European Commission

CASE STUDY

# DRIED SALTED COD IN NORWAY


EUMOFA

European Market Observatory for Fisheries and Aquaculture Products

## PRICE STRUCTURE IN THE SUPPLY CHAIN FROM NORWAY TO PORTUGAL

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# Contents

# SUMMARY


- Dried and salted cod ('clipfish') is a traditional export item for Norway and as far back as statistical records go, traces of export of clipfish can be found. In 1830 Norway was already exporting 7.500 tonnes of clipfish. Clipfish have since then followed an upward trend and reached a peak of 99.000 tonnes in 2014.

- The level of production and the price of dried and salted cod are closely related to the cod quotas awarded to Norway. The record level of 2014 was then linked to high quotas and low prices of the raw material. In the last two years (2015-2016), which saw a shortage in the raw material supply (Norway's cod catches fell from 473.500 tonnes in 2004 to 412.500 tonnes in 2016), clipfish exports dropped to 81.000 tonnes in 2016.

- Raw material (fresh/frozen cod) represents 84% of the total cost of dried and salted cod (margin excluded). Labour is the second-largest cost item, with 8-9% of the total cost.

- Portugal is Norway's main clipfish market and takes in 66% of Norway's total exports of cod clipfish.

- Dried and salted cod is shipped to Portugal by road for a transportation cost of 0,17 EUR/kg. Transportation by road takes approximately 5-6 days from the main processing area around Ålesund to central locations in Portugal.

- In Portugal dried and salted cod is directly delivered to large-scale retailers, who have a market share of approximately 90% for dried salted cod, out of which the top-3 retailers account for 80%.

- Portuguese large-scale retailers often sell Norwegian clipfish with high discounts.

# 0 TASK REMINDER – Scope and content

## 0.1 Case study scope

**Reminder**

The rationale for choosing to analyse price transmission and distribution of value in the supply chain of dried salted cod is described in the table below.

| Product | Origin | Characteristics | Market and price drivers |
|---|---|---|---|
| Dried salted cod | Fisheries (Barents Sea) | Processing activity in Norway almost exclusively for export purposes<br><br>Portugal main destination market<br><br>Product particularly requested by large-scale retailers | Availability and cost of raw material<br><br>Competition of dried salted cod imported from Norway and locally processed product from imported raw material<br><br>Possible loss leader strategy in Portugal |

Key elements of the analyses will concern:

- The evolution and profitability of the Norwegian processing industry;
- The transport from Norway to Portugal;
- The role of Portuguese large-scale retailers in the marketing of dried salted cod and the impact on the logistics of the product.
- The pricing strategy of Portuguese large-scale retailers.

## 0.2 Content of the document

Unlike the previous studies on price transmission, which focus on the analysis of one product in one country, this study follows the product from the raw material supply and processing in Norway to the final consumption in the destination market Portugal.

# 1 DESCRIPTION OF THE PRODUCT

## 1.1 Technical and commercial characteristics

The Norwegian cod processing industry produces three main types of processed products:

- salted and dried fish (in Norwegian: klippfisk),
- unsalted dried fish or stockfish (in Norwegian: tørrfisk),
- salted fish (in Norwegian: saltfisk).

These three products are mainly made from cod.

Dried and salted saithe, haddock, ling and tusk are also produced and exported, but in smaller quantities and exported to other geographical markets than Portugal.

The case study focuses on salted and dried cod (“clipfish”, also spelt “klipfish” or “klippfish”).

### Case study product

**Name:** Atlantic cod (*Gadus morhua*)

FAO code: COD

**Related codes** in the product nomenclature:

- Fresh:

CN code: 03 02 51 10 — Atlantic cod (*Gadus morhua*), whole

CN code: 03 02 51 90 — Greenland cod (*Gadus ogac*) and Pacific cod (*Gadus macrocephalus*), whole

CN code: 03 02 59 10 — Polar cod (*Boreogadus saida*), whole

CN code: 03 04 44 10 — Atlantic cod (*Gadus morhua*), Greenland cod (*Gadus ogac*), Pacific cod (*Gadus macrocephalus*) and Polar cod (*Boreogadus saida*), fillets

- Frozen:

CN code: 03 03 63 10 — Atlantic cod (*Gadus morhua*), whole

CN code: 03 03 63 30 — Greenland cod (*Gadus ogac*), whole

CN code: 03 03 63 90 — Pacific cod (*Gadus macrocephalus*), whole

CN code: 03 03 69 10 — Polar cod (*Boreogadus saida*), whole

CN code: 03 04 71 10 — Pacific cod (*Gadus macrocephalus*), fillets

CN code: 03 04 71 90 — Atlantic cod (*Gadus morhua*) and Greenland cod (*Gadus ogac*), fillets

CN code: 03 04 79 10 — Polar cod (*Boreogadus saida*), fillets

CN code: 03 04 95 21 — Pacific cod (*Gadus macrocephalus*), other than fillets

CN code: 03 04 95 25 — Atlantic cod (*Gadus morhua*), other than fillets

CN code: 03 04 95 29 — Greenland cod (*Gadus ogac*) and Polar cod (*Boreogadus saida*), other than fillets

- Dried, salted, smoked:

CN code: 03 05 32 11 — Pacific cod (*Gadus macrocephalus*), fillets, dried, salted

CN code: 03 05 32 19 — Atlantic cod (*Gadus morhua*), Greenland cod (*Gadus ogac*) and Polar cod (*Boreogadus saida*), fillets, dried, salted

CN code: 03 05 51 10 — Atlantic cod (*Gadus morhua*), Greenland cod (*Gadus ogac*) and Pacific cod (*Gadus macrocephalus*), dried, unsalted

CN code: 03 05 51 90 — Atlantic cod (*Gadus morhua*), Greenland cod (*Gadus ogac*) and Pacific cod (*Gadus macrocephalus*), dried, salted

CN code: 03 05 53 10[1] — Polar cod (*Boreogadus saida*), dried, whether or not salted

CN code: 03 05 62 00 — Atlantic cod (*Gadus morhua*), Greenland cod (*Gadus ogac*) and Pacific cod (*Gadus macrocephalus*), salted, not dried

CN code: 03 05 69 10 — Polar cod (*Boreogadus saida*), salted, not dried

## 1.2 Production process of clipfish

The production process of clipfish consists of three steps[2]:

- step 1: salting

Depending on the preference of the market, the fish (which arrives either fresh or frozen at the plants) is usually salted and matured for 10-20 days. Norwegians typically use 0.5-1 kilos of salt per kilo of fish.

- step 2: drying

Once the fish has been salted, it is put onto pallets and left to dry indoors, in specially designed drying tunnels in which temperatures are between 20 and 25°C[3].

The length of time it takes for the fish to dry depends on its size and how it was salted, so it can be anywhere between 2-7 days.

- step 3: sorting

The fish is ready when it has a water content of around 40-50% (depending on the market). It is then stored at a low temperature, between 0 and 5°C.

The clipfish is then sorted by quality – the highest of which is "Superior/Primeira[4]". Sizes vary from the smallest 31/40 (31-40 fish per 50 kg carton), to the largest 8/10 (8-10 fish per 50 kg carton).

## 1.3 Production and availability of cod

### 1.3.1 Evolution of Norwegian catches

Norway provides almost one third of the world catch of Atlantic cod, ahead of Russia (30%) and Iceland (19%).

Table 1 – World catches of Atlantic cod (*Gadus morhua*) in tonnes

| Country | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Norway | 225 775 | 221 299 | 217 789 | 215 443 | 243 660 | 283 482 | 340 167 | 357 951 | 471 316 | 473 477 | 422 267 |
| Russia | 203 738 | 207 530 | 189 913 | 194 610 | 234 065 | 272 772 | 316 263 | 334 729 | 436 466 | 438 962 | 386 077 |
| Iceland | 212 423 | 199 375 | 174 436 | 151 397 | 188 976 | 178 599 | 182 356 | 204 645 | 236 051 | 237 756 | 244 554 |
| EU-28 | 125 405 | 125 236 | 117 467 | 119 029 | 127 190 | 139 981 | 142 197 | 149 656 | 142 081 | 140 254 | 147 158 |
| Greenland | 11 111 | 15 124 | 19 371 | 25 521 | 16 626 | 17 548 | 19 602 | 21 226 | 26 861 | 30 533 | 49 755 |
| Faroe Islands | 35 755 | 30 753 | 28 141 | 27 103 | 27 308 | 33 003 | 28 825 | 29 668 | 32 446 | 36 400 | 39 679 |
| Canada | 26 156 | 27 412 | 26 732 | 26 837 | 19 948 | 17 257 | 13 038 | 10 997 | 10 518 | 13 001 | 12 234 |
| USA | 6 314 | 5 724 | 7 687 | 8 652 | 8 940 | 8 035 | 7 984 | 4 766 | 2 263 | 2 345 | 1 528 |
| Other | 3 100 | 1 959 | 2 017 | 1 911 | 1 336 | 1 256 | 1 113 | 763 | 1 397 | 1 551 | 1 181 |
| Total | 849 777 | 834 412 | 783 553 | 770 503 | 868 049 | 951 933 | 1 051 545 | 1 114 401 | 1 359 399 | 1 374 279 | 1 304 433 |

Source: FAO 2017 - Fishstat

[1] 03 05 59 10 until 2016

[2] Source: Norwegian Seafood Council

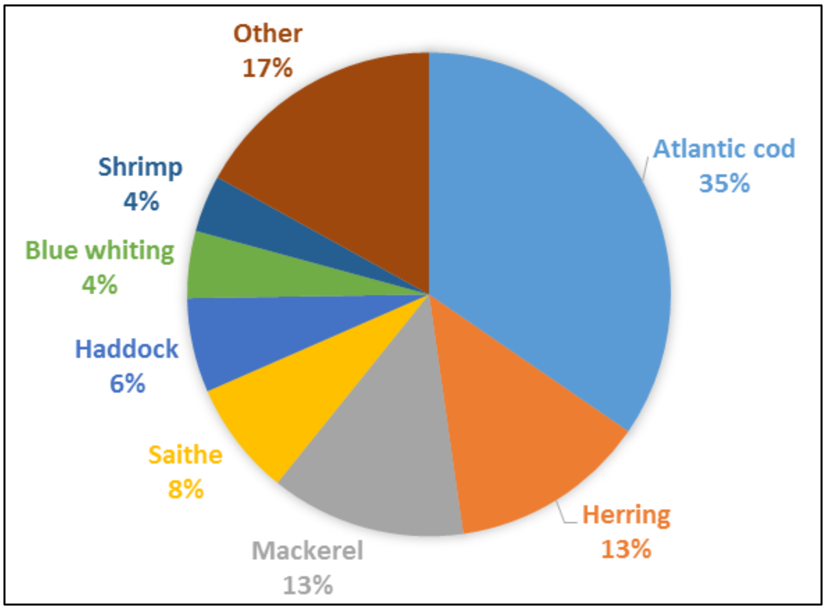
[3] Until the end of the 1950s the fish was dried outside on clips, which explains the origin of the name "clipfish".

[4] Under this sorting scheme there are two quality categories, "primeira" and "sortido", which are strongly connected to the type of gear used by fishing vessels. Frozen raw material landed by longliners gives 90% of primeira and 10% of sortido, whereas for frozen cod landed by trawlers the ratio is 80/20 (Source: NOFIMA – Rapport 4/2015 "Råstoffkvalitet og salgsverdi").

### 1.3.2 Supply from capture fisheries

With revenues of NOK 6,45 billion (EUR 694 million) in 2016, the Atlantic cod fishery is by far the largest Norwegian fishery and represents 35% of the first sale value of Norway's total catches.

Figure 1 – Value of Norwegian catch by species in 2016




Source: Fiskeridirektoratet

Atlantic cod represents 52% in volume and 59% in value of the total catch of groundfish species, ahead of saithe and haddock.

Besides cod, the main species used by the clipfish industry are saithe, tusk and ling.

Table 2 – Norwegian catches of groundfish species (tonnes)

| Country | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Atlantic cod | 225 775 | 221 299 | 217 789 | 215 444 | 243 659 | 283 481 | 340 167 | 357 951 | 471 316 | 473 478 | 422 267 | 412 537 |
| Haddock | 63 337 | 71 412 | 73 286 | 74 299 | 106 324 | 124 696 | 159 550 | 160 977 | 101 240 | 94 214 | 96 964 | 110 336 |
| Saithe | 230 567 | 256 856 | 225 464 | 227 295 | 202 377 | 228 114 | 190 344 | 176 471 | 147 691 | 153 833 | 151 507 | 154 059 |
| Tusk | 11 862 | 14 347 | 15 293 | 16 197 | 13 763 | 17 013 | 14 754 | 13 439 | 11 432 | 11 406 | 13 746 | 14 803 |
| Ling/Blue ling | 15 133 | 17 195 | 19 049 | 19 887 | 17 108 | 18 939 | 16 139 | 16 049 | 15 815 | 17 080 | 18 131 | 18 350 |
| Greenland halibut | 15 632 | 13 336 | 10 163 | 9 017 | 10 176 | 9 789 | 10 232 | 12 717 | 12 595 | 14 055 | 14 393 | 16 789 |
| Atlantic redfishes | 12 960 | 17 345 | 13 722 | 8 117 | 8 296 | 13 339 | 9 799 | 10 279 | 9 037 | 19 350 | 24 793 | 24 859 |
| Argentines | 17 073 | 25 149 | 16 407 | 13 428 | 13 579 | 12 871 | 12 061 | 12 362 | 13 234 | 14 470 | 15 240 | 18 836 |
| Other | 24 530 | 26 441 | 28 648 | 27 356 | 27 135 | 24 030 | 23 954 | 25 369 | 28 245 | 24 083 | 23 530 | 27 603 |
| Total | 616 869 | 663 380 | 619 821 | 611 040 | 642 417 | 732 272 | 777 000 | 785 614 | 810 605 | 821 969 | 780 571 | 798 172 |

Source: Fiskeridirektoratet

### 1.3.3 Supply from aquaculture

Farmed cod production, which peaked at 21.240 tonnes in 2010, dropped steadily to 5 tonnes in 2015, before slightly rebounding to 450 tonnes in 2016[5]. The initial optimism for cod farming was based on the trust that the major production challenges were solved and that low quotas and corresponding high prices for wild cod would prevail. But none of these assumptions proved to be true: the intensively farmed cod had high mortality at larval stage and the mortality continued in the sea cages, in some cases exceeding 50 %; growth rates were also lower than expected; escapes from the sea cages were common; and losses due to diseases were severe. Because of these issues, the cod farming industry did not have the strength to resist when the financial crises appeared in 2008 together with lower cod prices due to higher quotas for wild cod (source: NOFIMA).

[5] Source: Fiskeridirektoratet

In this context, the ex-farm price (22,01 NOK/kg in 2016) is still higher than the first-sale price of caught cod (15,64 NOK/kg in 2016). Unlike the major farmed species in Europe (salmon, trout, seabass, seabream, etc.), for which aquaculture production is much bigger than fisheries production, the production of cod farmed is very low and negligible compared to the production of wild cod.

Farmed cod is only sold to the fresh market.

## 1.4 The clipfish industry in Norway

### 1.4.1 Raw materials

Cod is the most common fish species used for the production of dried and salted fish in Norway. Both fresh and frozen raw materials are used. In general production in Northern Norway is based on fresh cod while in the Western region processing units use frozen cod.

Raw materials are commonly transported directly to the land-based production plants by the fishing vessels that caught the fish. In some cases, the fish is landed at a different port and transported by road to the processing plant.

### 1.4.2 Location of production

The main production area is the Møre og Romsdal county, around Ålesund, which hosts the major processing companies. North Norway also has a significant processing industry.

### 1.4.3 Level of production

Norway produces around 120.000 tonnes of dried and salted fish a year.

Table 3 – Norwegian production of dried and salted fish

| | Sold volume | |
|---|---|---|
| | tonnes | 1000 EUR |
| 2012 | 128 435 | 708 370 |
| 2013 | 92 762 | 423 553 |
| 2014 | 130 660 | 604 688 |
| 2015 | 118 516 | 616 020 |
| 2016 | 120 232 | 544 824 |

Source : Eurostat – Prodcom

PRODCOM code 10202350 : "Dried fish, whether or not salted; fish, salted but not dried; fish in brine (excluding fillets, smoked, heads, tails and maws)

It has to be noted that this code covers:

- at species level : not only cod, but also other species such as saithe, ling, haddock and tusk;
- at product level : not only dried saled fish (clipfish), but also not salted dried fish (stockfish) and wet-salted fish.

### 1.4.4 Economic performance of the clipfish industry

NOFIMA, a Norwegian institute for applied research in the fields of fisheries, aquaculture and food, regularly issues reports on economic performance of the Norwegian fish processing industry. The latest one was published in January 2017 and contains the results of the 2014 year[6].

The survey shows that the Norwegian fish processing industry experienced a considerable increase in earnings in 2014 and that most segments producing for human consumption saw improved margins, while the fishmeal and fish oil industry saw somewhat weaker (but still high) margins. Producers of conventional products like clipfish, stockfish and salted fish, experienced particularly improved profitability in 2014.

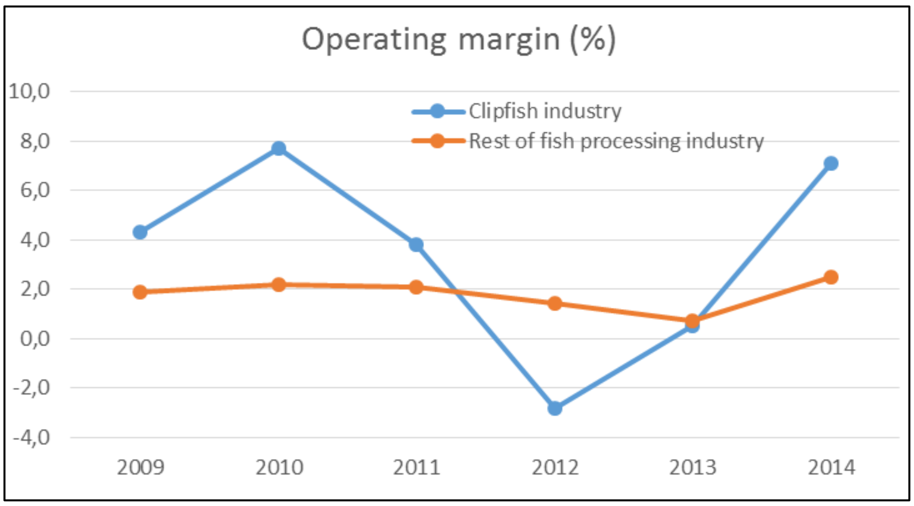
If we compare margins in the clipfish sector with the rest of the Norwegian fish processing industry over the 2009-2014 period (figure below), we observe that:

- the rest of the fish processing industry is less volatile than the clipfish sector, which is not surprising as it includes many different industry segments (filleting industry, stockfish industry, pelagic freezing, packaging, canning industry, the smoking industry) and thus segment fluctuations are smoothed out in the overall figures;

- in the first part of the period surveyed (2009-2012), margins decreased much faster for the clipfish industry than for the rest of the fish processing industry, even if the 2009 profit margin for the clipfish segment can hardly be taken into account due to exceptionally high financial earnings[7];

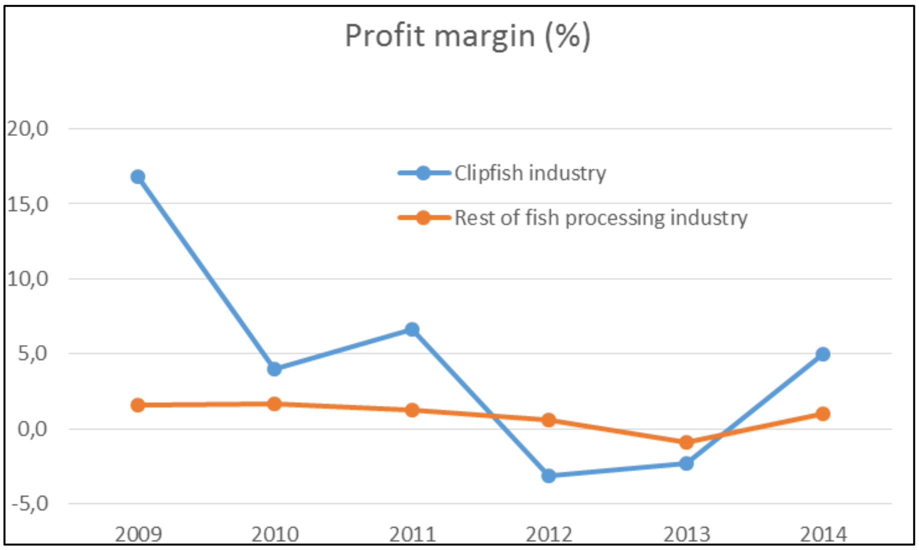
- from 2012-2014 the profitability of the clipfish sector improved significantly: the operating margin, which had decreased by -2,8% in 2012, rose 0,5% in 2013 and 7,1% in 2014 and the profit margin, which experienced a negative growth in 2012 and 2013, increased 5,0% in 2014; in that year the operating and profit margins of the rest of the fish processing industry only increased 3,0% and 1,4% respectively.

Figure 2 – Evolution of economic performance of the Norwegian clipfish processing industry




[6] https://nofima.no/pub/1448323/

[7] Financial earnings of the clipfish industry represented 22,9% of the operating revenues in 2009, while they usually represent 1,5 to 2% (average 2010-2014: 1,7%).




Source : EUMOFA elaboration based on NOFIMA data (Rapport 1/2017 "Driftsundersøkelsen I fiskeindustrien – Driftsåret 2014", published in January 2017)

The sample of companies analysed by NOFIMA (fish meal and fishoil sector not included) includes 277 companies, which generated a turnover of NOK 39 billion (EUR 4,7 billion)and employed 9.142 staff (corresponding to 8.408 FTEs) in 2014.

The sample of clipfish producing companies includes 21 companies in 2014, for a turnover of NOK 3,75 billion (EUR 449 million) and 833 staff employed (782 FTEs).

### 1.4.5 Local consumption of clipfish

The consumption of dried and salted cod is very limited in Norway, being less than 1% of total production according to stakeholders we have engaged with, and takes place both in restaurants and at home. Out-of-home consumption takes place mostly in Ålesund and in a few cities (Kristiansund, Bergen, Oslo).

In December 2017 the leading large-scale retailer SPAR was offering three products, all in 400 g packs:

- clipfish fillet, without skin and bones, at 99,90 NOK/pack (10,15 EUR), i.e. 249,75 NOK/kg (25,38 EUR),

- clipfish bites, without skin and bones, at 99,90 NOK/pack (10,15 EUR), i.e. 249,75 NOK/kg (25,38 EUR),

- clipfish loins, without skin and bones, at 139,00 NOK/pack (14,12 EUR), i.e. 347,50 NOK/kg (35,31 EUR).

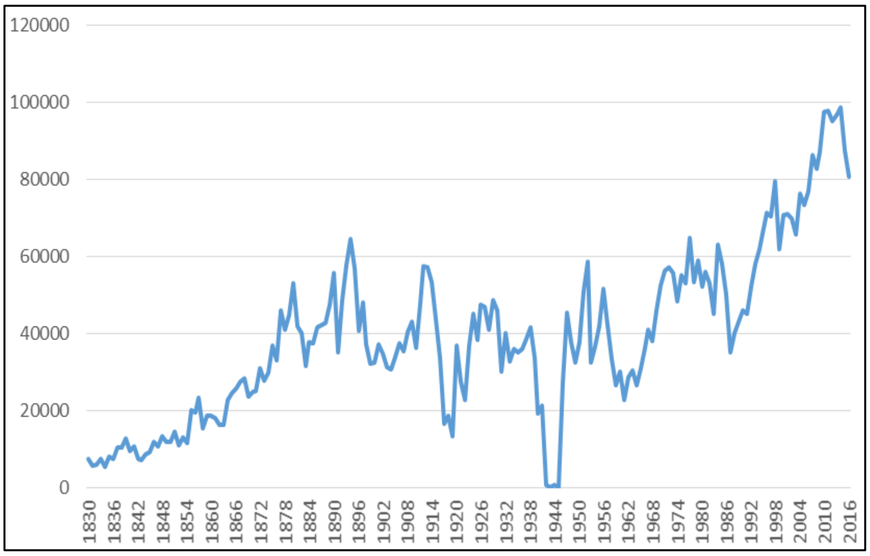
# 2 NORWEGIAN EXPORTS

## 2.1 Exports of clipfish: a long-standing history

Clipfish is a traditional export item for Norway and, as far back as statistical records go, traces of export of clipfish can be found. In 1830 Norway was already exporting 7.448 tonnes of clipfish. Volumes of clipfish exports have followed an upward trend since then and reached a peak of 98.666 tonnes in 2014 (in relation with high quotas and low prices).

In the last two years, which saw a shortage in the raw material supply (Norway's cod catches fell from 473.500 tonnes in 2004 to 412.500 tonnes in 2016), clipfish exports dropped to 80.732 tonnes in 2016.

Figure 3 – Evolution of Norwegian exports of clipfish from 1830 to 2016




Source: SSB (Statistics Norway)

Thus, Norway exported 81.000 tonnes of clipfish worth some NOK 3,7 billion (EUR 400 million) in 2016[8]. In terms of volume, this was an 8% reduction or 6.700 tonnes, and in terms of value this was a 6% decrease compared to 2015.

Besides the raw material issue mentioned above, this decline was due to challenges in some of Norway's major markets: e.g. in Brazil there have been challenges related to market access and increased competition from other suppliers and other species[9], and in Angola, whose economy is largely depending on petroleum (oil makes up over 90% of Angola's exports), the slump of oil prices in 2016 had a strong impact on the country's economy and consumption. Norway's main clipfish market, Portugal, held up quite well in 2016, with stable volumes (+0,7%) and a significant increase in value (+10% at NOK 1,5 billion or EUR 160 million).

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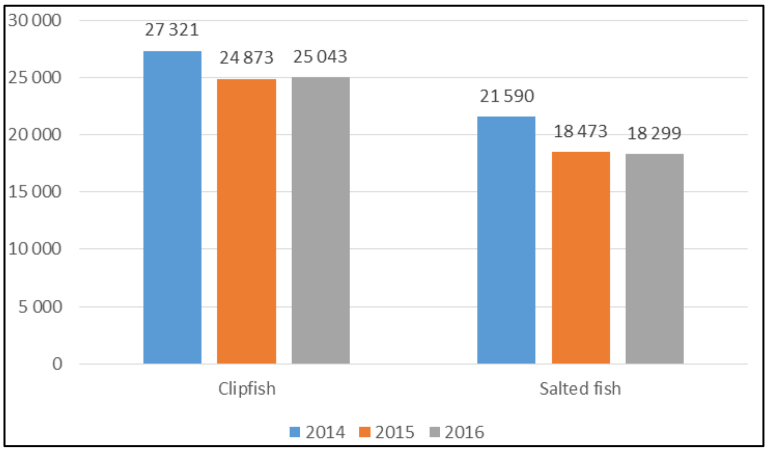
[8] Source : Norway Seafood Council

[9] Due to the price of cod, Norwegian exports of clipfish made from cod to Brazil decreased strongly in recent years (-34% in 2015 and -21% in 2016 by volume) and have been partly replaced with clipfish made from saithe.
Dried salted saithe is also exported to Africa, Dominican Republic and Jamaica. Dried salted ling is popular in Mexico.

Figure 4 - Norway's exports of clipfish and salted fish to Portugal (tonnes)




Source: Nordea

## 2.2 Main destinations

Portugal takes 66% of Norway's exports of clipfish made from cod. Other significant export markets are Brazil (16%), Denmark (5%), Italy (3%) and France (3%).

Table 4 – Norway: 10 most important export markets for clipfish made from cod in 2016

| *Country* | Volume | Value | | Price | |
|---|---|---|---|---|---|
| | tonnes | 1000 NOK | 1000 EUR | NOK/kg | EUR/kg |
| Total export | 38 145 | 2 275 049 | 244 876 | 59,64 | 6,42 |
| *EU-28* | *29 631* | *1 778 139* | *191 391* | *60,01* | *6,46* |
| Portugal | 25 043 | 1 508 606 | 162 380 | 60,24 | 6,48 |
| Brazil | 6 226 | 355 952 | 38 313 | 57,17 | 6,15 |
| Denmark | 1 810 | 105 773 | 11 385 | 58,44 | 6,29 |
| Italy | 958 | 59 078 | 6 359 | 61,67 | 6,64 |
| France | 977 | 52 888 | 5 693 | 54,13 | 5,83 |
| Switzerland | 550 | 33 983 | 3 658 | 61,79 | 6,65 |
| Canada | 547 | 32 981 | 3 550 | 60,29 | 6,49 |
| USA | 365 | 25 532 | 2 748 | 69,95 | 7,53 |
| San Marino | 361 | 21 990 | 2 367 | 60,91 | 6,56 |
| Other | 826 | 48 462 | 5 216 | 58,67 | 6,32 |

Source : EUMOFA elaboration based on SSB trade data data (Statistics Norway)

Codes 03055121 (clipfish made from *Gadus morhua*) and 03055129 (clipfish made from *Gadus ogac* and *Gadus macrocephalus*) of Norwegian trade statistics

Portugal is also Norway's most important export market for salted cod (not dried), absorbing 72% of total exports. Other significant markets are also European, notably Spain (18%), Greece (7%) and Italy (2%).

Table 5 – Norway: 10 most important export markets for salted cod in 2015

| *Country* | Volume | Value | | Price | |
|---|---|---|---|---|---|
| | tonnes | 1000 NOK | 1000 EUR | NOK/kg | EUR/kg |
| Total export | 25 483 | 988 443 | 110 445 | 38,79 | 4,33 |
| *EU-28* | *25 422* | *985 518* | *110 119* | *38,77* | *4,33* |
| Portugal | 18 473 | 717 992 | 80 226 | 38,87 | 4,34 |
| Spain | 4 536 | 171 026 | 19 110 | 37,70 | 4,21 |
| Greece | 1 742 | 65 313 | 7 298 | 37,49 | 4,19 |
| Italy | 514 | 24 657 | 2 755 | 47,97 | 5,36 |
| Denmark | 93 | 3 583 | 400 | 38,53 | 4,30 |
| France | 56 | 2 017 | 225 | 36,02 | 4,02 |
| San Marino | 30 | 1 382 | 154 | 46,07 | 5,15 |
| Switzerland | 22 | 1 358 | 152 | 61,73 | 6,90 |
| Tunisia | 10 | 408 | 46 | 40,80 | 4,56 |
| Other | 39 | 1 159 | 130 | 29,72 | 3,32 |

Source: Norway Exports

## 2.3 Exports to Portugal

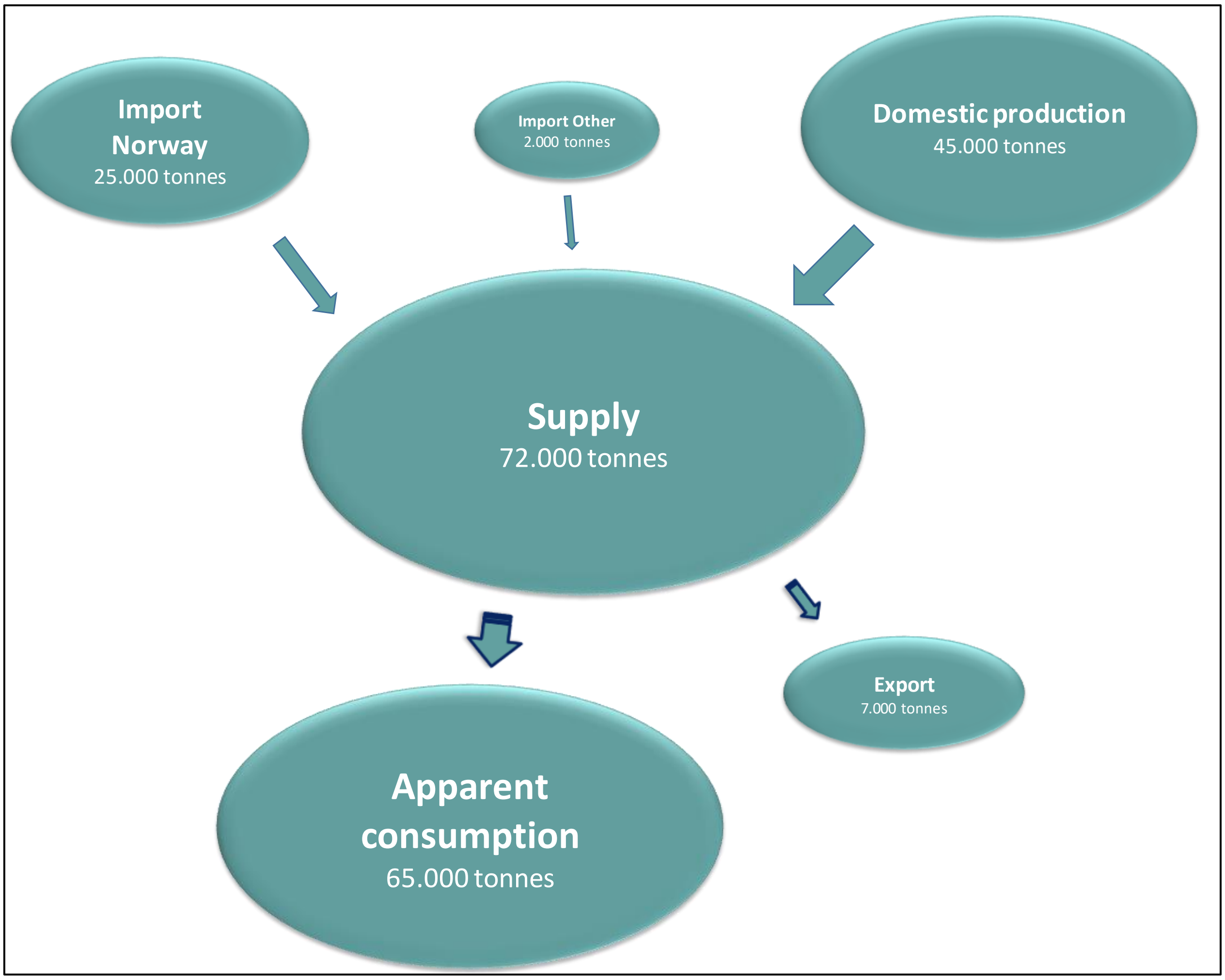
Besides dried and salted cod, Norway also exports wet salted cod and frozen cod for domestic processing in Portugal into dried salted cod. Portugal is indeed the only other country which produces dried and salted cod at industrial scale. Lower production and labour costs are some of the explanations why Portugal chose to produce dried salted cod from Norwegian raw materials (see below the section on production in Portugal).

# 3 THE PORTUGUESE MARKET

## 3.1 Supply of the Portuguese market

- The Portuguese market for dried salted cod (clipfish) amounted to some 65.000 tonnes in the last years, 36% being supplied by import (mostly from Norway) and 64% by local production made from imported raw material (frozen cod) or semi-processed product (wet-salted cod).

Figure 5 - Supply of the Portuguese market for dried salted cod in 2016




Source: elaboration EUMOFA

Portugal also exports some quantities of dried salted cod to Brazil (2.400 tonnes in 2016), France (2.000 tonnes), Angola (900 tonnes) and Spain (400 tonnes).

- The top 3 fisheries and aquaculture commodities imported by Portugal are cod products.

Table 6 - Imports of the top-10 fisheries and aquaculture commodities in Portugal

| Commodity | 1000 EUR |
|---|---|
| Dried and salted cod (clipfish) | 149 222 |
| Cods nei, salted or in brine | 126 208 |
| Atlantic cod, frozen | 111 187 |
| Octopus, frozen | 100 187 |
| Shrimps and prawns, other than coldwater, frozen | 79 499 |
| Shrimps and prawns (*Penaeus spp* .), frozen | 70 038 |
| Gilthead seabream, fresh | 49 228 |
| Atlantic salmon, fresh | 47 310 |
| Swordfish, frozen | 44 181 |
| Squids (Ommastrephes sagittatus, Loligo spp.), frozen | 38 698 |

Source : FAO

FAO trade data use the FAO International Standard Statistical Classification of Fishery Commodities (ISSCFC) which is derived from the United Nations Standard International Trade Classification, Revision 4 (SITC Rev. 4) and linked to the Harmonized Commodity Description and Coding System of the World Customs Organization and to the FAOSTAT classification.

nei: not elsewhere included

The first product mentioned in table 6 is a finished product destined for the final market (retail and HORECA), while the following two are products mostly destined for the processing industry.

## 3.2 Supply chain Norway-Portugal

### 3.2.1 Actors

The supply chain for dried salted cod is roughly illustrated in the figure below.

The producers are the Norwegian fishing fleet, both coastal and high sea. Their catches provide an input to the processors. All first-sales of cod are regulated by the Raw Fish Act[10] and managed by the Fishermen's Sales Organisations which handle the trade between fishermen and processors.

The processors are land-based Norwegian companies, generally equipped with a landing wharf, which transform fresh or frozen cod into dried salted cod[11].

Portuguese large-scale retailers are the main clients of Norwegian exporters.

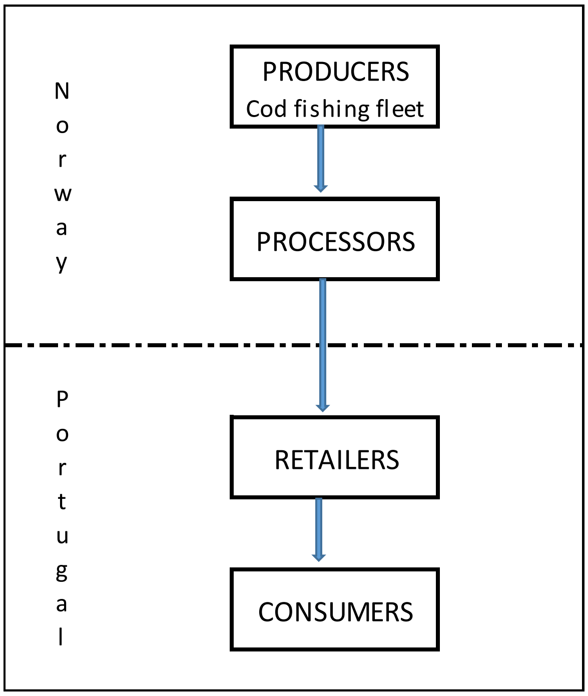
In all seafood exports from Norway, the Norwegian Seafood Council (NSC) plays an important role. In particular the NSC works together with the industry to develop markets. NSC, which is a public company owned by the Ministry of Trade, Industry and Fisheries, finances its activities through fees levied on all exports of Norwegian seafood (1,05% of the FOB[12] value of exported products in the case of clipfish). NSC has representations in all major salted cod markets (Portugal, Spain, Italy, Brazil) and organizes each year in Portugal a seminar on the future of clipfish ("O Futuro do Bacalhau") with stakeholders of Norway and Portugal.

[10] The Raw Fish Act of December 14, 1951 establishes that the sale of wild fish at auction must be managed by the fishermen's sales Organizations.

[11] Three processors (Fjordlaks, Jangaard, Møre Codfish) account for almost 90% of Norwegian exports of dried and salted cod to Portugal (source: stakeholder interviews).

[12] Free on board

Figure 6 - Supply chain Norway-Portugal for dried salted cod




### 3.2.2 Products

Dried salted Atlantic cod is the preferred product in Portugal and accounts for almost the entire dried and salted fish consumption.

According to Norwegian exporters, alternative products to dried salted cod produced in Norway from Atlantic cod are:

- dried salted cod processed in Portugal from frozen or wet salted cod imported from Norway;

- salted cod from Iceland;

- dried salted cod from other cod species (*Gadus microcephalus*) produced in Portugal or Iceland;

- dried salted products from other whitefish species such as saithe, tusk and ling.

## 3.3 Distribution channels

Large-scale retailers have a market share of approximately 90% for dried salted cod, out of which the top 3 retailers (Continente, Pingo Doce, Intermarché) cover 80% (source: Clipfish seminar Ålesund, August 2017).

Traditional shops account for 10%.

HORECA uses more and more wet-salted cod, which they mostly buy from the Portuguese processors. Indeed fewer restaurants are using clipfish due to new regulations which require them to use the cod in less than two days, once desalted.

Portuguese large scale retailers have strict requirements regarding deliveries of dried and salted cod; in particular they are very strict on the absence of surface salt and on the dryness degree. For these reasons, Norwegian providers have to face many claims and manage many returns.

## 3.4 Processing in Portugal

The Portuguese fish processing industry produces around 45.000 tonnes of dried salted cod annually, processed from wet-salted cod mostly imported from Norway (and, to a small extent, from China) or from frozen cod imported mainly from Norway and Russia.

Portuguese production decreased in the last two years as a result of the strong increase of the cost of raw material: the price of imported wet-salted cod rose from 3,66 to 4,54 EUR/kg (+24%), while the price of frozen Atlantic cod was increasing from 2,16 to 2,87 EUR/kg (+33%).

Table 7. Production of dried salted cod in Portugal

| | Production | Sold volume | | |
|---|---|---|---|---|
| | *tonnes* | *tonnes* | *1000 EUR* | *EUR/kg* |
| 2010 | 50 173 | 36 700 | 207 952 | 5,67 |
| 2011 | 50 042 | 36 434 | 226 558 | 6,22 |
| 2012 | 54 922 | 39 842 | 227 604 | 5,71 |
| 2013 | 56 555 | 44 130 | 233 848 | 5,30 |
| 2014 | 48 968 | 47 836 | 243 894 | 5,10 |
| 2015 | 43 125 | 36 943 | 226 298 | 6,13 |

Source: INE (Instituto Nacional de Estatística)

# 4 PRICES ALONG THE SUPPLY CHAIN (Norway-Portugal)

This chapter analyses prices and trends at the various stages of the cod supply chain, with the objective of setting the framework for price transmission analysis (chapter 5).

## 4.1 Production cost (raw material)

### 4.1.1 Minimum price system

All first-hand sales of demersal fish are regulated by the Raw Fish Act of 14 December 1951 and managed by fishermen's sales associations (SOs). In practice, fishermen report their catches to the associations, who sell it on their behalf. Depending on where the fish is landed, different SOs are responsible; the main one is Råfisklag (Norges Råfisklag) from Nordmøre county in the south-west to Finnmark in the north-east, followed by SUROFI (Sunnmøre og Romsdal Fiskesalgslag) in Møre og Romsdal county, and Vest-Norges Fiskesalgslag in Sogn og Fjordane and Hordaland counties.

A market-based minimum price is set by the SOs and the industry in cooperation. A new minimum price scheme entered into force in October 2016 and the minimum price turned into a "dynamic minimum price".
The dynamic minimum price is calculated every 14th day and is based on three different prices:

- average price of fresh cod;
- average price of frozen cod;
- average export price (monthly weighted average of a recalculated price of headed and gutted cod for the main uses of cod in Norwegian exports).

The average prices for fresh and frozen cod are based on Råfisk's own sales, while the raw material export price is calculated by Nofima.

The dynamic minimum price is calculated according to the following formula:
**(80% of average price fresh cod + 70% of average price frozen cod + 60% of average export price) / 3.**

Table 8. Dynamic minimum prices for cod (NOK/kg)

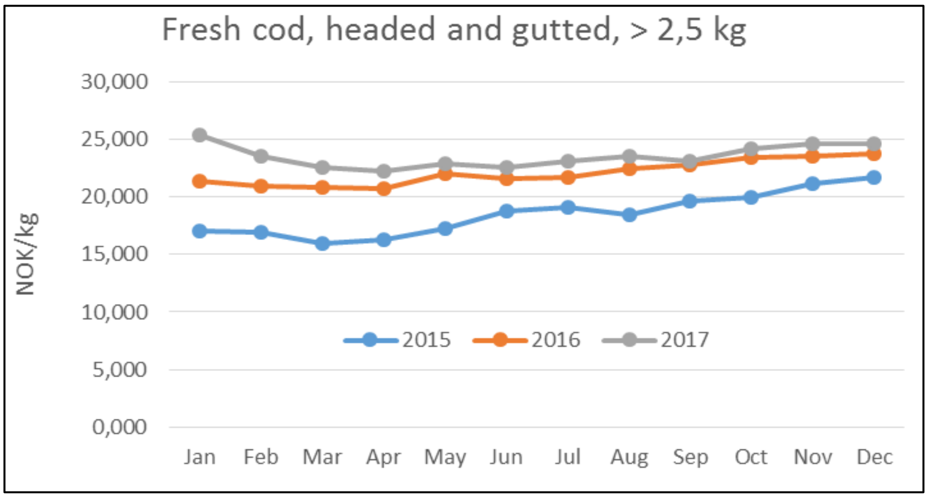
| Period | 28/8/17-10/9/17 | 11/9/17-24/9/17 | 23/10/17-5/11/17 | 6/11/17-19/11/17 |
|---|---|---|---|---|
| **Headed and gutted** | | | | |
| Cod > 6,0 kg | 19,25 | 19,75 | 20,50 | 21,25 |
| Cod 2,5-6,0 kg | 19,00 | 19,50 | 20,25 | 21,00 |
| Cod 1,0-2,5 kg | 17,75 | 18,25 | 19,00 | 19,75 |
| Cod < 1,0 kg | 15,00 | 15,50 | 16,25 | 17,00 |
| **Whole** | | | | |
| Cod > 9,0 kg | 12,53 | 12,87 | 13,37 | 13,87 |
| Cod 3,7-9,0 kg | 12,37 | 12,70 | 13,20 | 13,70 |
| Cod 1,5-3,7 kg | 11,37 | 11,87 | 12,37 | 12,87 |
| Cod < 1,5 kg | 7,87 | 10,03 | 10,53 | 11,03 |

Source: Norges Råfisklag

### 4.1.2 First-sale prices

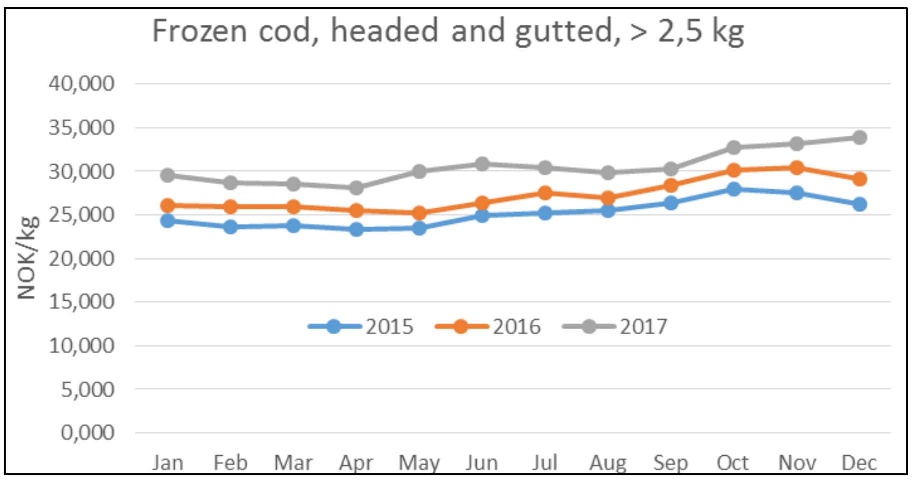
Weekly and monthly first-sale prices are available from fishermen's sales organisations.

Figure 7. Monthly first-sale price of fresh cod caught by Norwegian vessels




Source: Norges Råfisklag

Figure 8. Monthly first-sale price of frozen cod caught by Norwegian vessels

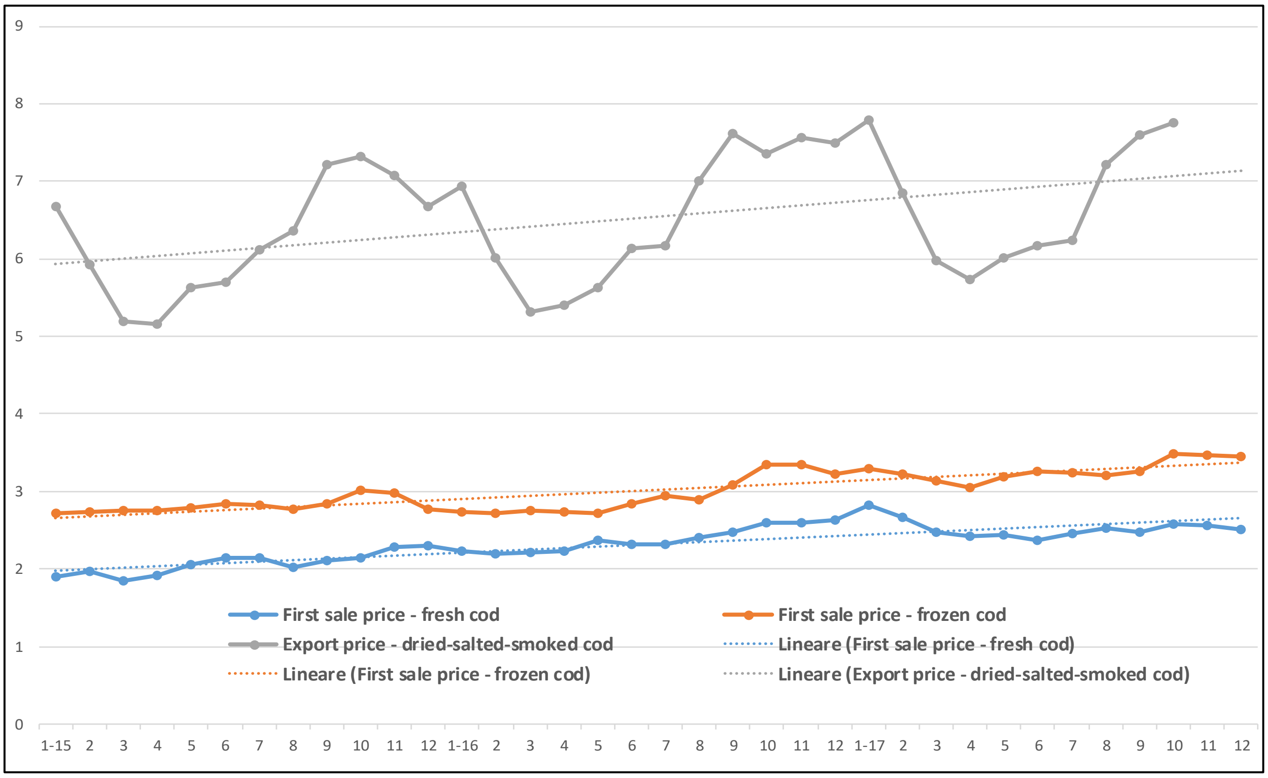



Source: Norges Råfisklag

## 4.2 Export prices

Export prices of dried and salted cod are provided on a monthly and yearly basis by COMEXT for fresh and frozen cod as well as for dried-salted-smoked cod. But the latter does not distinguish the different types of products (clipfish, salted cod, dried cod, etc.). The figure below shows that the export price of dried-salted-smoked cod follows an upward trend, as with first-sale prices of fresh and frozen cod, but a more marked one: the slope of the trend line is 0,0341 for dried-salted-smoked cod whereas it is only 0,0206 in the case of frozen cod and 0,0194 for fresh cod. The seasonal peaks observed for dried-salted-smoked cod from September each year can also be observed for fresh cod and frozen cod.

Figure 9 - Monthly Norwegian export prices of dried-salted-smoked cod (EUR/kg)




Sources :

- first-sale prices for fresh cod: Norges Råfisklag
- first-sale prices for frozen cod: Norges Råfisklag
- export prices of dried-salted-smoked: COMEXT

## 4.3 Transport cost to Portugal

Dried salted cod is usually transported in bulk by road or container vessels to the respective import countries.

Regarding exports to Portugal, dried and salted cod is primarily transported by road. Transportation by road takes approximately 5-6 days from Ålesund to central locations in Portugal. By comparison a container vessel takes 12-14 days. Lorries are loaded with 22,5 net tonnes and one shipment costs approximately 35.000 NOK, i.e. 1,56 NOK (or 0,17 EUR) per kg.

In the recent past codfish were mostly exported in full boatloads, but this mode is no longer used to export to Portugal, for two main reasons:

- a full shipment is worth EUR 6 to 8 EUR million (NOK 60-75 million) and there is no more financial capability for such amounts;

- as Norwegian exporters send to end-users (large-scale retailers), transport by truck offers more flexibility; supermarket chains generally want products to be delivered in time-slots of two hours and allow only 2 missed shipments per year.

## 4.4 Retail prices in Portugal

Retail prices of dried and salted cod vary according to the size (there are five standard weight categories) and the quality (there are two quality categories).

Table 9. Size categories used for dried and salted cod in Portugal's retail channels

| Weight | Portuguese name | English translation |
|---|---|---|
| < 0,5 kg | Miúdo | Small |
| 0,5 - 1,0 kg | Corrente | Standard |
| 1,0 - 2,0 kg | Crescido | Large ("grown") |
| 2,0 - 3,0 kg | Graúdo | Large |
| > 3,0 kg | Especial | Special |

Source: Portuguese retailers

There are no public data on retail prices of clipfish. Data below have been collected from a leading large-scale retailer.

Table 10. Retail prices of Norwegian dried salted cod in Portuguese supermarkets in November 2017

| EUR/kg | | | Quality categories | |
|---|---|---|---|---|
| | | | Asa preta (Black wing) | Asa branca (White wing) |
| Size categories | 1,0 - 2,0 kg | "Crescido" | 6,74 (instead of 8,99) | 9,99 |
| | 2,0 - 3,0 kg | "Graúdo" | 7,49 (instead of 9,99) | 11,49 |
| | > 3 kg | "Especial" | 8,24 (instead of 10,99) | 12,49 |

in red : special offers (25% discount)

Source: Continente

# 5 PRICE TRANSMISSION IN THE SUPPLY CHAIN

Chapter 5 complements the data of chapter 4 with information obtained through direct interviews with stakeholders.

Raw material (fresh/frozen cod) represents 84% of the total cost of dried and salted cod (margin excluded). Labour is the second-largest cost item, with 8-9% of the total cost.

Table 11. Price transmission for dried salted cod produced in Norway and exported to Portugal

(September 2017)

| *September 2017* | Cost (EUR/kg) |
|---|---|
| Raw material | 5,88 |
| Salt | 0,09 |
| Box | 0,10 |
| Labour cost | 0,60 |
| Other costs (processing) | 0,29 |
| Margin | 0,37 |
| **Ex-factory price** | **7,33** |
| Transport to Portugal | 0,17 |
| **Price delivered Portuguese retailer** | **7,50** |

Source : elaboration by EUMOFA from interviews with stakeholders in September 2017

Assumptions :

- raw material :

  * headed and gutted cod delivered factory : 2,76 EUR/kg

  * conversion from headed and gutted to clipfish : 2,13

  -> cost of raw material is thus 2,76 x 2,13 = 5,88

- cost of salt : 1 NOK/kg (0,09 EUR/kg)

- use of salt : 1 kg for 1 kg fish

- labour cost : 48 à 65 NOK/kg (0,51 to 0,70 EUR/kg)[13]

- other costs (processing cost) : estimated at 4% of ex-factory price, i.e. 7,33 X 0,04 = 0,29 EUR/kg

- margin : 5% of ex-factory price, i.e. 7,33 x 0,05 = 0,37 EUR/kg

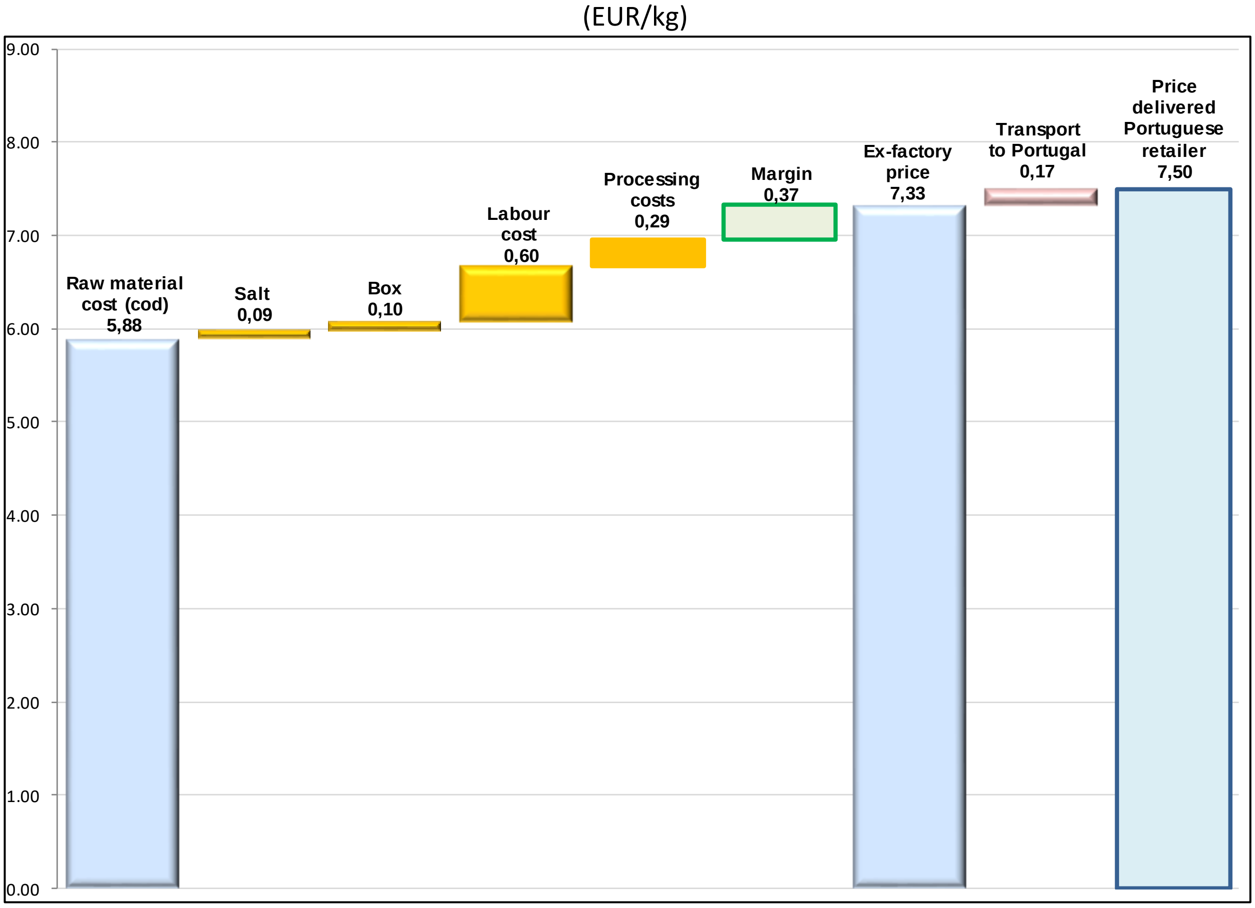
- cost of transport to Portugal (by truck) : 35.000 NOK (EUR for a truck of 22,5 tonnes

- exchange rate September 2017: 1 EUR = 9,3275 NOK (source: ECB)

[13] Labour cost in Norway is double that of the EU.
In 2016, hourly labour costs in the business economy were estimated at 50,7 EUR in Norway and 25,9 EUR in the EU-28 (source: EUROSTAT). The EU average masks significant gaps between Member states, with hourly costs ranging from between 4,4 EUR (Bulgaria) and 43,4 EUR (Denmark).
Cost labour in Portugal is 13,1 EUR/hour, i.e. almost four times less than in Norway.

Figure 10 illustrates the price transmission in the supply chain for dried salted cod. This figure has been drawn up from interviews of stakeholders in September 2017.

Figure 10 – Price transmission for dried salted cod produced in Norway and exported to Portugal




Portuguese large-scale retailers often sell the Norwegian clipfish at a significant discount: special offers with 20% to 30% discounts take place frequently and clipfish were sold in supermarket chains such as Continente or Pingo Doce at prices below 7,00 EUR/kg in September 2017. This could be seen as a loss leader strategy.

# 6 ANNEXES

## 6.1 Sources used

- EUMOFA
- EUROSTAT
- FAO
- FEAP
- NOFIMA
- Møreforsking Marin
- Norwegian Seafood Council
- Norwegian processors
- Portuguese retailers

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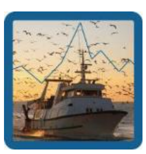

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