other	55%
Pilar Properties	South Africa	Fishing; other	92%
Pescanova Agents Namibia	South Africa	Fishing; other	92%
Eyethu Nova Joint Venture	South Africa	Fishing; other	49%
Suidor Fishing	South Africa	Fishing; other	49%
Suidor Trawling	South Africa	Fishing; other	49%
	South Africa	Fishing; other	92%
Novagroup	South Africa	Fishing; other	92%
Novacargo Namibia	South Africa	Fishing; other	42%
Novaship Logistics	South Africa	Fishing; other	92%
Subgrupo Novanam	Namibia	Fishing; processing seafood products; marketing food products	49%
Novanam Limited Namibia	Namibia	Fishing; processing seafood products; marketing food products	49%

Subsidiary / Associated company	Country	Activity	Shareholding
CMI Trawling	Namibia	Fishing; processing seafood products; marketing food products	48%
Conbaroya Fishing	Namibia	Fishing; processing seafood products; marketing food products	48%
Deep Ocean Fishing Namibia	Namibia	Fishing; processing seafood products; marketing food products	48%
Empire Trawling	Namibia	Fishing; processing seafood products; marketing food products	48%
Gendor Fishing	Namibia	Fishing; processing seafood products; marketing food products	47%
Gendor Holding	Namibia	Fishing; processing seafood products; marketing food products	48%
Gendor Resource Development	Namibia	Fishing; processing seafood products; marketing food products	48%
Glomar Fisheries	Namibia	Fishing; processing seafood products; marketing food products	48%
Kalahari Trawling	Namibia	Fishing; processing seafood products; marketing food products	48%
Lalandii Holdings	Namibia	Fishing; processing seafood products; marketing food products	48%
Nautilus Fishing Enterprises	Namibia	Fishing; processing seafood products; marketing food products	47%
Neavera Trawling	Namibia	Fishing; processing seafood products; marketing food products	47%
Novafish Shop	Namibia	Fishing; processing seafood products; marketing food products	47%

Subsidiary / Associated company	Country	Activity	Shareholding
Novafish Trawling	Namibia	Fishing; processing seafood products; marketing food products	47%
Novanam Fishing Industries of Namibia	Namibia	Fishing; processing seafood products; marketing food products	47%
Novanam Holdings of Namibia	Namibia	Fishing; processing seafood products; marketing food products	47%
Omuhuka Trawling	Namibia	Fishing; processing seafood products; marketing food products	48%
Oya Namibia	Namibia	Fishing; processing seafood products; marketing food products	19%
Pamwe Fishing	Namibia	Fishing; processing seafood products; marketing food products	23%
Skeleton Coast Trawling	Namibia	Fishing; processing seafood products; marketing food products	23%
Pomona Lobster Packers	Namibia	Fishing; processing seafood products; marketing food products	2%
Subgrupo Pescamar	Mozambique	Fishing; marketing food products	70%
Sociedade de Pesca de Mariscos (Pescamar)	Mozambique	Fishing; marketing food products	70%
Estaleiros Navais da Beira (Beiranave)	Mozambique	Fishing; marketing food products	50%
Pescabom	Mozambique	Fishing; marketing food products	70%
Compañía de Pesca del Océano Índico, (Copoic)	Mozambique	Fishing; marketing food products	70%
Pescas Carrelo (Carrelomar)	Mozambique	Fishing; marketing food products	36%
Subgrupo Promarisco	Ecuador	Aquaculture	100%
Promarisco	Ecuador	Aquaculture	100%
Balanceados Nova (Balnova)	Ecuador	Aquaculture	49%

Subsidiary / Associated company	Country	Activity	Shareholding
Megashak	Ecuador	Aquaculture	100%
Sombracorp	Ecuador	Aquaculture	100%
Subgrupo Seabel	France	Processing seafood products; marketing food products	100%
Seabel	France	Processing seafood products; marketing food products	100%
Krustanord	France	Processing seafood products; marketing food products	100%
Krustanova	France	Processing seafood products; marketing food products	100%
Sofranor	France	Processing seafood products; marketing food products	100%
Sofranova	France	Processing seafood products; marketing food products	100%

Sources: Pescanova (2015, April), *2014 Pescanova Annual Report,* p. 50-52; *ORBIS database*, viewed in March 2016.

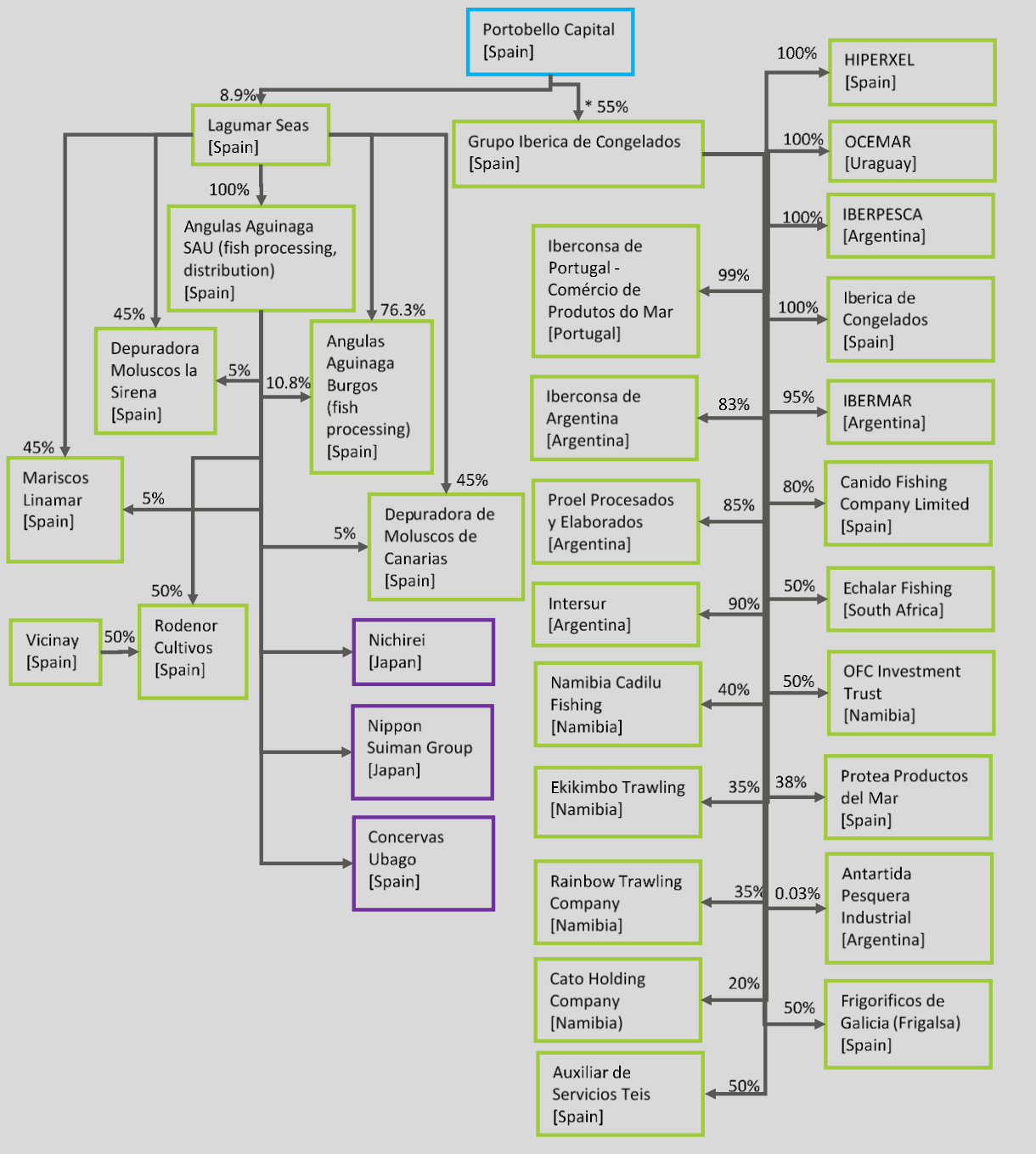
The Pescanova company structure shows evidence of both structural vertical and structural horizontal integration. Vertical integration is evident through the company's investments throughout the value chain from fish catching to the marketing of food products. Horizontal integration is seen in Pescanova's investments in fish catching companies, particularly in Africa, with some investments in fish catching companies in South America.

8.3.4. Portobello Capital

Portobello Capital is a Spanish private equity company founded in 2010 (Portobello Capital, n.d.). The company has a diverse portfolio, having invested in companies in different industries, including fisheries (ibid.). Portobello Capital has the majority stake in Grupo Iberica de Congelados (Iberconsa) and holds a 9% stake of Angulas Aguinaga (Portobello Capital, 2015). Figure 33 gives an overview of the Portobello Capital company structure.

In 2015, Portobello Capital acquired the majority stake in Iberconsa (Portobello Capital, 2015). Iberconsa was established in 1981 and is based in Vigo, Spain (Bloomberg Businessweek, n.d.). The company owns and operates vessels fishing in the Southeast and Southwest of Spain (FAO 41 and 47 regions respectively). The company catches various species of fish (e.g. toothfish, squid, hake, blue whiting and monkfish) (Iberconsa, n.d.). Iberconsa is a vertically integrated company as besides fish catching, it also engages in fish processing and the distribution of frozen seafood products (Iberconsa, n.d.). It has processing plants in Argentina and Namibia, owns a network of retail stores and has a stake in two cold storage companies in Galicia, Spain (Portobello Capital, 2015). As can be seen in Figure 33, besides in Spain, Iberconsa has subsidiaries in Argentina, Namibia, South Africa, Uruguay, and Portugal. The company is thus also horizontally integrated. In 2014, Iberconsa's total assets amounted to €160 million, while its revenue was €180 million (ORBIS, 2016j).

Figure 33. Company structure of Portobello Capital



Sources: Portobello Capital (2015, December), "Portobello Capital acquires Iberconsa", online: http://www.portobellocapital.es/portobello-capital-acquires-iberconsa/, viewed in May 2016; Iberconsa (n.d.), "Company - Group Companies", online: http://www.iberconsa.es/empresas_del_grupo.aspx/, viewed in May 2016. *Orbis*, "Iberconsa", viewed in May 2016; HIPERXEL (n.d.), "Conocemos", online: http://www.hiperxel.com/conocenos.html#, viewed in June 2016; *Orbis,* "Lagumar Seas", viewed in May 2016; Angulas Anguinaga (n.d.), "International", online: http://www.angulas-aguinaga.es/en/international/, viewed in May 2016; Bloomberg (n.d.), "Company profile of Angulas Aguinaga Burgos SL", viewed in June 2016.
* Portobello Capital holds 55% of Grupo Iberica de Congelados, the rest is held by individuals.

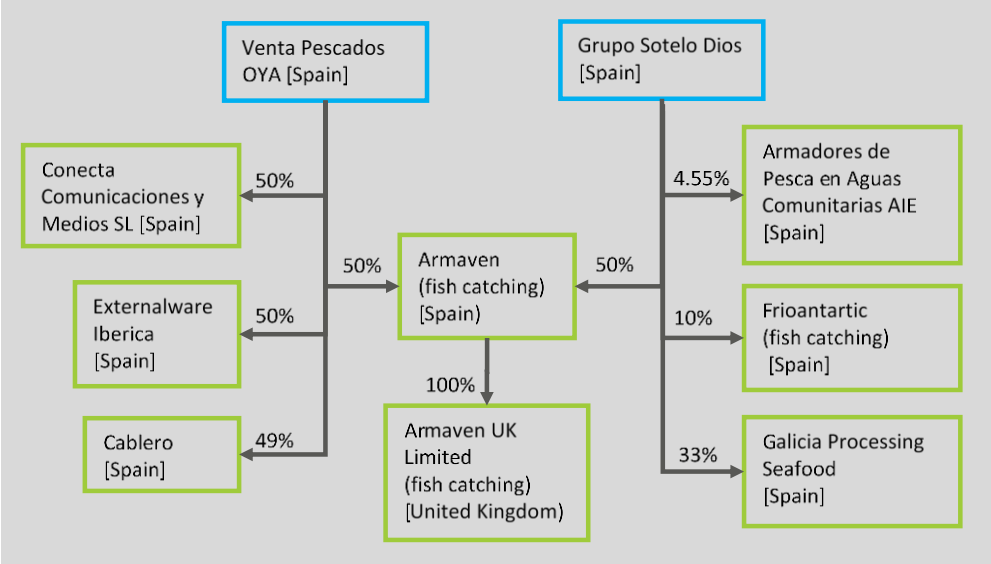
Portobello Capital also holds a 9% stake in Angulas Aguinaga (ORBIS, 2016d). Angulas Aguinaga was established in 1974 (Angulas Aguinaga, n.d.). The company engages in fish processing and distribution through its brands La Gula del Norte, Krissia, Prawn, Mussel, Salmon, and Octopus (n.d.). La Gula del Norte offers products that substitute elver-based products on surimi (ibid.). The company has subsidiaries in Spain and established partnerships with Japanese companies (Angulas Aguinaga, n.d. and ORBIS, 2016d). In 2014, the Angulas Aguinaga's total assets amounted to €145 million, while its revenue was €96 million (ORBIS, 2016d).

From the company structure and the description above, it is clear that Portobello Capital, through its investments in the fisheries segment, shows high levels of both structural vertical and structural horizontal integration. The company has investments throughout the value chain, from fish catching to processing and on to distribution and retail. Additionally, the company also has investments in a large number of fish catching companies; these are located on the Iberian peninsula, Africa, and South America.

8.3.5. Armaven

Armaven is a vessel owning company with vessels registered in Spain and the United Kingdom (Marine Traffic, n.d.; Marine Traffic, n.d.; Inter-American Tropical Tuna Commission, n.d.). Figure 34 gives an overview of the Armaven company structure. Armaven is a joint venture between Venta Pescados and Grupo Sotelo Dios (ORBIS, 2016i). Venta Pescados is a fish distribution company (Venta Pescados, n.d). Grupo Sotelo Dios holds a 10% stake in Frioantartic, a fish vessel owner fishing in the Atlantic and Indian Oceans (FAO 21, 27, 34, 41, and 51 regions).

Figure 34. Company structure of Armaven



Sources: *Orbis*, "Armaven", viewed in May 2016; *Orbis*, "Venta Pescados", viewed in May 2016; *Orbis*, "Grupo Sotelo Dios", viewed in May 2016; Companies House (2015, December*), Armaven (UK) Limited (06019239)*, p. 5.

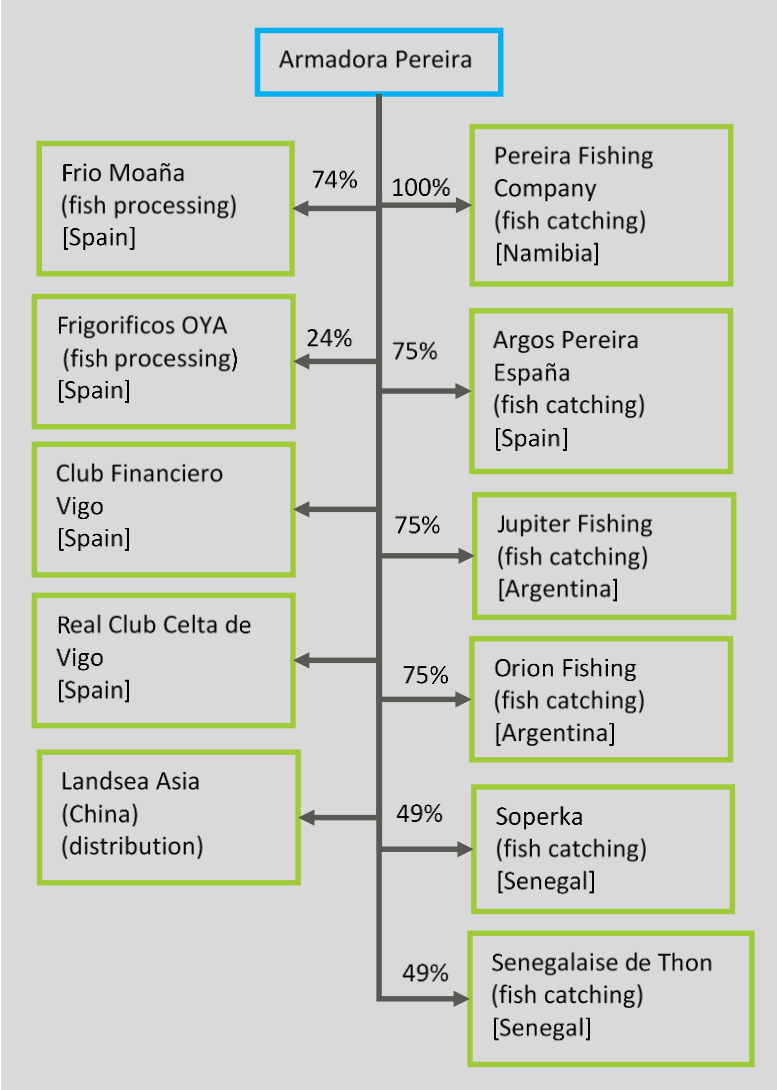
The company structure of Armaven shows evidence of both vertical and horizontal integration. Vertical integration is apparent in the investments in fish catching and processing. One of Armaven's parent companies, Venta Pescados, also distributes fish products. Armaven further shows evidence of horizontal integration through its investments in fish catching companies in both Spain and the UK.

8.3.6. Armadora Pereira

Armadora Pereira was established in 1955 (Bloomberg, n.d.). In 2014, Armadora Pereira's total assets amounted to €101 million, while its revenue was €83 million (ORBIS, 2016h).

Figure 35 gives an overview of the Armadora Pereira structure. Through its subsidiaries in Argentina, Namibia, and Senegal, the company fishes in the Atlantic Ocean (FAO 21, 27, 34, 41, and 47 regions) for a variety of species (Armadora Pereira, n.d.). Pereira Fishing Company, a subsidiary of Armadora Pereira, owns four vessels mainly operating along the Namibian coast (Pereira Fishing Company, n.d). Sopreca, another subsidiary, operates four frozen fishing vessels engaged in fish catching activities in Senegal, Gambia, and Guinee-Bissau (Sopreca, n.d.).

Figure 35. Company structure of Armadora Pereira



Sources: *Orbis,* "Armadora Pereira", viewed in May 2016*;* Landsea Food (n.d.), "Company", online: http://www.landseafood.com.cn/empresa.html/, viewed in June 2016; Pereira Fishing Company (n.d.), "Overview", online: http://pereiraoceanproducts.co.za/fishing/main_fishing.html, viewed in June 2016.

Armadora Pereira has processing plants in Europe, Africa, and South America (Landsea Asia, n.d.). Frigorificos, a subsidiary of Armadora, has a refrigeration processing plant located in Moana, Spain (Armadora Pereira, n.d.). Frigorificos has also facilities used for the classification, transformation, and containing and packing of seafood products (Frigorificos, n.d). Another of Armadora Pereira's subsidiary companies engaging in fish processing activities is Frio Moaña (Armadora Pereira, n.d.). Argos Pereira and Senegalaise de Thon are also fish catching subsidiary companies of Armadora Pereira operating in Spain and Senegal respectively (International Commission for the Conservation of Atlantic Tuna, n.d.).

Armadora Pereira distributes its products in the Asian market through its subsidiary, Seafood Asia, located in China (Landsea Asia, n.d).

The company is a vertically integrated company engaging in fish catching, fish processing and the distribution of fish products (Armadora Pereira, n.d.). Since Armadora Pereira has subsidiaries in different countries and continents, the company is also horizontally integrated.

8.4. Integration

As the company analysis presented in section 8.3 shows, the Spanish fish industry is highly integrated vertically and horizontally. Leading Spanish companies engage in fish catching, fish processing, wholesale and distribution of seafood products, while at the same time they hold subsidiaries, vessels, processing factories and distribution centres all over the world.

Structural vertical integration in Spain was initially comprised of upstream companies investing downstream. However, recently downstream companies have also started to invest upstream (Ayala, 2016; Anonymous, 2016; Freire, 2016; Touza, 2016). For upstream companies, the key driver for investing downstream is to gain access to the market. This has been made possible through improvements in logistics. For downstream companies, the key driver for investing upstream is to gain access to quota (Anonymous, 2016; Touza, 2016).

Javier Touza of Cooperativa de Armadores de Pesca del Puerto de Vigo stated that there are a number of examples of fish catching companies taking over the whole value chain in Spain (Touza, 2016). These companies first invested in the processing segment before investing in retail. Touza named the examples of Grupo Pereira and Pescanova (ibid.).

A small number of retail companies and private equity companies in Spain are investing in the fish catching segment. José Luis Freire of Conxemar noted that private equity company Portobello Capital had invested in integrated fisheries through investments in fish catching, processing, and distribution companies Iberconsa and Angualas Aguinaga (Freire, 2016). For such companies the motivation to integrate is to reduce costs, to become more competitive, and to compete globally. Upstream companies investing downstream do so in order to assure supply at a good price (ibid.). Companies that have integrated have become more competitive (Ayala, 2016).

A respondent from a large Spanish fishing company stated that from the outset his company was determined to vertically integrate (anonymous respondent from large Spanish fishing company, 2016). The fish catching company started with on-board processing and later started investing in on-land processing and distribution networks (ibid.).

Freire also described how fishermen have, in some instances, also grouped together to invest in processing companies (Freire, 2016). Touza described another recent initiative undertaken by a number of Spanish fishermen (Touza, 2016). These fishermen pool together their ITQs or NAFO quotas and distribute them in an efficient manner (ibid.). For example, one company has NAFO rights for 20 days, another for 25 days, and another for 30 days (ibid.). They then pool these days together so that one vessel can catch fish for the full 75 days one year, with each company taking it in turn (ibid.). The benefits are shared each year. Touza states that a similar initiative is being used by fishermen in the Gran Sol (Great Sole Bank) fishing grounds (ibid.).

Non-structural vertical integration is also present in Spain. A respondent from a large fishing company and Touza both stated that this is still more common than structural vertical integration (anonymous respondent from large Spanish fishing company, 2016 and Touza, 2016). This is generally in the form of off-take arrangements between producers and processors. However, given the recent developments in ease of access to markets, structural vertical integration is becoming increasingly common (anonymous respondent from large Spanish fishing company, 2016). The respondent noted, however, that one difficulty was that the market was becoming increasingly concentrated within a small group of large buyers (ibid.).

There is not a lot of structural horizontal integration taking place within Spain, although a few companies are acquiring other fishing companies in Spain (Ayala, 2016). A respondent from a

large Spanish fishing company with fishing activities exclusively outside Spain and the EU, stated that his company had engaged in structural horizontal integration from the beginning (anonymous respondent from large Spanish fishing company, 2016). In the 1990s and 2000s, horizontal integration took place at the fish catching and processing levels (ibid.). This was in order to expand production capacity, and to expand the species and product portfolios (ibid.). The respondent added that horizontal integration was more common at the processing level than at the producer level (ibid.). He attributes this to the fact that quotas and catches are relatively fixed and stable, and given the highly competitive state of the Spanish fish catching sector due to overcapacity, it is more difficult to engage in horizontal integration at the fish catching level (ibid.). Touza corroborates the statement that horizontal integration was taking place at the processor level (Touza, 2016). However, he also notes that there are increasing concerns about quota concentration, which can only occur with horizontal integration at the fish catching level (ibid.). Touza argues that safeguarding mechanisms are needed to prevent the formation of monopolies. He believes that there is an increasing tendency, particularly in the Gran Sol (Great Sole Bank) fishery, of quota concentration (ibid.). POs and the Spanish authorities are already undertaking steps to identify suitable limits and control mechanisms (anonymous respondent from large Spanish fishing company, 2016).

Spanish companies that did not have fishing activities in the EU and certain non-Union waters when Spain joined the EU in 1986, do not have a fishing track-records in the regulated waters (anonymous respondent from large Spanish fishing company, 2016). This has meant that they are not allocated quotas in the EU and certain non-Union waters (ibid.). For these companies it is now very difficult to invest in the fish catching sector in Spain, particularly given the high level of competition in the sector due to the overcapacity of the Spanish fishing fleet (ibid.).

Freire noted that horizontal integration at the fish catching level in Spain tends to be international, and particularly outside the EU (Freire, 2016). However, he added that there are also a number Spanish fish catching companies with investments in France and Ireland (ibid.). There are a number of barriers to Spanish horizontal integration in the EU. Firstly, according to Freire, the cost of labour is too high in most other EU countries, (ibid.). Another consideration is the quota allocation of species interesting to the Spanish market. Further barriers include general concerns by fishing companies about investing in unfamiliar countries (ibid.).

Touza similarly describes international horizontal integration at the fish catching level (Touza, 2016). He stated that over the last two years 14 vessels from his PO have flagged in France to gain access to more quotas. Some have also gone to Ireland and the UK, but most have gone to France (ibid.). He believes that this is a growing trend. The companies still maintain their companies in Spain, but also set up in France with vessels and become members of the French POs (ibid.). The flagging in France is primarily undertaken in order to gain access to quotas (ibid.). This is to get around the EU's 'relative stability key' issue (ibid.). This tendency reflag in France is done most often by Spanish fresh fish ship-owners (ibid.). They buy old ships in France, decommission them or sell them after transferring the quota and bring in newer vessels (ibid.). An example of a company that is doing this is Armaven SA in Spain and France (ibid.). Touza states that France has more quotas than Portugal, and the quota species in France are more interesting for the Spanish market (ibid.). Additionally, France has a small fleet and Spain and France have good relations (ibid.). Portugal and Spain have similar problems in relation to the 'relative stability key' (ibid.).

In terms of non-structural horizontal integration, there is quota swapping in Spain. Quota swapping can occur between companies and POs, both domestically and internationally. International quota swapping is usually undertaken by the POs.

9. UNITED KINGDOM

KEY FINDINGS

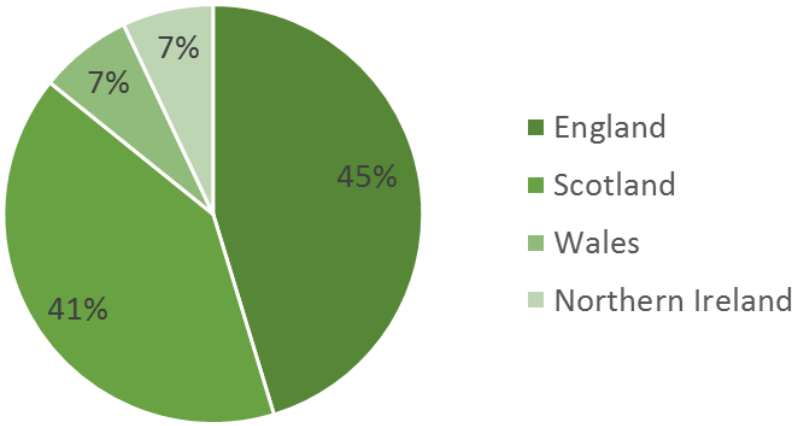
- Fish processing generates €10 billion in revenues
- Majority of catch harvested in Northern North Sea and West of Scotland
- Limited structural vertical integration
- High levels of structural horizontal integration, 13 companies hold 60% of quota
- Non-structural vertical integration is common
- Non-structural horizontal integration through quota trade, quota leasing, and quota swapping

9.1. Composition of United Kingdom fishery industry

The UK fish and seafood market was estimated to be worth €5 billion in 2015 (Infinity Research, 2015a, p.30). It is the fifth-largest fish and seafood market in Europe, accounting for 5.73% of revenue in 2015 (ibid.). The UK is the eighth-largest importer of fish and seafood products in the world (ibid.). More than 9% of its imports come from Iceland (ibid.). The main import category is prepared fish and seafood products, followed by fresh and chilled fish, and seafood (ibid.). The main distribution channels are supermarkets and hypermarkets, accounting for more than 50% of market share (ibid.).

In 2014, the UK had a fleet of 6,383 vessels, a reduction of 9% from 2004. There were 574 companies with more than one vessel, compared to 5,063 with only one vessel (see Table 30). There were approximately 12,000 fishermen employed in the sector in 2014 (see Table 30). Figure 36 shows that slightly less than half of the fishermen are located in England and 40% in Scotland (Scientific, Technical and Economic Committee for Fisheries, 2015).

Figure 36. Geographic spread of UK fishermen (2014)

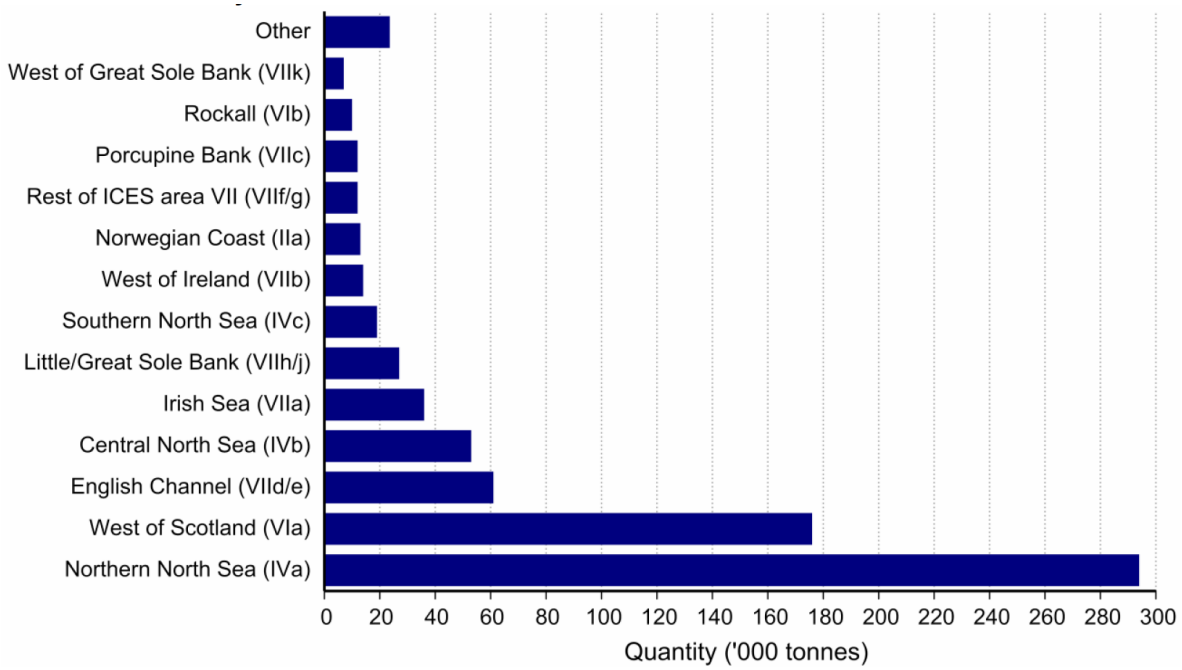


Source: Dixon, S.(2015), *UK Sea Fisheries Statistics 2014*, London: Marine Management Organisation, p. 1.

Table 30 shows that UK landing income from fishing was approximately €870 million in 2014 (Dixon, 2015, p. 3-4). The processing segment, on the other hand, generated a total turnover of €10 billion (ibid.). There is a fairly even distribution of catches in the UK : 35% of the value of landings are demersal fish, 32% are pelagic and 34% are shellfish (ibid.). Pelagic fish made up the bulk of the landings in Scotland in 2014, while demersal fish formed a slight majority in England (ibid.). The main pelagic species were mackerel and herring, while the main demersal species were cod, haddock, and plaice (ibid.).

As Figure 37 shows, more than 60% of all landings by UK vessels were harvested in the Northern North Sea or West of Scotland.

Figure 37. UK catches by sea area (2014)



Source: Dixon, S. (2015), *UK Sea Fisheries Statistics 2014*, London: Marine Management Organisation, p. 1.

In 2015, the UK imported €1.7 billion in fish (see Table 30). Iceland, China, and the Faroe Islands were the main exporters to the UK, accounting for 14%, 10% and 9% respectively of total UK fish imports (TradeMap, n.d.). In 2015, the UK exported €2.3 billion in fish and fish products (ibid.). France, the United States, and Spain were the main export destinations accounting for 28%, 16%, and 10% respectively of total fish and fish product exports (ibid.).

Table 30. Overview of fish industry in United Kingdom

Segment	Measure	Value	Proportion of total fishing enterprises / GDP / workforce
Fish catching	Enterprises with more than one vessel (2014)	574	10%
	Landing income (2013, € mlns)	869	0.05%
	Employment in the fish catching sector (2013)	12,022	0.04%
Processing	Employment in the fish processing sector (2013)	38,140	0.13%
	Processing production (2013, € mlns)	10,019	0.52%
Trade	Imports of fish (2015, € mlns)	1,675	0.07%
	Exports of fish (2015, € mlns)	2,307	0.09%

Source: Scientific, Technical and Economic Committee for Fisheries (2015, July), *The 2015 Annual Economic Report on the EU Fishing Fleet: Electronic Appendices*, Publications Office of the European Union, Luxembourg; EUROSTAT (2015, November), "GDP and main components - Current prices [nama_gdp_c]", online: http://ec.europa.eu/eurostat/data/database, viewed in January 2016; EUROSTAT (2015, October), "Employment (main characteristics and rates) - annual averages [lfsi_emp_a]", online: http://ec.europa.eu/eurostat/data/database, viewed in January 2016; TradeMap (n.d.), "List of importers for the selected product: Product: 03 Fish, crustaceans, molluscs, aquatic invertebrates nes", online: http://www.trademap.org/, viewed in January 2016; TradeMap (n.d.), "List of exporters for the selected product: Product: 03 Fish, crustaceans, molluscs, aquatic invertebrates nes", online: http://www.trademap.org/, viewed in January 2016.

9.2. Producers organisations

There are 24 producer organisations in the United Kingdom. The largest, Scottish Fish Producers Organisation, represents 190 vessels, which is 14% of the total fleet. The smallest, North Atlantic Fish Producers Organisation, represents three vessels. Table 31 provides an overview of the producer organisations in the United Kingdom.

Table 31. Producer organisations in the United Kingdom

Producer organisation	No. of vessels	% of total fleet
Scottish FPO	190	14%
Northern Ireland FPO	111	8%
Cornish FPO	107	8%
South Western FPO	77	6%
Anglo Northern Irish FPO	42	3%
Eastern England FPO	41	3%
Shetland FPO	37	3%
Anglo Scottish FPO	35	3%
Northern Producers Organisation	33	2%
North East of Scotland FPO	30	2%
West of Scotland FPO	30	2%
Fleetwood FPO	25	2%
Isle of Man Non-Sector	20	1%
Fife FPO	19	1%
North Sea FPO	17	1%
The FPO	17	1%
Aberdeen FPO	15	1%
Orkney FPO	10	1%
Interfish	9	1%
Lowestoft FPO	8	1%
Wales and West Coast FPO	7	1%
Lunar Group	5	0%
Klondyke	3	0%
North Atlantic FPO(c)	3	0%
Non-sector vessels (d)	483	35%
Total	**1,374**	**100%**

Source: Dixon, S.(2015), *UK Sea Fisheries Statistics 2014*, London: Marine Management Organisation, p. 21.

Among the POs listed above, three are in fact corporations: Interfish, Lunar Group and Klondyke. The fish quota system in the UK works as follows. There are 44 UK fisheries administrations (FAs). They cover the management of UK fish quotas for the International Council for the Exploration of the Sea (ICES) areas I, II, IV, VI, VII and associated areas, and Vb (Faroese waters) for which the UK receives a quota in EU legislation (Department for Environment, Food and Rural Affairs, 2015, p. 1). These areas are spread out between the north of Finland and south west of Ireland, and also cover Faroes Grounds. According to the FQA Register there are over 8 million FQAs in circulation (Fixed Quota Allocation Register, n.d.).

9.3. Company analysis

This section provides an analysis of the company structures of nine UK companies with the highest fixed quota allocation (FQA) units held. Table 32 provides an overview of the parent companies that own more than 2% of the total UK FQA. It should be noted that these are approximations. Due to the large number of FQA licences (1,094) it was beyond the scope of this research to identify parent companies for all FQA licences. The parent companies were identified for the top 100 FQA licences in terms of FQA units held. Furthermore, fishing companies also have access to FQAs through partnership agreements and minority shareholdings. The information below should thus be considered indicative rather than definitive.

Table 32 shows that 13 companies hold 60% of total UK FQA. The three companies with the highest levels of FQA are Interfish, Lunar Fishing and Andrew Marr International. The remainder of this section will describe the company structures of the nine UK companies with the highest levels of FQA.

Table 32. UK largest FQA owners (2016)

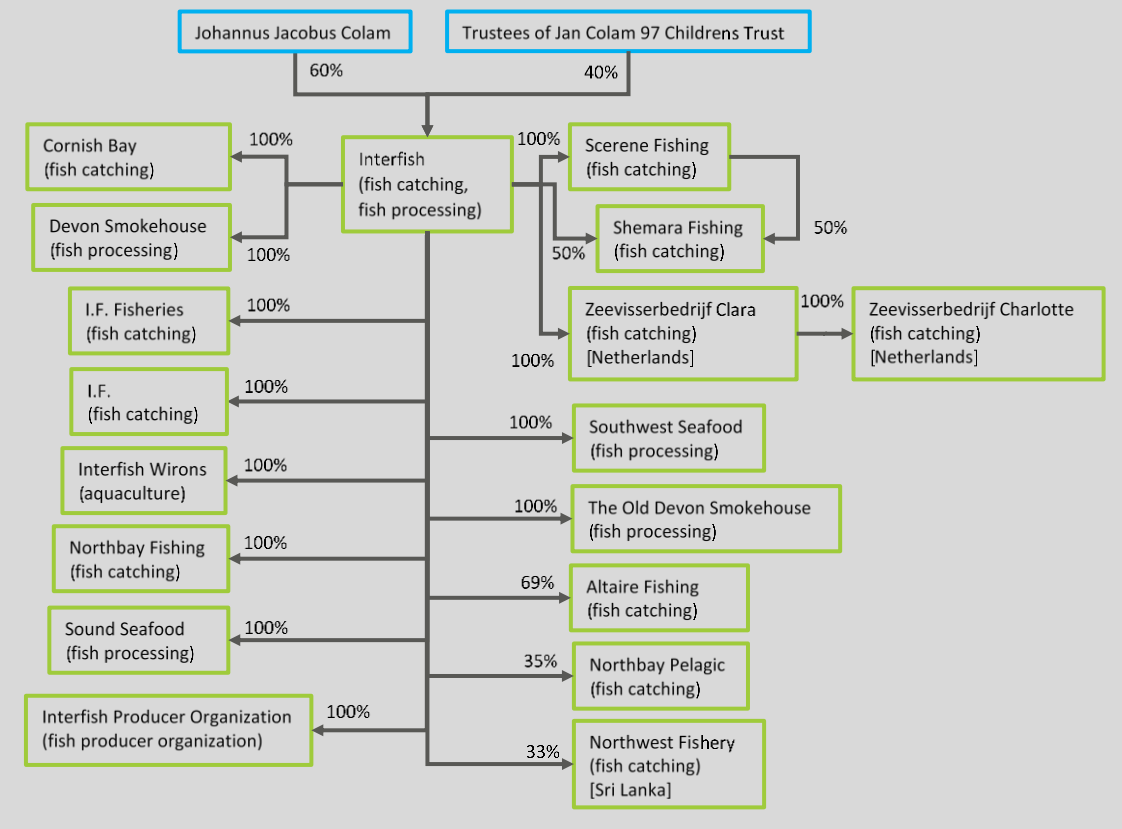
Parent company	FQA units	% of total UK FQA
Interfish	810,319	10%
Lunar Fishing	739,153	9%
Andrew Marr International	676,490	8%
Klondyke Fishing	506,953	6%
Cornelis Vrolijk	473,454	6%
Voyager Fishing	405,537	5%
L.H.D.	319,160	4%
Caley Fisheries	233,619	3%
Don Fishing	195,350	2%
Mewstead	194,770	2%
Parlevliet & Van der Plas Group	191,255	2%
Antares Fishing	143,834	2%
Zephyr Fishing	139,434	2%
Other	3,341,608	40%
Total	**8,264,090**	**100%**

Gov.UK (2016), "Fixed Quota Allocation Register", online: https://www.fqaregister.service.gov.uk/browse#tabs=1, viewed in April 2016.

9.3.1. Interfish

As shown in Table 32, Interfish holds approximately 810,000 FQA units, almost 10% of the UK total. In 2014 the company had a total operating revenue of approximately €109 million, up from approximately €70 million the previous year (ORBIS, 2016b). The company made a total profit of approximately €28 million in 2014, up from €19 million in 2013 (ibid.). Interfish had total assets of approximately €198 million in 2014, in 2013 total assets were €170 million (ibid.).

Figure 38. Company structure of Interfish



Source: *Orbis* (2016, June), "Controlling shareholders: Interfish"; *Obris* (2016, June), "Current subsidiaries: Interfish"; Interfish (2016), *Strategic Report, Report of the Director and Consolidated Financial Statements for the year ending 31 January 2015*, p. 18-19; Interfish Limited (2016, January), *Annual Return 2015*, p. 4.

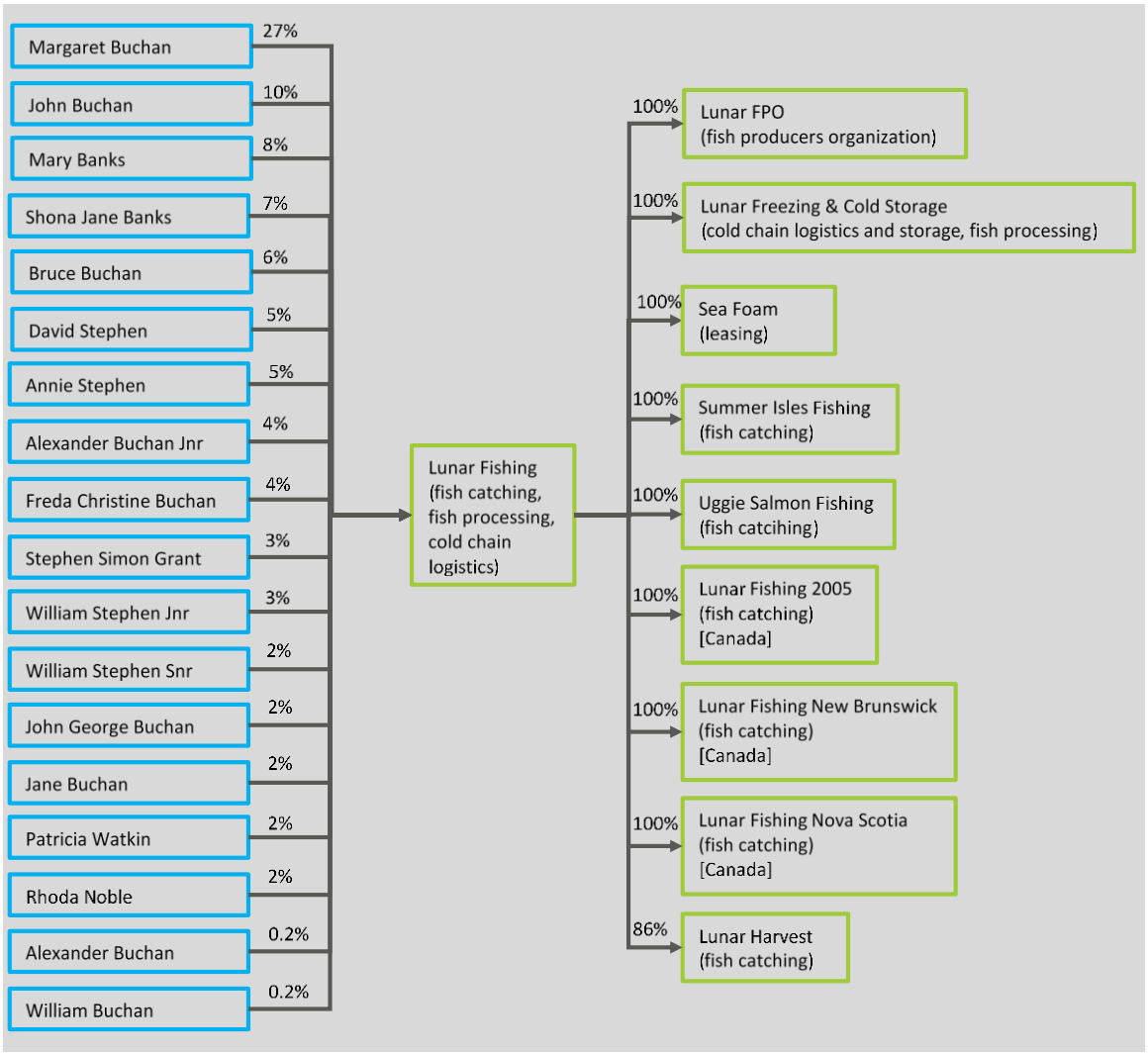
Figure 38 provides an overview of the Interfish company structure. Johannus Colam is the company's majority shareholder. Figure 38 shows that Interfish has a number of fish catching and fish processing subsidiaries. The company also has fish catching subsidiaries outside of the UK, in the Netherlands. Finally, Interfish also has its own producers' organisation. This can likely facilitate quota allocation.

The Interfish company structure shows significant levels of both vertical and horizontal integration. Vertical integration is limited to fish catching and fish processing, with no identified investments in distribution or retail. Interfish shows horizontal integration at both the national and international levels, with investments in fish catching companies in the UK and abroad.

9.3.2. Lunar Fishing

As shown in Table 32 Lunar Fishing holds approximately 739,000 FQA units, equal to roughly 9% of the total UK FQA. In 2014, the company had a total operating revenue of approximately €120 million, up from €110 million in 2013 (ORBIS, 2016e). Lunar Fishing generated a profit of €20 million in 2014, and approximately €13 million in 2013 (ibid.). The company had total assets worth approximately €161 million in 2014, up from €151 million in 2013 (ibid.).

Figure 39. Company structure of Lunar Fishing



Source: *Orbis* (2016, June), "Controlling shareholders: Interfish"; *Obris* (2016, June), "Current subsidiaries: Interfish"; Lunar Fishing (n.d.), "About", online: http://www.lunarfreezing.co.uk/about.html, viewed in June 2016; Lunar Fishing (2016), *Group Strategic Report, Report of the Directors and Consolidated Financial Statements for the year ending 31 December 2014*, p. 20-21.

Figure 39 provides an overview of the Lunar Fishing company structure. The company is owned by a number of individuals. The largest shareholder, with 27% of total shares, is Margaret Buchan. Figure 39 shows that Lunar Fishing has subsidiaries engaged in both fish catching and fish processing. The company has investments both in Scotland and in Canada. Similar to Interfish, Lunar Fishing also has its own producers' organisation.

Lunar Fishing shows evidence of both vertical and horizontal integration. Vertical integration is evident through investments in fish catching, fish processing and cold chain logistics. The company does not, however, have investments in retail. Horizontal integration is evident through investments in fish catching companies domestically as well as in Canada.

9.3.3. Andrew Marr International

As shown in Table 32, Andrew Marr International holds approximately 676,000 FQA units, equal to roughly 8% of total UK FQA units.

The director of Andrew Marr International is Alexander George Marr. He is also one of the shareholders. The other shareholders are C. L. Marr, S. A. Marr, N. L. Rathbone, A. J. Panton and A. L. Marr.

Andrew Marr International has 22 subsidiaries that are active in the fisheries sector. Many of these subsidiaries are dormant. Ten of the subsidiaries have their own subsidiaries, of which three in turn also have their own subsidiaries, of which two have yet more subsidiaries. Among the subsidiaries are Humber Fishing and Viking Fishing, the two largest FQA owners in the UK.

Humber Fishing owns the most FQA units of all fishing companies in the UK. The ultimate parent is Andrew Marr International. Humber Fishing has four subsidiaries in which it has a 50% stake. The remaining 50% stake is held by Viking Fishing and director of both Humber Fishing and Viking Fishing, M. J. Dougal.

Andrew Marr International generated a total revenue of €644 million in 2015, up from €634 million in 2014 (Andrew Marr International, 2016, p. 7-8). The company generated profits of €18.5 million in 2015, up slightly from €18.1 million in 2014 (ibid.). Andrew Marr International had total assets of approximately €185 million in 2015 up from €164 million in 2014 (ibid.).

Table 33 provides an overview of the Andrew Marr International company structure. The company has investments in fish catching, processing, storage, and trade.

Table 33. Andrew Marr International subsidiaries

	1st subsidiary	2nd subsidiary	3rd subsidiary	4th subsidiary
1	Almarr Seafoods Limited (dormant) – 100%			
2	Andrew Johnson Knudtzon Limited (cold storage) – 100%			
3	Attain Fishing Limited (marine fishing) – 100%			
4	Castlewood Fishing Limited (marine fishing) (dissolved) – 100%			
5	Fair Isle Fishing Limited (marine fishing) – 100%	Coolships 2 Limited (marine fishing) – 100%		
		Darpa Holdings (British Virgin Islands) – 100% -		
6	Falcon Fishing Limited (marine fishing) – 100%			
7	Good Hope Fishing Limited (marine fishing) – 100%			
8	Humber Fishing Limited (marine fishing) – 100%	Ocean Dawn Fishing LLP – 50%		
		Courageous Fishing LLP – 50%		
		GS Fishing LLP – 50%		
		Livingstone Fishing LLP – 50%		

	1st subsidiary	2nd subsidiary	3rd subsidiary	4th subsidiary
9	J. Marr (Aberdeen) Limited (dormant) – 100%	Bon-Accord Fish Selling Company Limited (dormant) – 99.99%		
		Forward Motor Trawlers Limited (dormant) – 99.99%		
		Johnstone Motor Trawlers Limited (dormant) – 99.99%		
		Rangor Fishing Company Limited (dormant) – 99.99%		
		Peter & J.Johnstone Limited (marine fishing) – 99.98%	Buchan Trawlers Limited (dormant) – 100%	
			Grampian Sea Fishing Limited (marine fishing) – 100%	MV Acorn (Scotland) – 75%
				MV Arcturus (Scotland) - 62.5%
				MV Fear Not (Scotland) - 75%
				MV Ardent (Scotland) – 25%
			M.F.E. Fishing Company LTD. (dormant) – 100%	
10		Minerva Fishing Limited (marine fishing) – 100%		
11		North East Fisheries Limited (marine fishing) – 100%	P/F Jókin (fish exporte, Faroe Islands) - >5%	
12		Tyne Fishing Limited (marine fishing) – 100%	Sophie Louise Fishing LLP (England and Wales) – 50%	
13		Viking Fishing Limited (marine fishing) – 100%	Ocean Dawn Fishing LLP – 50%	
			Courageous Fishing LLP – 50%	

	1st subsidiary	2nd subsidiary	3rd subsidiary	4th subsidiary
			GS Fishing LLP – 50%	
			Livingstone Fishing LLP – 50%	
14		J. Marr Seafoods (Holdings) Limited (dormant) – 99.99%	J. Marr (Sea Products) Limited (dormant) – 99.95%	
15		Prime Fish Company (Newcastle) Limited (THE) (marine fishing) (dormant) 99.98%		
16		Rusmar Limited (dormant) – 99.97%	Atlantic Seafoods International Limited (dormant)– 99.99%	
17		A.M.I Cold Stores Limited – 99.92%		
18		J.E. Sowden Limited (marine fishing) (dormant) – 99.90% check		
19		J. Marr (Grimsby) Limited (dormant) – 99.80%		
20		Fastnet Holdings Limited (marine fishing – 99.10%	Wright & Eddie Limited (marine fishing) – 100%	
			Fastnet Fish Limited (marine fishing) - >50%	F A S 2000 Limited (marine fishing) – 90%
				Westcountry Seafoods Limited – 52%
			Fastnet Highlands Limited (marine fishing) – 15%	
21	J. Marr (Seafoods) Limited (marine fishing, trading) – 96.58%	J. Marr (Commodities) Limited (marine fishing) – 100%		
		Clenham Limited (dormant) – 99.99%	Jaymarr (Seafoods) Limited (dormant) – 93%	

	1st subsidiary	2nd subsidiary	3rd subsidiary	4th subsidiary
		James Wight (Hull) Limited (dormant) – 99.96%		
		J. Marr Seafoods (Ship Services) Limited (dormant) – 99.93%		
		Geo T Baker (Mansfield) Limited (dormant) – 99.90%		
		J Marr (Management) Services Limited (dormant) – 100%		
		British Mackerel Exports Limited (dormant) – 50%		
22	Marrfish Limited (marine fishing) – 70%			

Source: *Orbis,* "Andrew Marr International" viewed in May 2016; Humber Fishing Limited (2015, April), *Abbreviated Financial Statements for the year ending 31 March 2015*, p. 3-4; Fair Isle Fishing Limited (2015, March), *Abbreviated Financial Statements for the year ending on 31 March 2015*, p. 4; Viking Fishing Limited (2015, March), *Abbreviated Financial Statements for the year ending on 31 March 2015*, p. 4.

Andrew Marr International shows a degree of vertical integration, from fish catching to cold storage, logistics and trade. The company also shows a large degree of horizontal integration at the fish catching level. This is most likely due to a desire to gain access to quota and to expand production capacity. Investments in other fish catching companies is limited to the UK (McClenaghan and Boros, 2016).

9.3.4. Klondyke Fishing

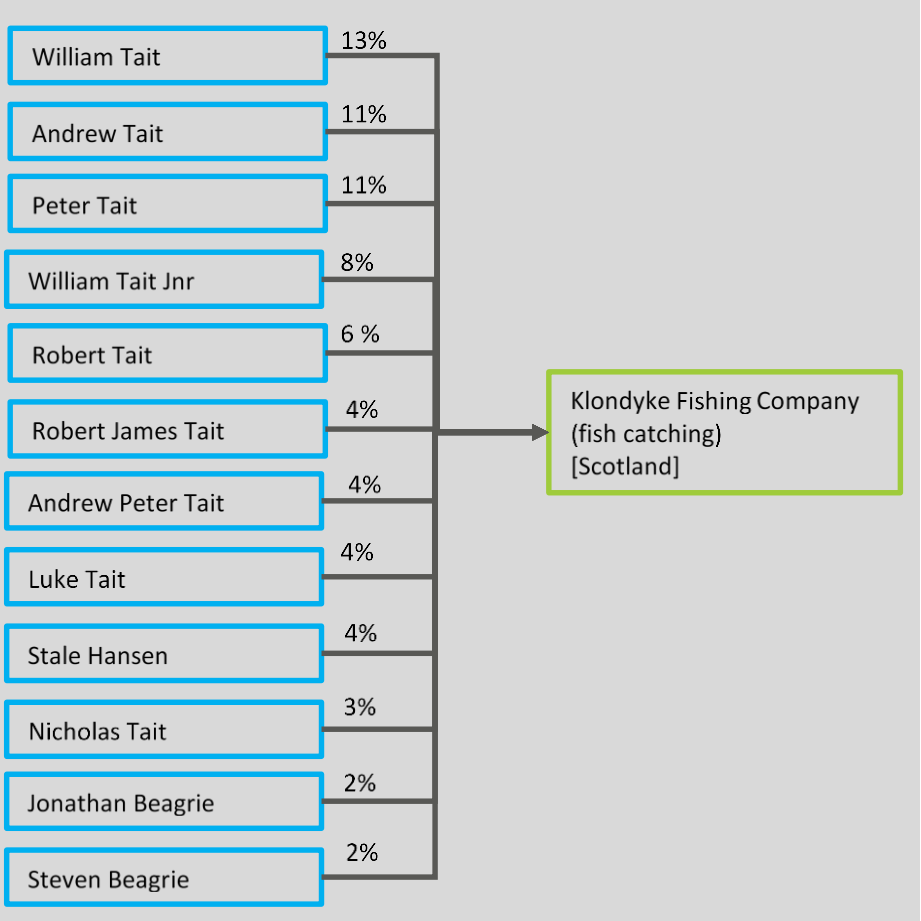
As shown in Table 32, Klondyke Fishing holds approximately 507,000 FQA units, roughly 6% of all UK FQA units.

Klondyke generated a turnover of €35.5 million in the year ending on 30 June 2015, down from approximately € 36 million the previous year (ORBIS, 2016c). The net profit was €15.2 million in 2015, and €17.2 million in 2014 (ibid.). Klondykes' total assets were €44.6 million in 2015, up from €44 million the previous year (ibid.).

Figure 40 shows that Klondyke Fishing has 12 shareholders and no subsidiaries. All its FQA is distributed over three vessels (Gov.UK, 2016).

Klondyke Fishing shows no evidence of vertical or horizontal integration.

Figure 40. Company structure of Klondyke Fishing



Source: ORBIS (2016, June), "Shareholders: Klondyke Fishing Company".

9.3.5. Cornelis Vrolijk

As shown in Table 32, Dutch Cornelis Vrolijk holds approximately 473,000 FQA units, roughly 6% of the total UK FQA.

Cornelis Vrolijk generated a turnover of €288 million in 2013 (the most recent year for which data were available) (Cornelis Vrolijk Holding, 2016). In 2012 it generated €321 million (ibid.). In 2013 the company made a profit of approximately €18 million, down from €46 million the previous year (ibid.). Cornelis Vrolijk had total assets of approximately €301 million in 2013, and €318 million in 2012 (ibid.).

Cornelis Vrolijk has 20 direct subsidiaries. Seven of them have their own subsidiaries. One of Cornelis Vrolijk's subisidaries, Jaczon, has 35 subsidiaries. Three others have only one subsidiary, and the other three have respectively, two, five and seven subsidiaries.

There are ten third level subsidiaries, three fourth level subsidiaries and one fifth level subsidiary, as can be seen in Table 34. Most of the Cornelis Vrolijk's subsidiaries are based in the Netherlands. Only North Atlantic Holdings Limited and its four subsidiaries are based in United Kingdom.

North Atlantic Fishing Company Limited is one of North Atlantic Holdings' subsidiaries. North Atlantic Fishing Company had a revenue of €24.2 million in 2014 (ORBIS, 2016f). That was about €800,000 more than the year before (ibid.). The company made a net profit of €3.8 million, €1.4 million less than in 2013 (ibid.). North Atlantic Holdings had total assets worth about €21.2 million in 2014, and one million less in the previous year (ibid.).

Table 34. Company structure Cornelis Vrolijk

	1st subsidiary	2nd subsidiary	3rd subsidiary	4th subsidiary	5th subsidiary
1	Cornelis Vrolijk International I (100%)				
2	Cornelis Vrolijk International II (100%)				
3	Cornelis Vrolijk International III (100%)	Cornelis Vrolijk Iberica Pelagic Sl (100%)			
4	Cornelis Vrolijk International IV (100%)	Cordial M.V. SRL (49%)			
5	Cornelis Vrolijk International V (100%)				
6	Cornelis Vrolijk International VI (100%)				
7	Cornelis Vrolijk's Visserij Maatschappij (100%)				
8	Diepzee Visserij Maatschappij Cornelis Vrolijk I (100%)				
9	Diepzee Visserij Maatschappij Cornelis Vrolijk II (100%)				
10	Diepzee Visserij Maatschappij Cornelis Vrolijk III (100%)				
11	Diepzee Visserij Maatschappij Cornelis Vrolijk IV (100%)				
12	Diepzee Visserij Maatschappij Cornelis Vrolijk V (100%)				
13	France Pélagique (100%)				
14	Jaczon (100%)	Intervis Scheveningen (100%)			

	1st subsidiary	2nd subsidiary	3rd subsidiary	4th subsidiary	5th subsidiary
		Jaczon Atlantic Klipper (100%)	Jaczon Visserij Maatschappij India (100%)		
		Jaczon Holland Klipper (100%)			
		Jaczon Internationaal Transport (100%)			
		Jaczon Klipper II (100%)			
		Jaczon Klipper IV (100%)			
		Jaczon Klipper Stream (100%)			
		Jaczon Koopvaardij Maatschappij (100%)			
		Jaczon Kotter Visserij Maatschappij (100%)			
		Jaczon Oceaan Klipper (100%)			
		Jaczon Offshore (100%)			
		Jaczon Orange Klipper(100%) Jaczon Participaties Maatschappij (100%)			
		Jaczon Royal Klipper (100%)			
		Jaczon Tonijnen Visserij Maatschappij (100%)			
		Jaczon Trawler Visserij Maatschappij (100%)			
		Jaczon Vastgoed			
		Jaczon Visgroothandel (100%)			
		Jaczon Visserij Maatschappij Afrika (100%)			

	1st subsidiary	2nd subsidiary	3rd subsidiary	4th subsidiary	5th subsidiary
		Jaczon Visserij Maatschappij Alpha (100%)			
		Jaczon Visserij Maatschappij Ameland (100%)	Wouter Sterk Jbzn (100%)	Jac. Den Dulk En Zonen (100%)	Dick Den Dulk (100%)
		Jaczon Visserij Maatschappij Bravo (100%)			
		Jaczon Visserij Maatschappij Charley(100%)			
		Jaczon Visserij Maatschappij Delta (100%)			
		Jaczon Visserij Maatschappij Friesland (100%)			
		Jaczon Visserij Maatschappij Golf (100%)			
		Jaczon Visserij Maatschappij Johanna Maria (100%)			
		Jaczon Visserij Maatschappij Marine (100%)			
		Jaczon Visserij Maatschappij Texel (100%)			
		Jaczon Visserij Maatschappij Wiron (100%)			
		Jaczon Visserij-Onderneming (100%)			
		Jaczon Visserijmaatschappij Zeeland (100%)			
		Jaczon Zeevarend Personeel (100%)			
		P. Knoester Junior (100%)			
		Reefer Stevedoring Ijmuiden (16%)	Dockers (100%)		

	1st subsidiary	2nd subsidiary	3rd subsidiary	4th subsidiary	5th subsidiary
			Reefer Stevedoring (100%)		
15	North Atlantic (Holdings) Limited (100%) [United Kingdom]	North Atlantic (Crewing) Limited (100%)			
		North Atlantic Fishing Company Limited (100%)			
		North Atlantic Seafoods Limited (100%)			
		Rusbrit Limited (100%)	Rusbrit (100%)		
		Valiant Trawlers Limited (100%)			
16	Scombrus (100%)				
17	Vroko International Holding (100%)	Dufisco (100%)			
		Vroko Star I (100%)			
		Vroko Star II (100%)			
		Vroko Star III (100%)			
		Vroko Star IV (100%)			
		Lisumar (-)			
		Primstar Holding (-)	Primstar (100%)		
			Gambastar Sl (50%)		
18	Finamar (50.01%)	Armement Dhellemmes SA (39%)			
19	Klipper (50.01)	Armement Dhellemmes SA (40%)			
		Compagnie Francaise Du Thon Oceanique (10%)	Armement Gueriden (50.01%)		
			Cofrepeche (2.38%)	Cofrepeche (74%)	

	1st subsidiary	2nd subsidiary	3rd subsidiary	4th subsidiary	5th subsidiary
				Aquaconsult (30%)	
			Synd Nat Armat Thoniers Cong (-)		
20	Reefer Stevedoring Ijmuiden (33%)				

Source: *Orbis*, "Cornelis Vrolijk Holding B.V. subsidiaries", viewed in June 2016

Cornelis Vrolijk shows evidence of both vertical and horizontal integration. Vertical integration is limited to fish catching and primary processing. However, horizontal integration has taken place both domestically in the Netherlands, as well as through investments in the UK, France and Spain.

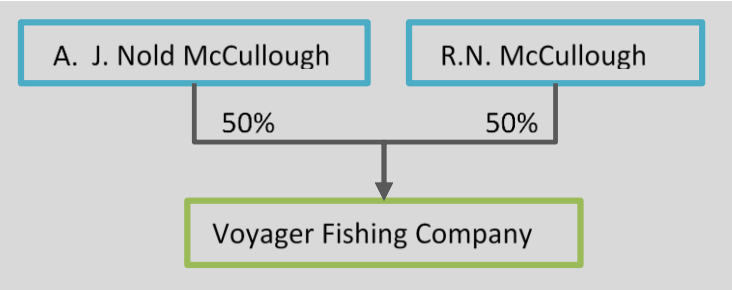
9.3.6. Voyager Fishing

As shown in Table 32, Voyager Fishing holds approximately 406,000 FQA units. This is equal to about 5% of the total UK FQA units.

Voyager's turnover was approximately €21 million in 2014, roughly the same as the previous year (ORBIS, 2016g). The company's net profit was approximately €1.8 million in 2014, down from €8 million in 2013 (ibid.). Voyager Fishing's total assets were approximately €77 million in 2014, down slightly from €78 million in 2013 (ibid.).

Figure 41 shows that Voyager Fishing Company has two shareholders, who own 50% of the company each. There is no information about subsidiaries. In fact, all of Voyager Fishing Company's quota is on one vessel (Gov.UK, 2016).

Figure 41. Company structure of Voyager Fishing



Source: *Orbis*, "Shareownership: Voyager Fishing Company, Limited", viewed in June 2016

There is no evidence of either vertical or horizontal integration in the company structure of Voyager Fishing Company.

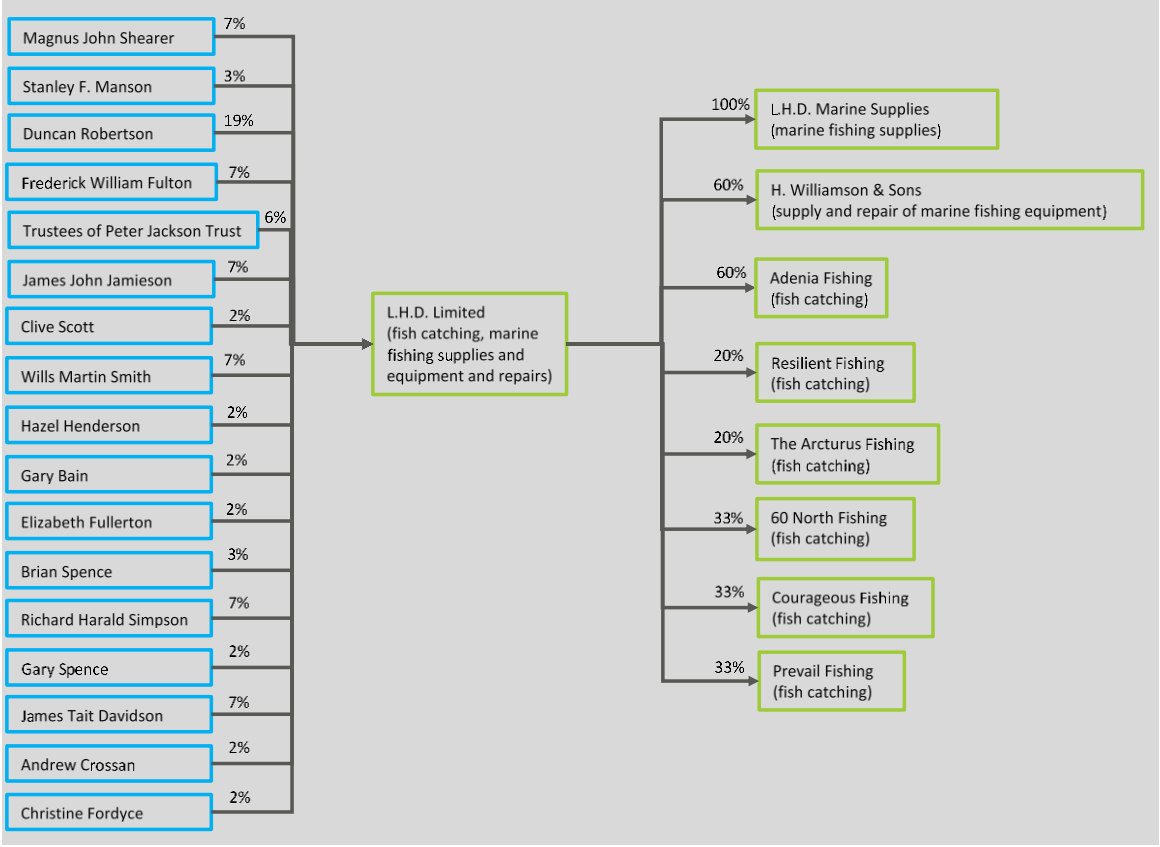
9.3.7. L.H.D.

As shown in Table 32, L.H.D. holds about 320,000 FQA units, approximately 4% of all UK FQA units.

L.H.D. generated a turnover of approximately €28 million in 2015, down from €33 million in 2014 (L.H.D. Limited, 2016, p. 6-8). The company achieved a profit of approximately €3.3 million in 2015, up from €2.3 million the previous year. L.H.D. had total assets worth approximately €36 million in 2015, down from €41 million in 2014 (ibid.). Figure 42 provides an overview of the L.H.D. company structure.

Between 1969 and 1994 the company took over other companies. In 1969 L.H.D. acquired the local net manufacturing and repair company D & A Duthie (L.H.D. Limited, n.d.). A new subsidiary company, L.H.D Net Mending Limited, was set up in 1969 (ibid.). In this way L.H.D could continue the net manufacture and repair business and expand the range of supplies and services offered to its customers (ibid.). L.H.D Net Mending Ltd changed its name to L.H.D Marine Supplies in 1996 (ibid.).

Figure 42. Company structure of L.H.D.



Source: L.H.D. Limited (2016, May), *Annual Return 2015*, p. 8-9; L.H.D. Limited (2016, May), *Financial Statements for the year ending 30 September 2015*, p. 20; L.H.D. Limited (n.d.), "History", online: http://www.lhdlimited.co.uk/about/history, viewed in April 2016.

In 1983, L.H.D. took over the local electronics company H. Williamson & Sons of Scalloway (L.H.D. Limited, n.d.). Then a new company, H. Williamson & Sons (Scalloway) Limited, which specialises in the supply and servicing of electronics for the marine, aquaculture and fish processing industries, was formed (ibid.).

In 1985, L.H.D took over J&M Shearer Ltd and formed a new company J&M Shearer (Ice Supplies) Ltd. New ice plants were built in Lerwick and Scalloway (L.H.D. Limited, n.d.). The company became part of L.H.D Marine Supplies Limited in 2004 (ibid.).

In 1994, L.H.D. took over the local company Oceansafe Ltd, which specialised in the production of nets for the salmon and fishing industries (L.H.D. Limited, n.d.). A new company, Oceansafe (Shetland) Ltd, was formed on 5 September 1994 (ibid.). The company ceased trading in February 2004 (ibid.).

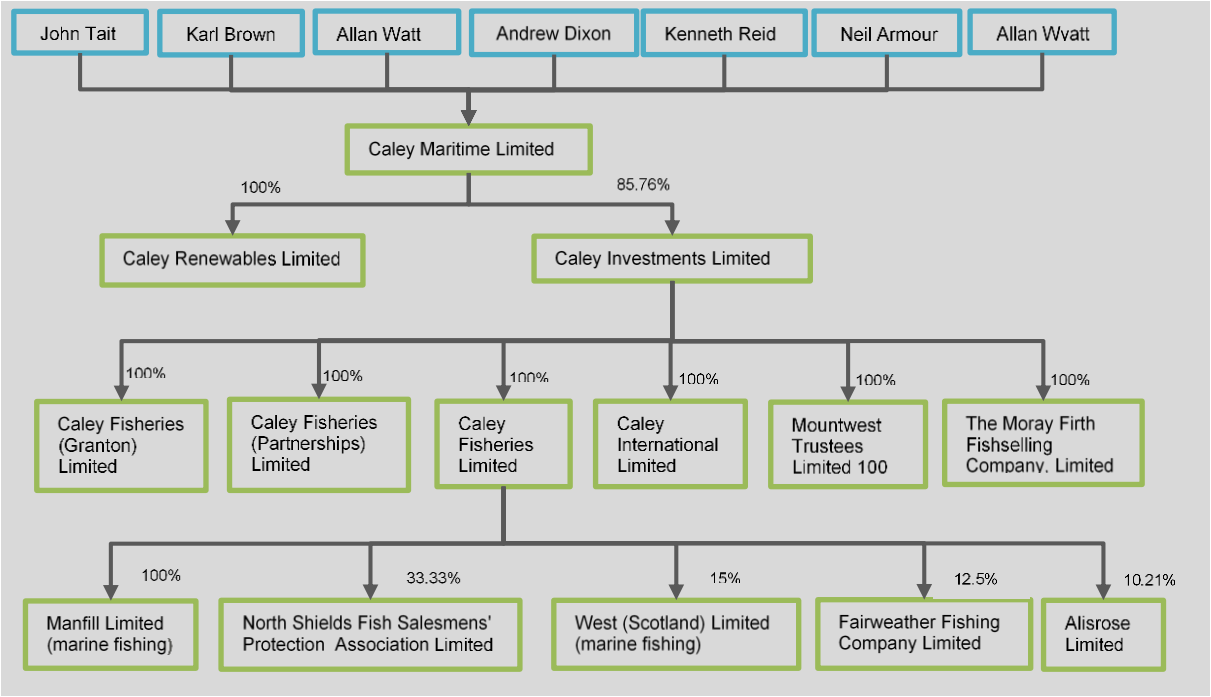
Today nets are designed, manufactured and repaired by L.H.D Marine Supplies Limited (L.H.D. Limited, n.d.). The company also specialises in the supply of ship chandlery, wire rope and chain, fishing gear, lifting gear and the supply of fuel oil (L.H.D. Limited, n.d.).

From the company structure and the description of L.H.D.'s history, it is evident that the company has engaged in a diversification strategy within the fish catching segment. Rather than investing in processing, the company has invested in supplies and equipment, sales and repairs. The company structure also shows evidence of horizontal integration through its investments in a number of fish catching companies. L.H.D.'s access to quota is higher than reported in Table 32 through its minority investments of less 50% in five fish catching companies.

9.3.8. Caley Fisheries

As shown in Table 32, Caley Fisheries holds approximately 234,000 FQA units, roughly 3% of the UK's total FQA units.

Figure 43. Company structure of Caley Fisheries



Source: Orbis, "Caley Maritime Limited" viewed in May 2016; Caley Fisheries Limited (2015, April), Annual Return AR01, p. 6; Caley Fisheries Limited (2014, December), Strategic Report, Report of the Directors and Financial Statements for the year ending 31 December 2014, p. 2, 16-17; Caley Fisheries Limited (2014, September), Special Resolution, p. 1.

Caley Fisheries generated a turnover of €3 million in 2014, whereas profit was only €460,000. The group had total assets worth approximately €19 million in 2014 (OBRIS, 2016).

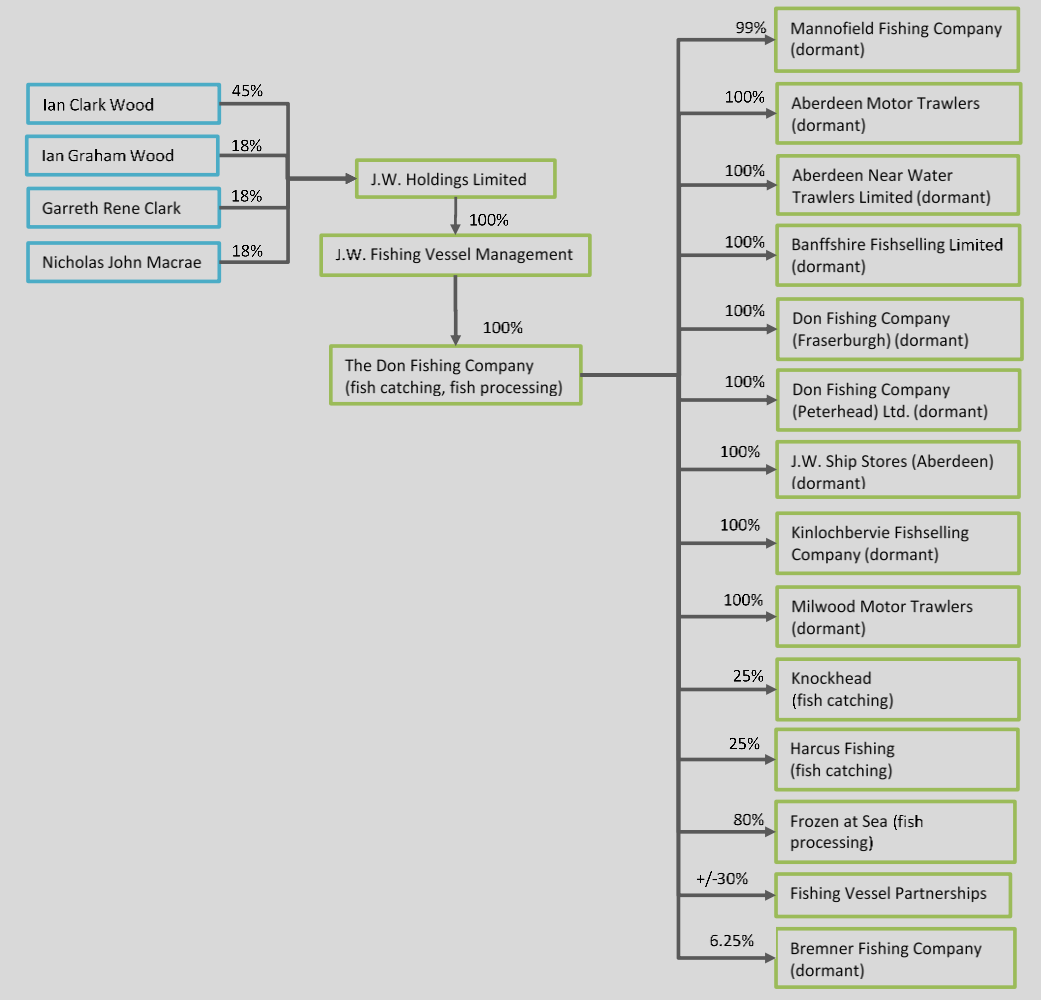
Figure 43 shows the company structure of Caley Fisheries. The direct parent of Caley Fisheries is Caley Investments, and the ultimate parent is Caley Maritime. Caley Fisheries has five subsidiaries.

Caley Fisheries does not show evidence of vertical integration. However, the company has a number of investments in fish catching companies active in the UK.

9.3.9. Don Fishing Company

As shown in Table 32, Don Fishing holds approximately 195,000 FQA units, roughly 2% of the UK total. The total FQA which Don Fishing has access to is likely to be higher given its minority investments in other fishing companies.

Figure 44. Company structure of Don Fishing



Source: *Orbis*, "The Don Fishing Company, Limited", viewed in May 2016
McKenzie, B. (2016, May 21), *Interview with Ward Warmerdam of Profundo*; J.W. Holdings (2016, May), *Annual Return 2015*, p. 6; J.W. Holdings (2015, September), *2014 Annual Report and Financial Statements*, p. 21-23.

Figure 44 shows the company structure of Don Fishing. Don Fishing's direct parent is J.W. Fishing Vessel Management and the ultimate parent is J.W. Holdings. Ian Wood and his family own J.W. Holdings. Of the 14 Don Fishing subsidiaries, only two are still active, Frozen at Sea (a processing company) and Fishing Vessel Partnerships.

Don Fishing Company generated a gross profit of €2.6 million in 2014, whereas the profit was almost €1.3 million in 2013 (J.W. Holdings, 2015, p. 6-8). The group had total assets worth €28 million in 2014. Ultimate parent company J.W. Holdings had turnover of approximately €21 million in 2014, down from €20 million the previous year (J.W. Holdings, 2015, p. 6-8). Profit amounted to approximately €2 million in 2014, up from €0.8 million in 2013. J.W (ibid.). Holdings had total assets worth approximately €31 million in 2014, €28 million the previous year (ibid.).

In an interview, the directory of Don Fishing (Bill McKenzie) provided further details regarding the company. Don Fishing does not own its fleet outright (McKenzie, 2016). It owns on average 30% of the each vessel in its fleet; some more, some less (ibid.). This kind of relationship with the vessel it calls partnerships. Don Fishing used to have 31 partnerships (ibid.). Now it has 16 (ibid.). However, it has now amassed sufficient quota to be profitable (ibid.). Don Fishing is catching less fish with 16 boats, but not much less (ibid.). The boats now have more quota (ibid.). There is now a better business strategy (ibid.). "The guys that remain are the best at what they do. They are not just fishermen, they are thinkers and business men (ibid.)." As a result, fishing strategies are far and away better than before (ibid.).

Don Fishing does not have formal off-take arrangements (McKenzie, 2016). It has "understandings" (ibid.). Some of these are long standing. The understandings imply that some vessels will always supply specific companies (ibid.). For example, Don Fishing has such an "understanding" with Lunar Freezing and Seafood Ecosse (ibid.).

Don Fishing also engages in quota leasing (i.e. for cash), quota swapping (i.e. for quota of different species), and borrowing quota from the PO (McKenzie, 2016).

From the company structure of Don Fishing it is evident that Don Fishing has engaged in both vertical and horizontal integration. Vertical integration is evident through its investments in both fish catching and fish processing companies. It does not, however, have any investments further downstream in distribution and retail. The company also shows evidence of horizontal integration through its investments in a number of fish catching companies and through its Fishing Vessel Partnerships. However, horizontal integration is limited to the UK.

9.4. Integration

As the company analysis in section 9.3 shows, there is a high degree of structural vertical and, particularly, structural horizontal integration in the UK fisheries. A number of the analysed companies had investments both in the downstream and midstream segments, from fish catching to fish processing, and in a number of instances also cold chain logistics. This research did not identify any companies with complete value chain vertical integration. A significant characteristic of the UK fisheries is that three companies also own their own PO (see Table 31). This is similar to findings in Estonia (see Chapter 5). David Anderson of the Aberdeen PO states that structural vertical integration is more common in the pelagic segment, although there is some vertical integration in the whitefish segment as well (Anderson, 2016). For example, Lunar Group has both a whitefish and pelagic fleet, and have processing facilities for both whitefish and pelagic fish species (ibid.). The general trend, in cases of structural vertical integration, has been fish catching companies investing in downstream segments (ibid.).

During the decommissioning schemes in 2003-2004 and 2011, many smaller companies sold out, and bigger companies, such as Don Fishing and Andrew Marr International, bought up the quotas (Coghill, 2016). Alan Coghill of the Orkney PO reports that a number of large companies, such as those mentioned above, have "interests" in fishing vessels in different POs (ibid.). They help fishermen obtain boats and quotas, as well as owning and leasing out their own quotas (ibid.). Given that banks have lost confidence in government policies and deliberations regarding quotas, they are no longer eager to accept FQAs as collateral for bank loans (ibid.). Now the big companies help attract bank finance for small fishing companies and fishermen through partnership agreements, as Don Fishing also does (ibid.).

There is also a high level of structural horizontal integration. This is evident in the fact that 13 companies hold approximately 60% of total UK FQA (see Table 32). These companies are likely to have access to even higher levels of FQA through their minority investments in a number of fish catching companies. The high level of quota concentration is likely to be the result of the UK not imposing quota limits (McKenzie, 2016 and Coghill, 2016). There is a UK quota trade register so as such, there is government oversight (McKenzie, 2016).

Coghill argues that there is no flagging protection, i.e. there is no protection against high levels of beneficial owners being foreign. As a result, there are a large number of ultimately foreign owned vessels in, for example, Scotland. However, Coghill notes that these are not necessarily in direct competition with Scottish fishermen as the foreign vessels target different species (Coghill, 2016). Anderson adds that vessels in the Scottish fisheries tend to be family-owned,

or a combination of family-owned with a fishing vessel partnership such as with Don Fishing (Anderson, 2016).

The level of horizontal integration is also dependent on the targeted segment. Kevin McDonnel of the West Scotland PO states that there is hardly any horizontal integration in the nethrops segment (McDonnel, 2016).

Anderson argues that both structural vertical and structural horizontal integration is motivated not only by the needs of the business but also to cut costs (Anderson, 2016). There are three big cost factors in the fisheries industry. These are quota, fuel and labour. The main drivers for change are quota and fuel (ibid.).

The UK fisheries also have forms of non-structural integration. Coghill states that there are forms of non-structural vertical integration in the UK fisheries. In the Orkney region there are no processing facilities, therefore, fishing companies located in Orkney tend to land there catch on the mainland of Scotland, the Shetlands or Denmark (Coghill, 2016). Fish catching companies often have off-take arrangements with processing companies, although these are not necessarily formalised (McKenzie, 2016 and McDonnel, 2016).

Anderson states that the FQA system has been in place since 1999, and quota/FQA trading started from day one (Anderson, 2016). Coghill reports that quota leasing is common in the Orkney PO. Quota leasing is done through agents and between POs (Coghill, 2016). Companies also engage in quota swapping within the PO, both domestically and internationally (McKenzie, 2016).

10. CONCLUSION

This research has found that the levels and forms of both structural and non-structural vertical and horizontal integration vary between the different case study countries (see Table 35 for an overview). This section will describe the observed trends and present an analysis within the scope of this research of the factors that influence the observed trends. Section 10.1 will describe the observed trends in structural integration. Section 10.2 will provide an analysis of the non-structural forms of integration.

Table 35. Overview of integration in selected EU fisheries

	Structural integration		Non-structural integration	
Country	***Vertical***	***Horizontal***	***Vertical***	***Horizontal***
Denmark	Very limited.	Domestically, both in demersal and pelagic segments. Very little foreign investment in demersal segment. Significant foreign investment in pelagic segment.	Particularly in the pelagic segment. Although majority of pelagic and demersal harvests sold at auction or markets.	Trade in quotas now stable. Renting in and out of quota, particularly in the demersal segment.
Estonia	High levels of integration in Baltic Sea and Gulf of Riga segment, particularly fish catching and fish processing. Integration less common in Baltic Coastal segment.	Both in the same PO, and Estonian fishing companies investing abroad, particularly in Finland.	Due to high level of structural integration, less non-structural integration.	Trade in quotas now stable. Quota swapping and renting is common. A formal system will be introduced to facilitate this.
France	Limited, with a few exceptions.	Limited, though there is some integration domestically. A growing trend is Spanish fish catching companies investing in France.	Limited due to varied catch composition. Majority of harvest sold in market.	No quota trade. Quota leasing is illegal. There is quota swapping.
Portugal	Yes	Limited. Some investments of Portuguese companies in Spanish fishing companies and vice versa.		

	Structural integration		Non-structural integration	
Country	***Vertical***	***Horizontal***	***Vertical***	***Horizontal***
Spain	High levels of integration. Initially upstream to downstream, recently also downstream to upstream, driven by access to markets and access to raw materials respectively.	Limited domestic integration due to overcapacity. Significant investment by Spanish fish catching companies in France, the UK and Ireland.	Yes, more common than structural vertical integration.	No quota trade due to overcapacity. Quota swapping in PO, both domestically and internationally.
United Kingdom	A number of companies with high levels of vertical integration, though not including retail. Notably some companies have own PO.	High levels of horizontal integration. 13 companies hold at least 60% of quota and have access to more through vessel partnerships and minority investments.	Yes, however, off-take arrangements are not generally formalised.	Yes, quota trade, quota leasing, and quota swapping. Quota swapping within PO, both domestically and internationally.

10.1. Structural integration

This section will describe the trends observed between the case study countries in terms of structural integration. It will analyse the factors that give rise to these trends.

10.1.1. Vertical integration

Similar to structural horizontal integration, the levels of structural vertical integration differ between the case study countries, and within countries between different segments. Again, there are a number of factors explaining the levels of vertical integration in the different case study countries. No one, single factor can explain any general trends. In Spain there are increasingly high levels of vertical integration, particularly an increase in full value chain integration. In France there is only one example of full value chain integration. Generally vertical integration, where it does occur in the case study countries, is limited to upstream and midstream, i.e. fish catching, processing, and trade/distribution, apart from the few cases of full value chain integration which also include retail through outlets or supermarkets.

10.1.1.1. Fishing segment

One clear difference in the levels of vertical integration relates to the extent that fish species can be targeted. This means that in segments such as the pelagic, and a small number of species in the demersal segment, there can be vertical integration as the fishermen can target specific species that can be used in processing. Where bottom trawling, for example, is used,

the catch composition is less predictable. This was described by the French respondents as the general reason why there was comparatively less vertical integration in the French fisheries. Of course, which species are target also depends on consumer demand. If the consumers in a particular country prefer fish species that can only be caught by bottom trawls, then the fishermen will fish to meet the demands of the consumers.

Another element in explaining the levels of vertical integration is the utility or desirability of processing, as seen in the Danish demersal segment for example. Danish respondents stated that the harvested demersal species in fact lose their value if processed, as most consumers prefer fresh or chilled. The lack of vertical integration was also observed in the Estonian fisheries.

However, comparatively higher levels of vertical integration were observed in the Spanish fisheries, although a number of the targeted species, e.g. megrim, monkfish and hake which are popular with Spanish consumers, are in fact demersal species. This can in part be explained by the fact that more vertically integrated companies did not target these species, and further by the fact that companies targeting these species were vertically integrated but did not include processing activities.

10.1.1.2. Cost

The cost of establishing processing plants was described as a barrier to downstream investments in the Danish fisheries. Another factor more particular to the nature of the Danish fisheries is the close proximity to processing plants in Germany and Norway. Since these processing plants are also closer to the final markets and/or distribution networks, Danish fishermen land their fish at these processing plants.

10.1.1.3. Ease of access

The increasing ease of access has been described in the Spanish fisheries as one of the reasons that more upstream companies are investing downstream and more downstream companies are investing upstream. In the Danish fisheries, the reverse is true: given the strict regulations in Danish fisheries, processing companies are put off investing in the fish catching sector.

10.1.1.4. Firm performance

In the majority of cases where vertical integration is observed, this has generally been fish catching companies investing in fish processing. Only a few examples in Spain and France have been upstream to downstream integration. Where downstream to upstream integration has taken place, it has been done to increase the profitability of the firm. By engaging in processing, the fishing company also earns the value added margins of its products. In both Estonia and the UK structural vertical integration has included, in a number of cases, companies owning their own POs. This further allows companies to benefit from a number of economies of scale.

10.1.2. Horizontal integration

Denmark, Estonia, Portugal and Spain have all implemented the ITQ system, while both France and the UK have not. Nevertheless, there are high levels of horizontal integration in the UK but not in France. There are high levels of horizontal integration in Denmark and Estonia, but not in Portugal or Spain. For Portugal and Spain the lack of horizontal integration, particularly domestically, is explained by the fact that there is an overcapacity in their fleets and high levels of competition for quota. This further explains the high levels of overseas investments in fish catching companies, especially by Spanish fishing companies, and particularly in cheaper

regions such as Africa and Latin America. Spanish fishing companies have limited investments in other EU fisheries.

When considering international forms of horizontal integration, i.e. investments by foreign companies in a national fishery, or by national companies in international fisheries, a number of factors need to be taken into consideration. However, none of these factors alone can definitively explain any identified trend.

10.1.2.1. Cost

Firstly, as alluded to above, is the cost factor. The cost factor was described as an important driver for foreign investment in Danish pelagic fisheries, and for Estonian fishing companies investing in Finland. However, cost does not explain why there were very few foreign investments in the Danish demersal segment, or why there were very few foreign investments in Estonian fisheries. The lack of investments in the Danish demersal segment can partially be explained by the low levels of ease of access, as the regulations regarding investment in Danish fisheries are very strict. However, these same regulations apply to the Danish pelagic segment, so a further explanatory factor is likely to be the higher level of return on investments in the pelagic segment compared the demersal segment.

The lack of investments in the Estonian fisheries is most likely explained by the strong network of existing Estonian companies, making it difficult for foreign investors to access the Estonian market.

The UK has one of the strongest economies of the selected case study countries. Nevertheless, only one company had investments in fish catching activities abroad, while there was also one foreign invested company among those with the highest levels of FQA in the UK. Thus other explanatory factors are needed. This may be found by contrasting the examples of Portugal and Spain. The UK had comparatively high levels of domestic horizontal integration by a relatively small number of companies. Access to quota was thus sufficiently guaranteed, and further complemented by fishing vessel partnerships and off-take arrangements. In both Portugal and Spain there was little quota concentration, or domestic horizontal integration. There were high levels of competition for already insufficient levels of quota. Therefore there was a stronger driver for investments in fish catching activities abroad.

10.1.2.2. Ease of access

Another factor that determines levels of horizontal integration is ease of access. This is particularly relevant for foreign investments is national fisheries, and national companies investing abroad. As mentioned above, ease of access in the Danish fisheries is very low, i.e. the regulations are very strict, and thus it is very difficult to gain access to Danish fisheries. Nevertheless, in the Danish pelagic sector the potential gains were attractive enough for foreign investments, while this was not the case in the demersal segment. By their own admission, ease of access in the French fisheries is comparatively low. Nevertheless, French fisheries has generally high levels of foreign investments, particularly by Dutch and Spanish companies. Therefore, further explanatory factors need to be found in the investing countries of origin. In both Denmark and the Netherlands competition for quota is high, driving companies in these countries to gain access to quota elsewhere.

Beyond the bureaucratic or administrative forms of ease of access, another element of ease of access is the market condition. While both Estonia and Spain may have comparatively fewer bureaucratic obstacles, their market conditions reduced the levels of foreign investment. Estonia has a tight group of fishing companies that are in a financially sound condition. Therefore, foreign investors find it difficult to enter the market. In Spain, the level of

competition for insufficient levels of quota due to overcapacity in the sector make it unattractive to foreign investors.

10.1.2.3. Fisheries management system

Of these six case study countries, two had not implemented the ITQ fisheries management system, France and the UK. However, in terms of structural horizontal integration, the fisheries management system does not seem to play a significant role. In France, there were comparatively low levels of quota concentration, or domestic horizontal integration, whereas in the UK these are high. In Spain and Portugal there were low levels of quota concentration, while in Estonia and in the Danish pelagic sector quota concentration was higher. Furthermore, in France there were comparatively higher levels of foreign investment reported in the French fisheries, compared to the UK. Foreign investment in the Spanish, Portuguese, Estonian, and Danish demersal segments were low, while foreign investment in the Danish pelagic segment was comparatively higher.

This implies that other factors, such as cost, ease of access, quota sufficiency/competition, and the profitability of the national fisheries sectors are likely to be more important factors in explaining the levels of structural horizontal integration.

10.2. Non-structural integration

This section will describe the trends observed between the case study countries in terms of non-structural integration. It will further provide an analysis of the factors that cause these trends.

10.2.1. Vertical integration

In many ways similar to structural vertical integration, non-structural vertical integration depended to a large degree on the fishing segment and the targeted species. In segments where species could be targeted more selectively, there was a higher degree of vertical integration in the form of off-take arrangements between fish catching companies and fish processing companies. Where this was not the case, the harvests were sold in markets or at auction.

In the Spanish fisheries, non-structural vertical integration was reportedly more common than structural vertical integration. This did not appear to be species or segment specific. However, the integration implied here includes off-take agreements between fish catching companies and distributors, skipping the processing stage in the value chain for species where processing decreases the value of the product. Another element is the that processing of some species of fish simply implies preserving the fish. Such processing is also common in Spain.

10.2.2. Horizontal integration

In terms of non-structural forms of integration, although there were still some differences, more similarities are found among the case study countries. In most countries there was a trade in quotas, the exceptions being Spain and France. In France, this was related to the fisheries management system which made it difficult to trade quotas as quotas were tied to vessels. The vessels themselves had to be purchased in order to access the quotas. In Spain, the lack of quota trade was due to a combination of overcapacity in the Spanish fishing fleet and the insufficient quotas for the active fishermen.

In all countries, apart from France, fishermen engaged in the renting in or out of quotas in order to compensate for surplus catch, to increase the quota for a targeted species, or to compensate for by-catch. In France, it was reportedly illegal to do so.

Fish catching companies in all the selected case study countries engaged in quota swapping. This occurred within the PO, between POs in the same countries, and between POs internationally. It also occurred between companies in a PO, and between different companies domestically and internationally.

10.3. Conclusion

The quantitative analysis carried out in this study has indicated that if there is a 10% increase in structural horizontal integration, or in the expansion of fleet size, there is a 0.001% decrease in employment. Therefore, the negative impact of horizontal integration on employment can be considered minimal. The study also found that fluctuations in employment in the fish catching segment do not directly correlate to fluctuations in employment in the fish processing segment. As is always the case with quantitative analysis, data limitations and the consideration of variables affect the findings. Nevertheless, the tests were robust. Further tests using different definitions of horizontal and vertical integration and using company level data could prove useful in future studies into the socioeconomic impacts of vertical and horizontal integration in the EU fisheries industry.

Regarding structural vertical and horizontal integration, it is difficult to determine general trends between the countries simply by looking at the companies themselves, the fisheries management system, the targeted species, historic factors, or the geographic location. External factors beyond the scope of this research, such as the business environment, rules and regulations, government policies, the economic condition of the country, and European economic conditions, play a significant role in describing the trends in both structural and non-structural horizontal and vertical integration. Further research on other countries, as well as expanding the research to factor in the external factors that were beyond the scope of this research, is needed in order to develop more holistic policy recommendations at both national and EU levels. Nevertheless, this research has identified a number of trends in both structural and non-structural vertical and horizontal integration in the six case study countries.

The full implementation of the landings obligation is also likely to have a significant impact on the processes of integration. Respondents already indicated efforts to take this into consideration, including seeking access to more quotas in addition to developing more selective fishing techniques. This quota seeking integration in response to the landings obligation will likely include more structural horizontal integration domestically, where resources allow this. In cases such as Spain and Portugal, it is likely that structucal horizontal integration driven by the landings obligation will be in the form of international investments. Existing processes of non-structural horizontal integration will become more fully utilised. It is likely that tools such as the web-based tools developed in Denmark and Estonia will become more common place, and potentially an EU-wide tool will emerge.

Additionally, the Brexit will also have an impact on the processes of integration in EU fisheries. However, it is impossible to determine, as yet, what this could entail. Most particularly as it is not yet clear what the Brexit will mean for UK and EU fisheries management.

11. RECOMMENDATIONS

As stated above, the levels and forms of integration vary between the different case study countries. These differences relate in part to external factors beyond the scope of the study. Further differences relate to the fishing segment (e.g. demersal or pelagic), the targeted species, ease of access, cost, firm performance, and the fisheries management system. This study focused on six case study countries in order to draw general conclusions. One of the key conclusions is that there are significant differences between the case study countries.

It can therefore be expected that expanding this research to include more of the 23 EU member countries with a coastline will highlight yet further differences, as well as similarities. Furthermore, the strategic responses of fish catching and processing companies to the landings obligation and the Brexit have not yet been fully developed. Given this context, it is difficult to develop EU level policy measures that could mitigate the economic and social costs and optimise the benefits of integration in the industry, in particular for the coastal communities most concerned. This is more especially so as fisheries management and commercial and industrial policies in general are, to a large extent, determined at the national level.

Nevertheless, this research has developed the following recommendations:

11.1. Further research

Further research is needed on two fronts. Firstly, the inclusion of more case study countries would be informative as it would highlight further similarities and differences. Suggested additional countries include Germany, the Netherlands, Sweden, Italy, Latvia and Greece. These countries are suggested due to the relative importance of their fisheries sectors as well as their geographic location. If 12 of the 23 EU countries with a coastline were analysed in the same way as has been done in this current research, the results could be considered more open to generalisations.

Secondly, using a basic econometric model and limited data, this research found that integration did not have a significant impact on employment or wages in the fish catching and fish processing segments. This is potentially a positive finding for communities that rely to a large degree on fish catching and processing as their source of income. However, further econometric research is needed in order to confirm this. The econometric analysis would need to use a number of more complex definitions of integration. It would further need access to more detailed data, preferably at the community level. This would mean, for example, access to income, employment, and fiscal data at the community level of a large number of communities that are or were reliant on the fish catching and processing sectors. Such data would need to be available for at least the last 10-20 years.

Broader qualitative analyses and more robust econometric analyses will help to confirm the findings of this study.

11.2. EU level platforms

While, given the autonomy of the member states and the significant differences between them, it may be more difficult to address structural integration through EU level policy measures, the non-structural forms of integration lend themselves much better to targeting through EU level policy measures. In terms of non-structural horizontal integration, this research found that fish catching companies engaged in quota trade, quota swapping and quota renting. In terms of non-structural vertical integration, this research found that fish catching companies committed to off-take arrangements or, more commonly, sold their harvest at auction or in markets. This

research therefore recommends a concrete measure to optimise, in particular for the coastal communities most concerned, the benefits of non-structural forms of integration in the industry: establishing two platforms at the EU level to facilitate these non-structural forms of integration.

11.2.1. Quota trading, renting, and swapping platform

One such platform would formalize non-structural horizontal integration. It would be accessible to fishermen throughout the EU. Initiatives are already in place in Denmark and Estonia; however, scaling this up to the EU level would allow more fish catching companies to benefit. Given the implementation of the landings obligation/discard ban, fish catching companies will increasingly seek to gain access to quotas, possibly outside of their quota portfolio. A transparent EU level platform will help them to flexibly, efficiently and effectively restructure their portfolios in order to maximise their income and minimise their losses.

11.2.2. EU level fish auction

Findings from the Danish fisheries suggest that fish auctions have a positive effect on increasing the benefits to fish catching companies. The Norges Sildesalgslag online auction is transparent, and guarantees a buyer. Norges Sildesalgslag staff are present at the landing sites to ensure that the volumes and qualities meet the deal requirements, and there is also insurance in case the processor is suddenly unable to pay for the transaction. The system avoids conflict between the vessels/skippers and processors. Scaling this up to the EU level would increase the benefits to fish catching companies throughout the EU, and would support the more common non-structural form of vertical integration.

11.1. Quota concentration safeguards

Given the varying interests of EU member states and the different national-level fisheries management systems, it may not be plausible to develop quota concentration safeguards at the EU level. Indeed, it may not even be desirable. A certain number of large-scale international fishing companies can be considered desirable as they can drive technological development and economic efficiencies.

Nevertheless, quota concentration safeguards need to be developed, at least at the national level, in order to mitigate the economic and social cost and optimise the benefits of integration, in particular for the coastal communities most concerned. The findings from Denmark show that it is vital that quota safeguards be comprehensive and are able to anticipate the efforts of companies to find loopholes in the legislation. Evidence from the United Kingdom and France shows that POs can play an effective role in ensuring that rights to fish are kept in the local fishing communities. EU level policy measures to promote quota concentration safeguards can be developed, while the integration of these safeguards into the national level fisheries management systems should remain the responsibility of the Member States. Such a strategy would remain within the spirit of the Common Fisheries Policy.

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