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**Economics of the Portuguese fish processing industry: the past half century  
and future prospects**

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**ECONOMICS OF THE PORTUGUESE FISH PROCESSING INDUSTRY:  
THE PAST HALF CENTURY AND FUTURE PROSPECTS**

**By**

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Competition, cluster and market analyses for salted cod and salted and dried cod industry

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## Abstract

The purpose of this report is to analyse developments in the Portuguese fish processing industry from the 1960s to the present. In this period, Portugal has undergone tremendous political and macroeconomic changes. While Portugal used to be nearly self sufficient in the supply of fish, the country has become a net importer of this commodity. These changes have also affected fish processing. Moreover, the development of the industry has been promoted in several different ways. Fish processing has expanded in recent decades gaining market share in the domestic market. Furthermore, Portugal has now become an important exporter to several countries, for instance gaining market share for salted & dried cod in Brazil. The purpose of this report is to highlight and analyse these developments.

## **1. BACKGROUND**

The purpose of this paper is to analyse developments in the Portuguese fish processing industry from the 1960s to the present. In this period, Portugal has undergone tremendous political and macroeconomic changes. Traditionally Portugal was a distant water fishing state (DWFS), but this changed with the introduction of Extended Fisheries Jurisdiction at the end of the 1970s, leading to the demise of Portugal as a DWFS. These changes have also affected fish processing. Thus, while Portugal used to be nearly self sufficient in the supply of fish, the country has become a net importer and has maintained one of the largest per capita consumption of fish in the world. The development of the processing industry has been promoted in several different ways, such as by EU investment funds. Moreover, EU tariffs are designed to protect and promote the fish processing industry: while imports of raw materials are largely duty free, imports of processed products are subject to duty. As a consequence, fish processing in Portugal has expanded and the country has become an important exporter to several countries and it has increased its market share for salted & dried cod to Brazil at the expense of Norway. This paper analyses these developments and considers future developments. In a sense, it is an extension of Bjørndal *et al.*, (2015), who analysed the developments in Portuguese fisheries from the 1960s to the present.

Data from different sources were collected for the preparation of this report. In some instances, there may appear to be divergences between data. This will often be for reasons such as different definitions of products as well as periodisation. All monetary values are nominal, unless otherwise noted.

The report is organised as follows: in the next section, the macroeconomic and political development of Portugal from the 1960s to the present is described. In section three, the economic environment of the industry is analysed, with an emphasis on the competitiveness of the Portuguese

industry vis-à-vis other countries. Fish supply to Portugal consists of domestic landings and imports, which are quantified in section four. Section five deals with fish processing, while exports from the industry are given in section six and section seven provides some concluding remarks.

## **2. ECONOMIC DEVELOPMENT IN PORTUGAL FROM THE 1960s TO THE PRESENT**

### Transition from dictatorship to democracy

In 1960, Portugal was a colonial power with a dictatorship led by Oliveira Salazar from 1932 until 1968. The country had large overseas territories in Africa, in Oceania, in Asia, and in the Indian subcontinent. India gained independence in 1947, but the Salazar regime refused to recognise the sovereignty (Fonseca and Marcos, 2013). The annexation of Goa, Daman and Diu in December 1961 by the Indian Union and the emerging nationalist movements in Portuguese African colonies triggered the Overseas War that lasted over 13 years (1961-74), ending with the Carnation Revolution in Portugal. The aftermath of the coup resulted not only in a democratic regime, but also in other changes and Portugal faced economic difficulties. The International Monetary Fund (IMF) intervened on two occasions in order to re-establish the economy (Ferreira and Marshall, 2011). During the dictatorship little attention was placed on literacy among the population (Candeias, 2004), and labour intensive jobs for illiterate people, such as in the case of fisheries, were highly supported by the regime (Benavente, 1996). Even after the return to democracy, the educational gap between Portuguese human capital and other European core countries persisted (Pereira and Lains, 2012).

### Political evolution

Rocha (1977) has demonstrated that economic growth, specifically during the 1960s, was not triggered by colonial exploitation, but by the industrialisation process, because it was in this that there was the greatest development. Essentially, overseas territories were a centre of power for the financial and industrial groups who obtained cheap raw materials, but were a source of growing unproductive spending.

Portugal was handling three colonial war fronts (Angola, Mozambique and Guinea Bissau) during the 1960s and early 1970s and faced high financial costs that represented on average 20% of total public expenditure (macroeconomic shock). This was one of the main reasons for a cessation in the traditional rigorous balance in public finances (Mata and Valério, 2003). At its peak, spending on the colonial wars represented around 40% of state finances (Rocha, 1977).

The tremendous increase in the price of oil in the winter of 1973 led to the oil crisis, where world economies slowed down and became unstable. Portugal was facing growing popular

discontent during this time, which resulted in the coup of 25<sup>th</sup> April 1974. After the Revolution, commercial shortages were considerable in relation to the previous period (Costa *et al.*, 2011). Until 1975, the welfare state provoked significant growth in public debt without fiscal sacrifices.

Between 1976 and 1982, controlling the balance of payments was a constant concern. The currency was devalued in order to restrain imports, and this depressed investment growth. Only by the 1980s was there some strong industrial diversification due to export growth and domestic consumption (Costa *et al.*, 2011).

### Portuguese economic links to the world

Following the Messina Conference in 1955, the UK reopened negotiations for creating a 'free trade zone'. Despite UK interest in including its oldest ally, Portugal, there were some obstacles such as the exclusion of agriculture, which at that time was of great relevance to the dictatorship regime known as *Estado Novo* or 'New State'. In addition, there was the question of the overseas colonies, with the Portuguese position being criticised in the international arena (Pinto and Teixeira, 2002). Portugal joined the European Free Trade Area (EFTA) in 1959. Costa *et al.* (2011) emphasise that Portugal was an exceptional case because it was the only non-industrialised country to become part of EFTA. The effect of EFTA on Portuguese exports was of major importance during the early 1960s and the country began to industrialise as a result (Barreto, 2002). From the institutions created under the Bretton Woods agreements, Portugal joined the IMF, the World Bank and the GATT. By that time, the regime had also opened up to foreign capital and overseas investments (Lains, 1994). In this period, hundreds of thousands of people left their occupations in the countryside. Lisbon and Porto received most of the people searching for urban and industrial jobs and consequently metropolitan areas developed (Silva *et al.*, 2012). Geographic vicinity and the ease in crossing borders were the main motivational factors (Rocha-Trindade, 1986).

### Economic policy

In 1960, the majority of exports comprised of a few products – canned fish, raw and manufactured cork, cotton textiles and wine. However, by the early 1970s (before the 1974 military coup), Portugal's export list showed higher product diversification (Baklanoff, 1979).

The lack of a concise development policy for Portugal based on the high concentration of capital and economic power, had some negative effects on income distribution, demand and technological progress (Sousa, 1969). From 1960 to 1973, despite Portuguese public accounts having a negative balance, the economy was booming and the growth rate in exports of Portuguese merchandise was notable – 11% per annum. According to Neves and Rebelo (2001), this 'Golden Age' can be attributed to several reasons: the interest rate was low (2.5% in the 1965-70 period),

which led to cheap capital for investments; emigration and military enrolment prevented unemployment from rising; and the exchange rate policy favoured the Escudo in nominal terms. Individuals and firms changed their patterns of production and consumption through emigration, trade, tourism and foreign investment, leading to a structural transformation (Leite, 2006). Illiteracy rates started to decrease by the 1970s (Mata and Valério, 2003).

Portuguese economic growth slowed down after the year of the coup. Heavy industry almost collapsed as all sectors of the economy went into free fall. During this period, many firms under foreign control dramatically reduced their investments, and the role of the state in the economy increased dramatically (Baklanoff, 1979).

The slowdown in economic growth was amplified by the mass emigration of skilled workers and entrepreneurs due to political intimidation, and the costs of accommodating over 500,000 refugees from former overseas territories between May 1974 and the end of the 1970s (Carrington and De Lima, 1996). During the Colonial War, many men emigrated or left with the long distance fishing fleet to avoid being drafted into the army, coming back only after the establishment of democracy. The *retornados*, i.e., Portuguese nationals returning to Portugal from the colonies, increased the Portuguese labour force by roughly 10% in just a few years and had a strong adverse effect on Portuguese wages.

The agreement with the EEC was signed in 1972 (e.g. Bruneau, 1982). An opening in terms of trade with other western countries occurred just after the newly established democratic regime (Bastien and Cardoso, 2003).

In 1986, Portugal became a member of the then EEC and left EFTA. Structural and cohesion funds from the EU subsequently permitted the Portuguese economy to recover and in 1999, Portugal adopted the Euro replacing the former national currency, the Escudo.

In the late 1980s, the Portuguese economy began to display several problems, especially concerning productivity, as well as substantial fiscal and external imbalances (Blanchard, 2007). By the early 1990s, Portugal was being praised for its economic miracle (Tomé, 2011) and for the speed of its convergence (Barry, 2003). After a recession in 1993, the economy grew at an average annual rate of 3.3%, well above EU averages. In the following decade, the Portuguese economy stagnated, even though Portugal joined the European Monetary Union (EMU) in January 1999. According to Mateus (2012), the adhesion to the EMU led to the imposition of certain macroeconomic restrictions on the Portuguese economy.

During the 1990s, Portugal became an open economy with good transport infrastructure, while it had also reduced inequality in income (Neves and Rebelo, 2001). In the 2000s, the Czech Republic, Greece, Malta and Slovenia overtook Portugal in terms of GDP per capita. The global financial crisis starting in 2007 amplified the situation. GDP per capita growth in 2008, at 1.3%,

was the lowest, not just in the European Union, but also in the whole of Europe. Unemployment increased from about 270,000 in 2002 (5.0%) to about 450,000 in 2007 (8.0%) reaching around 820,000 in the first trimester of 2012 (15.5%) (Pordata, 2015). More recently, unemployment peaked in January 2013 (17.5%), but soon afterwards there was a downward trend, reaching 16.2% in 2013 and 13.9% in 2014 (INE, 2015; Pordata, 2015).

### The trade regime

Cod fisheries reached their peak during the *Estado Novo*, although there was always the necessity to import. The importance of cod as a source of protein for the population and as an important factor in the trade deficit, led to investments in the fisheries sector (Moutinho, 1985). This period of fisheries protectionism lasted from the mid 1930s to 1967, when imports were liberalised. Nevertheless, even with the implementation of this policy, imports were still needed (Garrido, 2004). In the overseas territories, there was some discrimination favouring Portuguese mainland products, and some restrictions and higher tariffs were applied to foreign products. In 1962, when Portugal accessed the GATT, there was some relaxation of trade restrictions on foreign products. However, a residual list of foreign imports barriers remained, of which olives, olive oil, cod, and metal-mechanic products were amongst those that attracted the most important restrictions (Rocha, 1982).

### The recent recession

The period 2002-2007 is considered a worldwide unsustainable boom. Several forms of external finance fed the increase in consumption in most of the developed economies. The emerging economies led by China expanded their investments and boosted their exports (Verick and Islam, 2010). The World Bank (2010) stated that the increase in credit flows was responsible for the cost of capital to fall. This optimism about the future led to an underestimation of risk by investors. The US, which is a consumption-led economy, was able to expand consumption even with an increase in prices. This led to a deterioration in the US current account deficit (Baily *et al.*, 2008).

The evidence from OECD countries was that during the recession of 2008-09, labour adjustment in Portugal for the manufacturing sector was weak, in terms of both hours and employment (only comparable to Norway, Luxemburg and Greece). However, Portugal and Luxemburg were the only European OECD countries where a fall in the nominal hourly earnings in the manufacturing sector occurred from 2008 to 2009. Some signs of recovery were found in the third quarter of 2009 for four European countries, including Portugal, reaching a stagnation point afterwards. Unlike its European counterparts Greece and Italy, Portugal was facing an increase in public debt during the crisis period (Verick and Islam, 2010).

According to Sinn (2014), during the period between the Madrid Summit (1995) to the year of the 'declared' crisis (2008), the Portuguese price level (GDP deflator) increased by 47 per cent, being overtaken only by Greece, Spain and Ireland. However, some improvements occurred due to the decrease in labour costs, which in Portugal amounted to 6.2% from 2007-2012.

Majocchi (2012) points out that some of the weakest economies of the Eurozone (including Portugal), have been highly penalised by the overall market that shows distrust concerning long-term financial responsibilities. For Portugal, a bailout plan of €78 billion was implemented in 2011 by the European Commission, the IMF and the European Central Bank.

In 2012, the average EU expenditure per capita for fish was €103, but with substantial variation between countries (Anastasiou *et al.*, 2014). Portugal was at the top with about € 260 per capita. The financial problems faced by some countries had an impact on consumers' behaviour and their spending habits, causing a decrease in purchases of fish and shellfish. From 2011 to 2012, countries like Greece (-8.3%), followed by Portugal (-2.9%) and Italy (-1.9%) experienced decreases in expenditure on fish.

### **3. THE ECONOMIC ENVIRONMENT OF THE PORTUGUESE FISH PROCESSING INDUSTRY**

Several policies are in place to promote the Portuguese fish processing industry. Some of these are EU policies while others are national.

Cod is the most important fish product in the Portuguese market, as will be demonstrated in sections three to six. Moreover, essentially all cod is imported. For this reason, it is of interest to look at duty on cod exports to the EU, including Portugal, originating in different countries as well as duty free quotas. The rates for Most Favoured Nations (MFNs) apply to all members of the World Trade Organisation (WTO) and are intended to ensure non-discrimination. GATT quotas also apply to all members of the WTO.

For Norway, there is no duty on exports of frozen, salted and salted & dried fillet of cod, while there is a 0.9 % duty on frozen cod fillets once total exports exceed the duty free quota. For Norwegian exporters, duty free exports can be achieved in two ways. One is through the 'compensation' quota, which applies to Norway only. The other is through the autonomous quota, but in this case the frozen fillet of *Gadus morhua* (Atlantic cod) or *G. macrocephalus* (Pacific cod), must be destined for processing in the EU by an importer who has an end-use licence.

For salted & dried cod, the duty is 3.9 % once exports exceed 25,000 tonnes. The GATT quota in question applies to cod of the species *Gadus morhua*, *G. ogac* (Greenland cod) and *Boreogadus saida* (Arctic cod). This means that at the margin, the duty is 3.9 %. It is noticeable that



the duty is higher on processed products (salted & dried) than on less processed products. This is due to the EU policy of protecting and promoting their processing industry. Iceland faces the same duties as Norway, except for an exemption on frozen cod fillets.

Canada and Russia in general face the duties for MFNs with 12% for frozen cod, 13% for salted cod and salted & dried cod; however, Russia pays only 8.5% for frozen cod. Thus, these two countries face considerably higher duties than Norway and Iceland.

Under an agreement called CETA (from 2015), Canadian products enjoy preferential access to the EU. This agreement benefits the salted & dried fish industry in Canada. After CETA is in force, almost 96 percent of EU tariff lines for fish and seafood will be duty-free. From 2022 onwards, 100 percent of these tariff lines will be duty-free, making Canadian products more competitive<sup>1</sup>.

Bjørndal and Ellingsen (2015) studied the *effective protection* of processing of salted & dried cod in Portugal. Under reasonable assumptions they found that effective protection can be more than 20%.

Fish processing is considered a labour intensive industry. For this reason, labour market conditions and labour costs are important. In 2012, average wage costs including social costs for one man-year in the fish processing industry in Portugal were € 12,000 (Döring and Borrello, 2014). Norway is the main supplier of salted & dried cod to Portugal, a product that is marketed in competition with frozen or salted cod that is imported and further processed in Portugal. The annual minimum salary for a Norwegian production worker in 2015 is about € 34,000, excluding social costs<sup>2</sup> (Arbeidstilsynet, 2015).

The European Union offers investment funds to promote growth and job based recovery in Europe. The investment funds offered by the EU represent direct subsidies directed at industries such as fish processing in member countries. In Portugal, the national framework of support to the fisheries sector is under the Operational Programme of Fisheries 2014-2020 (PROMAR), under the European Fisheries Fund (FEP). These subsidies are available for financing the systems and equipment necessary for the preparation process, processing, handling, storage, wrapping and packaging, final storage, marketing, and traceability of salted & dried fish products.

The nature of these funds is in the form of non-refundable or refundable subsidies. The public support for investment projects with a value under € 100,000 is in the form of a non-repayable grant. The public support for investment in projects with a value in the range € 100,000 - € 2.5 million is in the form of a non-repayable grant of 80% of its value and repayable aid for the

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<sup>1</sup> [http://www.geraldkeddy.ca/media/CETA%20Backgrounder\\_Nova%20Scotia.pdf](http://www.geraldkeddy.ca/media/CETA%20Backgrounder_Nova%20Scotia.pdf)

<sup>2</sup> Based on salary group 1, fish processing industry, production work: the minimum wage at 37.5 hours per week is NOK 162.85 per hour.

remaining 20% value. The public support for projects of € 2.5 million or more are provided in the form of a non-repayable grant for 40% of its total value and with a repayable subsidy for the remaining value. The maximum value of a non-repayable grant is € 4.2 million and the total value for public support is € 6 million.

The refundable subsidy takes the form of a loan with a zero interest rate, which is repayable within six years, counted from the date of payment of the last portion of the subsidy. The refundable subsidy is converted into a repayable grant by half the amount, if approved and if the planned targets specified in each contract are achieved by the end of the free period.<sup>3</sup>

The 10 biggest non-refundable grants to support salted & dried fish production in Portugal amount to €16 million. Up until 2013, a total of 81 projects had been supported.

The Portuguese government also supports investments through the Investment Tax Code and Portugal2020 (AICEP, 2015). Tax incentives under the Investment Tax Code are provided to encourage productive investment projects with a positive impact on innovation and job creation. Eligible expenses can be machines, equipment and buildings, as well as intangibles such as software and technology transfer. However, it only applies to projects with eligible expenses equal to or above €3 million. Recipients can be granted a corporate income tax credit of 10% up to 25% of the eligible investment. Other tax benefits such as exemption from municipal property tax, municipal tax and stamp tax transactions can be granted up to a 10-year period after the conclusion of the investment.

Investments in new products, services, production methods or processes may also receive financial incentives in the form of a loan where 35% of eligible expenses constitute an interest-free loan with an eight years' reimbursement period and a loan conversion of up to 50% (cash grant) of the incentive depending on the performance of the project. Innovation must be at least nationwide (non-SME). Financial grants combined with tax incentives applied to the same expenses may not exceed 25% of the eligible investment (tax credit + cash grant + loan interest saving).

Bjørndal and Ellingsen (2015) show that the Portuguese fish processing industry has advantages also in other areas such as export finance and support of research & development compared to Norway, Iceland and the Faroe Islands.

In the framework of the Anti-Crisis Measures adopted by Portugal, SMEs' access to export finance has been a major priority for the government (OECD, 2015). In this context, 12 'SME Invest and SME Growth' credit lines have been launched to facilitate SME access to credit. These credit lines, with a total bank credit of €12.2 billion, have long-term maturities (up to 7 years) and preferential conditions, namely, partially subsidised interest rates and risk sharing public guarantees,

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<sup>3</sup> [http://www.promar.gov.pt/Download/EIXOS/EIXO2/Medida2/Port\\_424\\_C.pdf](http://www.promar.gov.pt/Download/EIXOS/EIXO2/Medida2/Port_424_C.pdf)

which cover 50% to 75% of the loan. These credit lines aim to support the financing of fixed investments and SME working capital.

As of May 30, 2014, about 133,000 projects were eligible for the 'SME Invest and SME Growth' credit lines. €12 billion were provided to about 69,000 SMEs (20% of SMEs), supporting more than 907,000 jobs. As part of the global package of the SME investment credit lines, the Government proceeded to recapitalise the Mutual Counter-Guarantee Fund allowing SMEs to benefit from a higher level of public guarantees. The share of the Portuguese Government guaranteed loans in total SME loans has grown significantly during recent years from 0.9% in 2007 to 7.8% in 2013, demonstrating the sustained public efforts to maintain SME access to finance (idem).

State Guaranteed products managed by COSEC<sup>4</sup> cover the risks associated with export and investment, especially to politically risky countries. COSEC is the Portuguese Credit Insurance Company, which acts as an export credit agency (ECA) and provides, on behalf of the Portuguese State, insurance cover for the transactions applied by Portuguese exporters. The guarantees cover up to 98%, with a minimum credit of €20,000. Insurance costs from €250 (the minimum premium) plus a document fee (Bjørndal and Ellingsen, 2015).

The Portuguese Government has also created the 'Leaders Programme' to improve relations between banks and SMEs. The Leaders Programme identifies the 'best' SMEs in order to build trust between SMEs and banks in terms of assessing credit worthiness.

Investments in the research and development (R&D) of new products, services or new production methods and processes are supported by the Government through financial incentives, *Portugal 2020* and tax incentives, *SIFIDE II* (AICEP, 2015). Financial incentives are distributed in the form of a base rate covering 25% of eligible expenses<sup>5</sup>; bonuses of up to 60 percentage points according to project scope and company size; cash grants of up to €1 million of incentives; and for an incentive amount that exceeds €1 million, 25% can be given as an interest free loan and 75% as a cash grant. A Corporate Income Tax Credit (deduction) is given at a base rate of 32.5% of expenses incurred in that period and an incremental rate of 50% of the increase in expenses incurred during that period compared to the average from the previous two fiscal years, of up to €1.5 million.

In summary, Portugal is becoming an increasingly attractive destination for investment and industry growth, offering competitive grants and incentives for research and development – reinforced by Portugal 2020: a more competitive tax regime with the reform of corporate income

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<sup>4</sup> <http://www.cosec.pt/index.php?id=1>

<sup>5</sup> Eligible expenses are costs of technical staff dedicated to R&D activities; acquisition of services from third parties, including technical and scientific assistance and consulting; purchase of scientific and technical instruments and equipment; as well as costs associated with patent registration and acquisition.

tax in 2014 and a sustained public effort to maintain SME access to finance. Moreover, labour costs are competitive, and fish processing is protected by duty on exports from other countries with fairly high effective protection of processing of salted & dried cod in Portugal.

#### **4. FISH SUPPLY TO PORTUGAL**

Fish supplies to the fish processing industry come from two sources, domestic production (fish landings and aquaculture) and imports. We will consider both.

##### Domestic production

Bjørndal *et al.* (2015) analyse Portuguese fisheries for the period 1960-2011. They show that Portuguese landings increased from 502,000 tonnes in 1961 to a peak of 578,000 tonnes in 1964, the highest quantity recorded. Subsequently landings were in decline but with a peak of 563,000 tonnes in 1967. At this time, the catch of cod (*Gadus morhua*) was the priority. It resulted from a political initiative aimed at preventing shortages in food supply. Another peak of 479,000 tonnes occurred in 1973. After this peak, there was a substantial drop in landings starting in 1974. This is explained not only by internal developments, which are mostly related to consequences of the Revolution in terms of economic conditions and demography, but also by the overexploitation of fish stocks, access restrictions to the waters of former colonies, the introduction of 200 mile Exclusive Economic Zones for coastal countries, the abrupt end of direct state support to fisheries, and the oil shocks during the 1970s that greatly affected the profitability of the distant water fisheries because of substantial fuel price increases. In the following years, Portuguese landings flattened out at an annual level of around 250,000 tonnes for the period 1978-1983.

In 1986, the year Portugal joined the European Union, there was a substantial increase in the harvest to 407,000 tonnes, after which there was a gradual decline to a bottom of 198,000 tonnes in 2000. In 2013, total landings amounted to 196,250 tonnes. Catches of the 10 most important species landed are shown in table 1. Combined they represent 71 % of total landings. The three most important ones (chub mackerel, sardine and horse mackerel) combined represent 87,439 tonnes or 45 % of total landings.

Table 1: Catches of the 10 most important species in 2013 (tonnes).

<b>Species</b>	<b>Tonnes</b>
Chub mackerel	40,477
European pilchard (=sardine)	27,752
Atlantic horse mackerel	19,210
Common octopus	11,513
Atlantic redfishes nei	9,576
Atlantic cod	9,485
Blue shark	6,915
Bigeye tuna	5,534
Atlantic mackerel	4,171
Black scabbardfish	4,116
<b>Sum</b>	<b>138,749</b>

Source: FAO (2015).

The entry to the EEC and the limitations on distant water fishing led to a change in the Portuguese fleet structure. The distant water fleet practically disappeared, while local and coastal fleets, despite being reduced drastically, had the opportunity to renew themselves.

Aquaculture in Portugal is quite recent but is believed to have great potential. Aquaculture production is still modest although there has been an increase. In 1993, aquaculture production was 6,391 tonnes, but by 2012, it had reached 10,317 tonnes. A similar trend is observed in the value of production.

Throughout this period, the farmed species did not change significantly and were mainly trout, sea bream, sea bass, clams, cockle, oysters, mussels and turbot. Turbot and mussels have gained importance in the last few years due to investments in production capacity. From 2008 onwards, turbot has been the most important aquaculture product reaching 4,406 tonnes in 2012. Clams are also very important with 2,394 tonnes in 2012. Clams fetch the highest price, followed by turbot. In 1992, the price for clam was €6.24/kg; in 2003, it increased to €15.20, while in 2012 it was recorded at €8.45/kg. The turbot price was €4.62/kg in 2012.

#### Portuguese fish imports

Although there were substantial variations from year to year, import volume was on an upward trend from 1976 to 2011. Quantities grew from 113,500 tonnes in 1976 to 403,900 tonnes in 2011 – corresponding to an average increase of 3.7% per year (figure 1). The corresponding import value also increased significantly – from \$110 million in 1976 to \$2,030 million in 2011, an average annual growth of 8.7%.

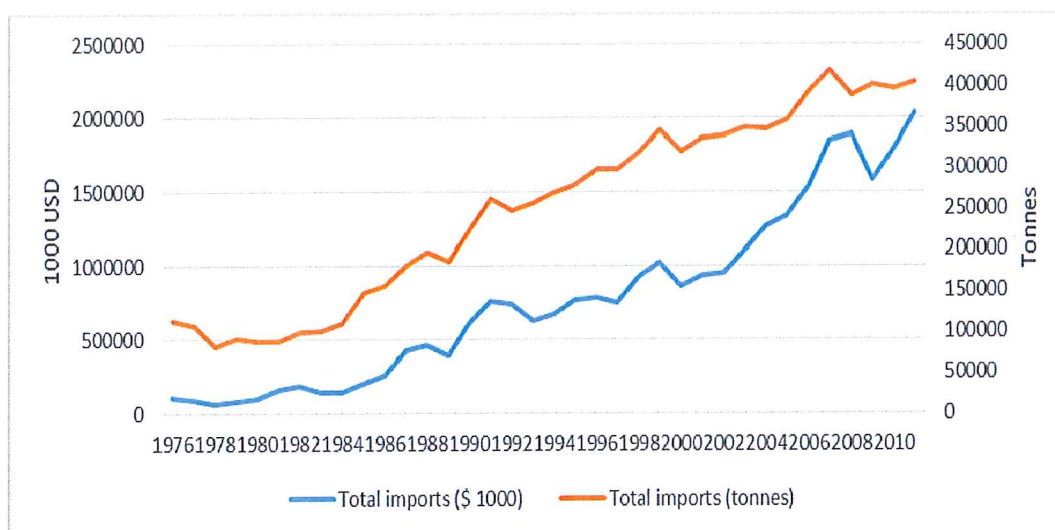


Figure 1: Portuguese fish imports 1961-2011. Quantity (tonnes) and monetary value (\$ '000). Source: FAO (2015).

In 2011, the top 10 import products accounted for 40% of imports, with the top five commodities representing 26% (table 2). It is noticeable that four of the top 10 commodities were based on cod, together amounting to 90,543 tonnes or 56% of the total (Cods nei, salted or in brine, 27,835 tonnes; Atlantic cod, frozen, 26,823 tonnes; Cod, salted & dried, 24,617 tonnes; Pacific cod, frozen, 11,268 tonnes). All four commodities experienced an increase in imports from start to end of the period (1976-2011).

Table 2: Imports of the 10 most important commodities by volume in 2011. Tonnes.

Commodity	Tonnes
Cods nei, salted or in brine	27,835
Atlantic cod, frozen	26,823
Cod, salted and dried (klipfish)	24,617
Octopus, frozen	13,895
Jack and horse mackerels, fresh or chilled	13,436
Squids ( <i>Ommastrephes sagittatus</i> , <i>Loligo spp.</i> ), frozen	11,491
Shrimps and prawns, frozen, nei	11,385
Pacific cod, frozen	11,268
Marine fish, fresh or chilled, nei	10,812
Mackerels nei, frozen	10,794
<b>Sum</b>	<b>162,356</b>

Source: FAO (2015).

### Cod Imports

Data are available on imports of frozen, salted and salted & dried cod to Portugal for the period 1990-2013 (figure 2). Imports of all products show variation over time. Nevertheless, frozen and salted & dried cod showed an increase over the period, while imports of salted cod declined.

Imports of frozen cod were only 6,880 tonnes in 1990, but subsequently increasing to

quantities at about 40,000-44,000 annually between 1994 and 1996. After a decline, the quantity started increasing again and reached a peak of just over 55,000 tonnes in 2006. After a reduction in the recession years, 50,355 tonnes were recorded in 2013.

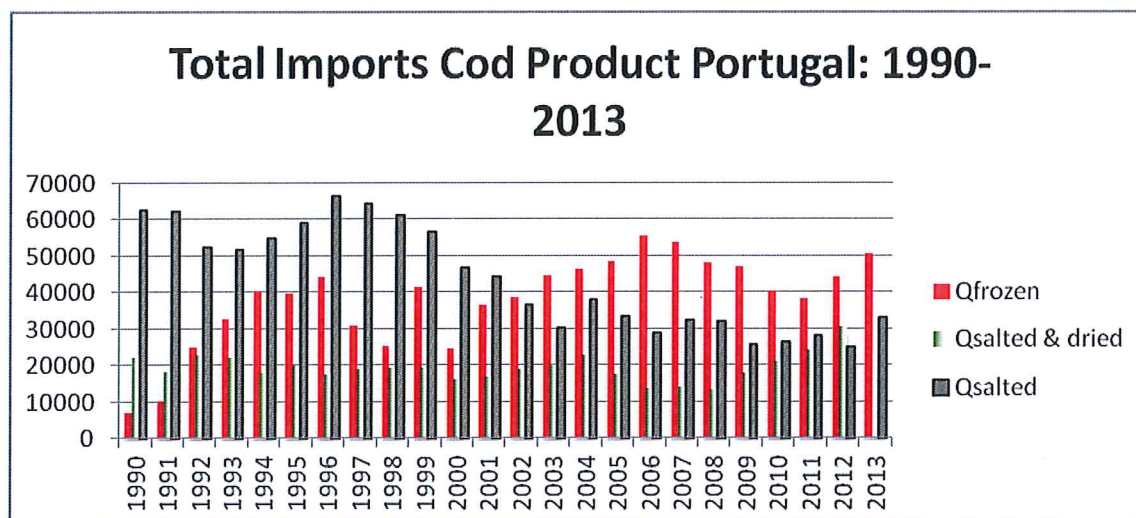


Figure 2: Total Imports of Frozen Whole Cod to Portugal: 1990-2013.

Source: Eurostat.

Imports of salted & dried cod varied between 16,300 – 22,800 tonnes annually in the period up to 2004, but without any particular trend. During the recession imports declined, reaching a nadir of 13,150 tonnes in 2008. Subsequently, imports increased to a level just over 30,000 tonnes in 2012 and 2013.

Imports of salted cod were around 62,000 tonnes in 1990-1991. After a decline, imports increased to a peak of 66,000 tonnes in 1996. Subsequently, a declining trend was observed up until 2003. Since then, there has been a lower level of imports, although with variations from year to year. In 2013, 32,700 tonnes salted cod were imported – just over half the quantity from 1990.

Thus, if we look at unprocessed (frozen) and semi-processed (salted) products, the increase in frozen product is noticeable. This indicates that more fish is now salted and dried in Portugal than in the past. It is also noticeable that imports of salted & dried cod have increased in recent years.

Over the period, salted & dried received the highest price per kg, while salted cod received a premium over the frozen product. In 2013, the real price – defined as real revenue divided by quantity - of salted & dried cod was € 4.39/kg, that of salted cod € 3.25/kg and that of frozen cod € 1.88/kg (Asche and Gordon, 2015). The differences reflect the degree of processing.

Country of origin for different cod products also shows variation over time. For frozen cod, the most remarkable change is the Netherlands with a market share of 0.494 in 2013, up from zero in 1990. In the same period, the US share was reduced from 0.414 (1990) to 0.101 (2013) while that of Russia reduced from 0.526 in 1995 to 0.075 in 2013. These changes are due to the role of the

Netherlands as a hub in international cod trade: cod from many countries in the North Atlantic and North Pacific is shipped to the Netherlands for further distribution to other markets. For salted & dried cod, the reduced market share of Norway from 0.427 in 1990 to 0.012 in 2013 is remarkable. This is due to the fact that products are shipped to EU member countries to reduce duty by taking advantage of duty free quotas (Bjørndal and Ellingsen, 2015). Sweden is most important in this respect, as its market share for salted & dried cod has increased from zero in 1990-1995 to 0.623 in 2013. For salted cod, Norway's market share has declined while those of the Netherlands and, in particular, Sweden has increased substantially.

In recent years, China has become an exporter to Portugal. In 2013, China exported 82 tonnes of frozen cod, 326 tonnes of salted & dried cod and 3,092 tonnes of salted cod to Portugal. China's market share for salted cod in 2013 was 9.45%, up from only 1.83% in 2005. The cod originates in the North Atlantic and/or the North Pacific and is re-exported after being salted in China.

## **5. FISH PROCESSING IN PORTUGAL**

Various data series are available when it comes to the development of the fish processing industry. However, there are changes in data series and variables over time. Moreover, while data on some variables go back to 1969, others are much more recent. Additional information is presented in the appendix.

The annual turnover – domestic sales plus exports - of the Portuguese fish processing industry increased from € 740 million in 2002-2003 to € 988 million in 2007 and € 1,091 million in 2008. It then seemed to have levelled off, with € 1,078 million recorded in 2012 (appendix, table A1). The total quantity produced was 127,000 tonnes in 2000, increasing to 212,000 tonnes in 2009 – where it levelled off except for a small dip in 2011. Cost data are available only from 2008. Profits, defined as turnover minus total production costs, declined from € 425 million in 2008 to € 342 million in 2012. The levelling off in turnover and the reduction in profits is presumably due to the recent recession.

The gross value added, defined as turnover + other income - energy costs - purchase of fish and other raw material for production - other operational costs, increased from € 449 million in 2009 to about € 510 million in 2010-2011, before decreasing to € 421.6 million in 2012. Capital productivity is calculated as gross value added divided by the value of capital (total value of assets) and is expressed in percentage terms. Over the period, it varied between 43.2 – 50.2 % (appendix, table A1).

The fish processing industry is composed mainly of three product forms: frozen, salted & dried and canned products. The frozen products include aquatic invertebrates (squid, cuttlefish,



octopus, clams, cockles and others), hake, fish fillets sardine, cod and redfish. In 2012, frozen production was 106,000 tonnes, salted & dried 61,000 tonnes and canned 45,000 tonnes. The different sectors will be analysed in more detail below.

The number of firms and employees in fish processing in Portugal for the period 1996-2012 is given in table 3. Initially, the number of firms was in decline from 134 in 1996 to 94 in 2003. Subsequently it increased to a peak of 211 in 2008, before it went down to 180 in 2012. The trend in the total number of employees is similar with a peak of 7,314 in 2011, down to 6,823 in 2012. The decrease in the last three years examined can be explained by the economic crisis that hit Portugal severely.

Table 3: Number of Firms and Employees in the Fishing Processing Industry in Portugal.

<b>Year</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>
<b>No of Firms</b>	134	135	111	115	104	n.a.	95	94	143
<b>No of employees</b>	6,570	5,553	5,893	5,823	5,469	n.a.	5,627	5,429	5,854

<b>Year</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>
<b>No of Firms</b>	150	166	187	211	202	194	185	180
<b>No of employees</b>	6,149	6,149	6,685	6,668	6,815	7,277	7,314	6,823

Source: INE (2015).

n.a.=not available.

Table 4 shows that the industry is comprised mainly of small firms with less than 10 employees. In fact, in 2012 Portugal had only four firms with more than 250 employees and 43 firms with more than 50 employees, against 137 firms with fewer than 50 employees. A positive remark is the fact that the number of large firms was doubled while the number of small firms decreased throughout this period. Note also that females represent 68% of the overall work force in 2012.

Table 4. Overview over the Portuguese processing industry.

	2008	2009	2010	2011	2012	Δ 2011-12	Δ 2008-12
<b>STRUCTURE</b>							
Company	213	202	194	185	180	-3 %	-15 %
≤ 10 employees	111	99	91	82	91	11 %	-18 %
11-49 employees	57	62	59	58	46	-21 %	-19 %
50-249 employees	43	37	41	41	39	-5 %	-9 %
≥ 250 employees	2	4	3	4	4	0 %	100 %
<b>EMPLOYMENT</b>							
Employees	6 664	6 815	7 277	7 314	6 823	-7 %	2 %
Females	4 287	4 384	4 681	4 889	4 660	-5 %	9 %
Males	2 377	2 431	2 596	2 425	2 163	-11 %	-9 %

Source: Döring and Borrello (2014).

### The period 1969-2012

Data for some variables are available from 1969 onwards<sup>6</sup>. Up to 1990, only quantities are available for canned and frozen products while only the value is available for salted & dried.

In 1969, frozen production was 8,118 tonnes (see figure 3). Becoming part of the European Economic Community in 1986 gave a boost to this production, which increased from 17,981 tonnes in 1987 to 31,344 tonnes in 1988. In 1990, the frozen production was 50,305 tonnes, whereas in 1992 it dropped to 19,976 tonnes. From 1992 to 1999, the lower levels of production continued, representing 19,285 tonnes in 1999. This occurred when European economies became weaker and Portugal experienced an unstable period. From 1999 and onwards, the quantities have increased significantly. In 2009, production was 109,953 tonnes with a slight decrease in 2011 to 103,998 tonnes – which can be explained by the financial crisis. In 2012, a quantity of 105,892 tonnes was recorded. The share of cod in frozen production increased from 4% in 2000 to 30% in 2011, down to 26% in 2012.

Canned production was around 50,000 tonnes in 1969. In 1990, it was 43,767 tonnes and dropped to 33,943 tonnes in 1992. Again, the weakening of the European economies and the instability in Portugal can explain this reduction. In 1996, the production reached its lowest level at 26,886 tonnes before subsequently increasing, reaching a quantity of 44,700 tonnes in 2012, i.e., about 10% less than in 1969.

<sup>6</sup> During this period, there are missing values for the year 1991, due to a change in the series calculation carried out by INE.

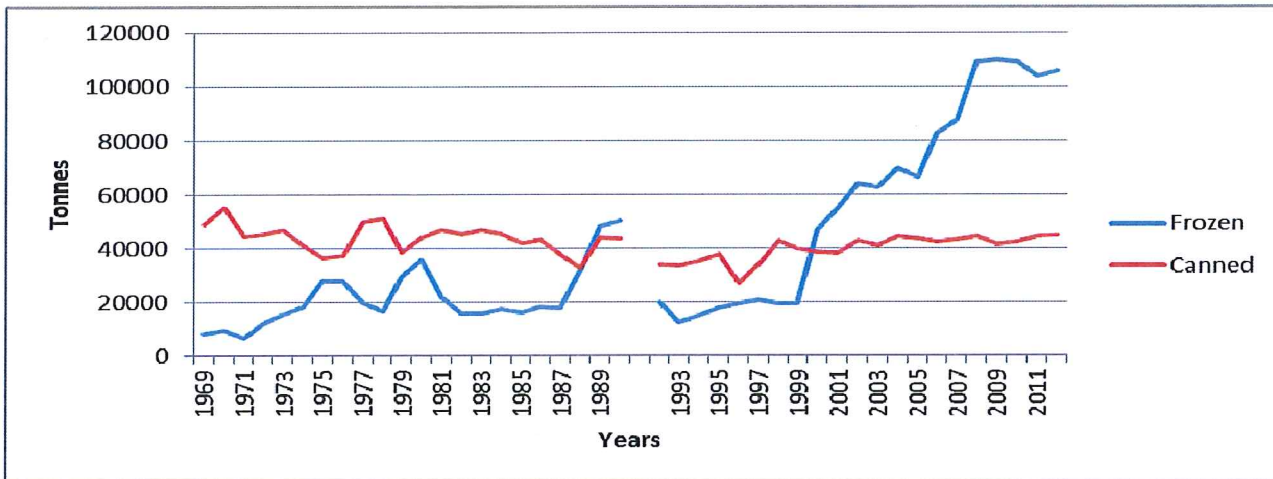


Figure 3: Produced frozen and canned quantities in the fish processing industry: 1969-2012. Source: INE (2015).

In 1969, the value of salted & dried production was € 2.852 million. In figure 4, we can see that salted & dried production was almost non-existent until 1981. From this year on, there was a substantial increase, reaching its peak value of € 430.3 million in 2007. Afterwards, there was a decrease in 2008 to € 314.3 million. Subsequently, the production stayed at lower than peak-levels, with € 335.5 million recorded in 2012. Cod represented more than 80% of salted & dried production.

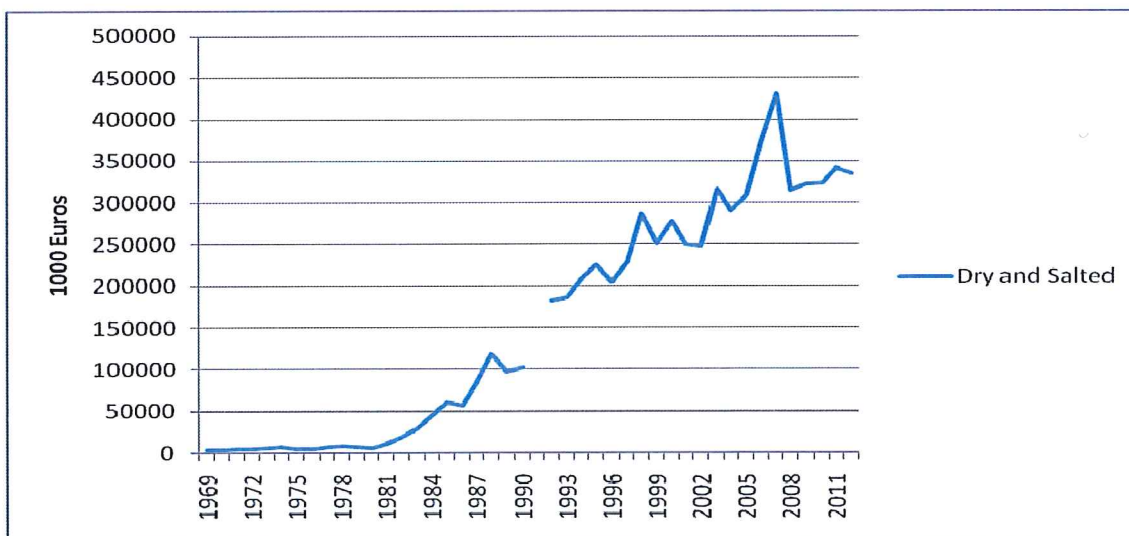


Figure 4: Value of Produced salted & dried quantities in the Fishing Processing Industry: 1969-2012. Monetary values. Source: INE (2015).  
The 1992-2012 period

From 1992, new variables became available – namely quantity and value of sales.

Figure 5 gives annual production for frozen, salted & dried and canned products. It is

interesting to note that up until 2000, salted & dried was the most important product form. In 1997, quantities produced were 56,295 tonnes against 20,551 tonnes for frozen production and 33,807 for canned production. However, since 2000, frozen production has taken the lead – and in 2012, this was the most important product form. Meanwhile, the production of canned products has been more stable. In 2012, the quantity of frozen production was 105,892 tonnes, while salted & dried production was 61,411 tonnes and canned production was 44,700 tonnes.

The difference between production and sales is given as exports: in 2012, 62% of the overall production was for the domestic market while 38% was exported. Annual domestic sales of frozen products were slightly less than 20,000 tonnes up to 1999; subsequently increasing to 88,761 tonnes in 2008, before falling to 85,601 tonnes in 2012. Again, the crisis affected the sales negatively. The trends for salted & dried products as well as canned products were similar from 2001. In 2012, the quantities sold for salted & dried was 47,406 tonnes and for canned it was 42,808 tonnes.

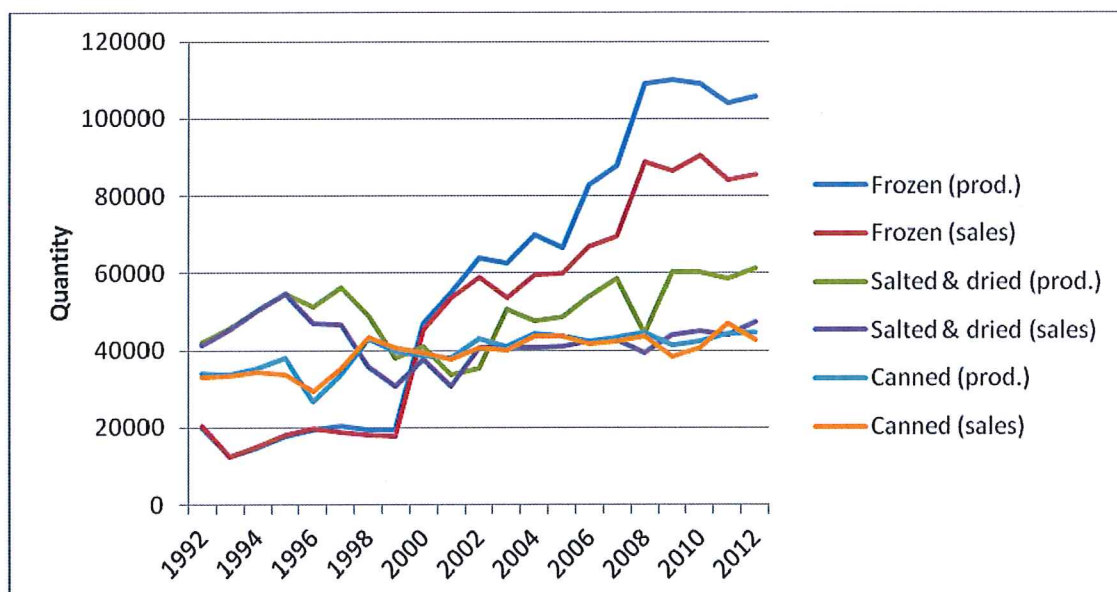


Figure 5: Produced and sold products – frozen, salted & dried and canned 1992-2012. Tonnes.  
Source: INE (2015)

Annual exports, measured as the difference between produced and sold quantities, are given in figure 6. Quantities were negative for some years and this can be explained by the selling from inventories and/or periodisation between production and sales.

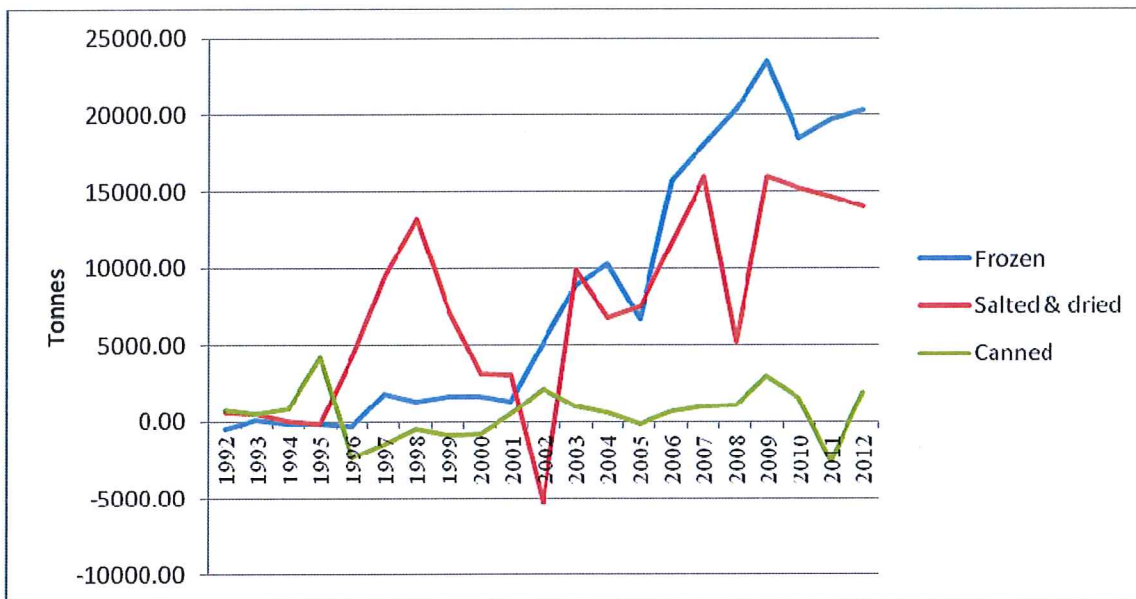


Figure 6: Exports as measured as the difference between production and sales – frozen, salted & dried and canned. 1992-2012. Tonnes.

Source: INE (2015).

Exports of canned products are overall very modest. This implies that virtually all canned production is consumed in the domestic market. Frozen exports were also initially negligible, but started increasing in 1997 (1,800 tonnes), and continued rising quickly from 2002 and onwards. A peak of 23,500 tonnes was reached in 2009, followed by a decline and amounting to 20,300 tonnes in 2012. Salted & dried cod products have shown great variability over time. A peak of 15,900 tonnes was reached in 2009, followed by a decline to 14,000 tonnes in 2012.

Value of sales is given in figure 7. Until 2006, the value of sales for salted & dried was the highest of the three product forms. In 1992, it reached €179.4 million compared to €99.1 million for canned and €31.2 million for frozen products. In 2000, the value of sales of frozen products, €148.8 million, surpassed the value of canned products, which amounted to €123.9 million. In 2006, the value of sales was €293.2 million for salted & dried products, €258 million for frozen products and €156.3 million for canned products. In 2012, the value of sales was € 330 million for frozen products, €259 million for salted & dried products and € 194.7 million for canned products.

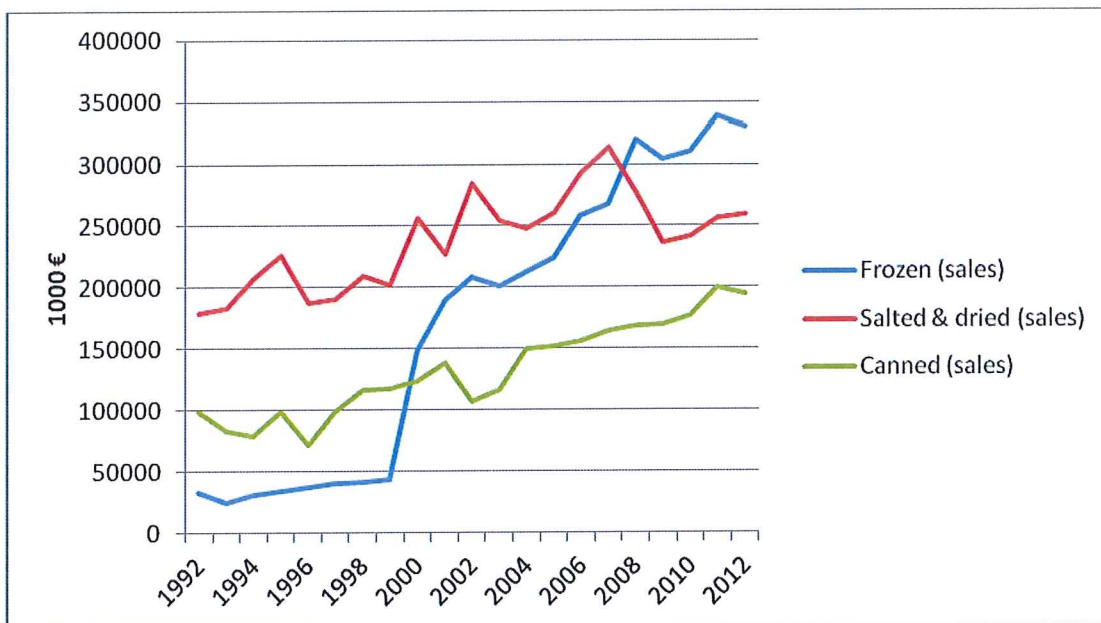


Figure 7: Value of sales from the processing industry. 1992-2012. € '000.  
Source: INE (2015).

The sale average sales price of salted & dried products is higher than that of frozen and canned products, although the prices of the latter two have shown an increasing trend over the period of study (figure 8). The difference in prices reflect the fact that salted & dried products are more processed than the other two product forms.

In 1992, the average price per kg was €4.32 for salted & dried products, €2.98 for canned products and €1.62 for frozen products. In 2012, the price per kg was €5.46 for salted & dried-, €4.55 for canned- and €3.85 for frozen products. It illustrated in figure 8, the average price per kg for salted & dried products was above €6 between 1999 and 2008 – with two peaks above €7. However, after its second peak, the price dropped sharply, reaching €5.46 in 2012.

Prices for frozen and canned products showed a general and steady increase throughout the period. Furthermore, as seen in figure 8, the average prices for the two product forms did not only follow the same trend, but were also quite similar in terms of price levels. In 2006, for instance, the average price of canned products was €3.74, while it was €3.85 for frozen products.

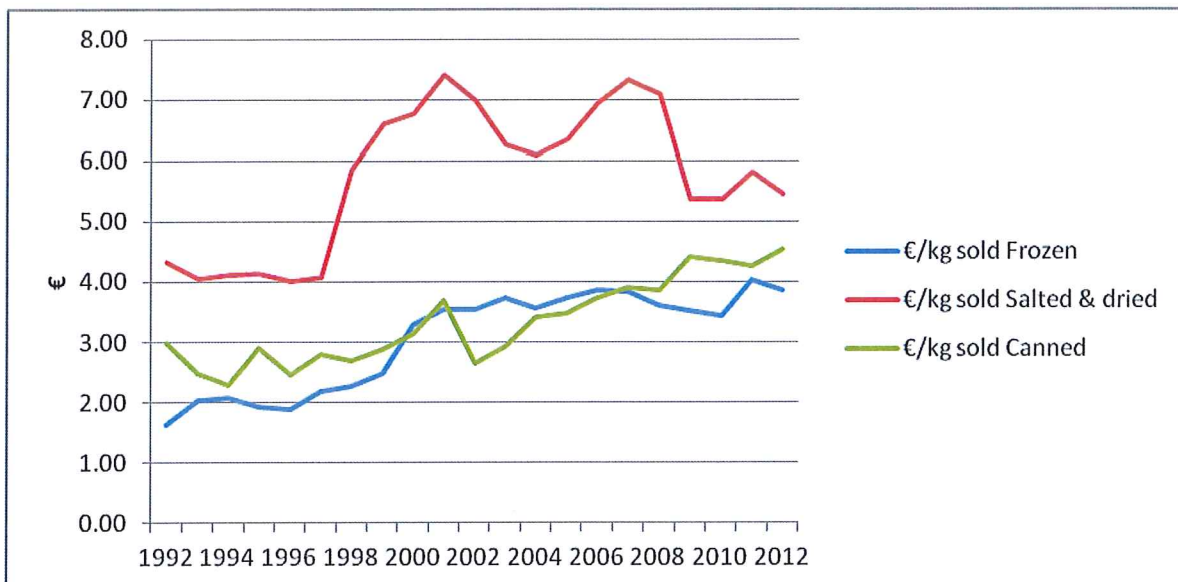


Figure 8: Average price 1992-2012. €/kg.  
Source: INE (2015).

### Summary

Overall, the Portuguese fish processing industry has gained importance over the last few decades. Total production increased from 127,000 tonnes in 2000 to 212,000 tonnes in 2012, while turnover increased from €740 million in 2002 to € 1,078 million in 2012. Expansion has been particularly important for frozen and salted & dried production, which experienced major increases in the period 1969-2012. Canned production on the other hand has been more stable. It should be noted that the canned industry was already important during the dictatorship as it employed a significant number of the illiterate population at that time.

## 6. FISH EXPORTS FROM PORTUGAL

From 1990-2014, Portuguese exports were characterised by substantial growth (figure 9). Quantities were quite stable from 1990 to 1998 at around 90,000 tonnes, followed by a slow growth from 1999 to 2009. From 154,667 tonnes in 2010, export quantities reached 258,223 tonnes in 2014 - an increase of 68%.

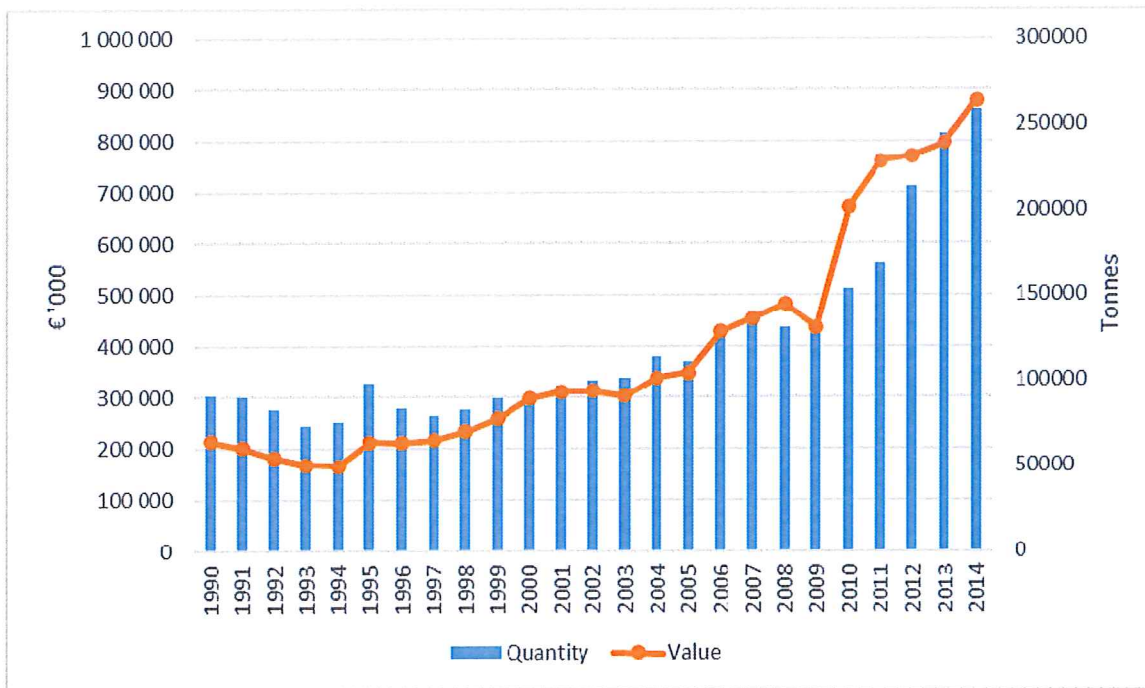


Figure 9: Portuguese exports quantity (tonnes) and value (€ '000), 1990-2014. Source: NSC (2015).

In terms of value, exports varied from €166 million to €213 million during the first half of the 1990s. This was followed by a slow growing trend, increasing from €213 million in 1995 to €482 million in 2008. After a correction in 2009, a rapid increase occurred – and in 2014, export value amounted to €879 million.

In 1990, the 10 most important species accounted for 86% of the total value; sardine, cod and seabream alone represented 56%. In contrast, the three most exported species in 2014; ink fish, cod and sardine accounted for only 38%, while the top 10 species accounted for 75% of export value. Thus, the mix of species exported has become more diversified over time (figure 10).



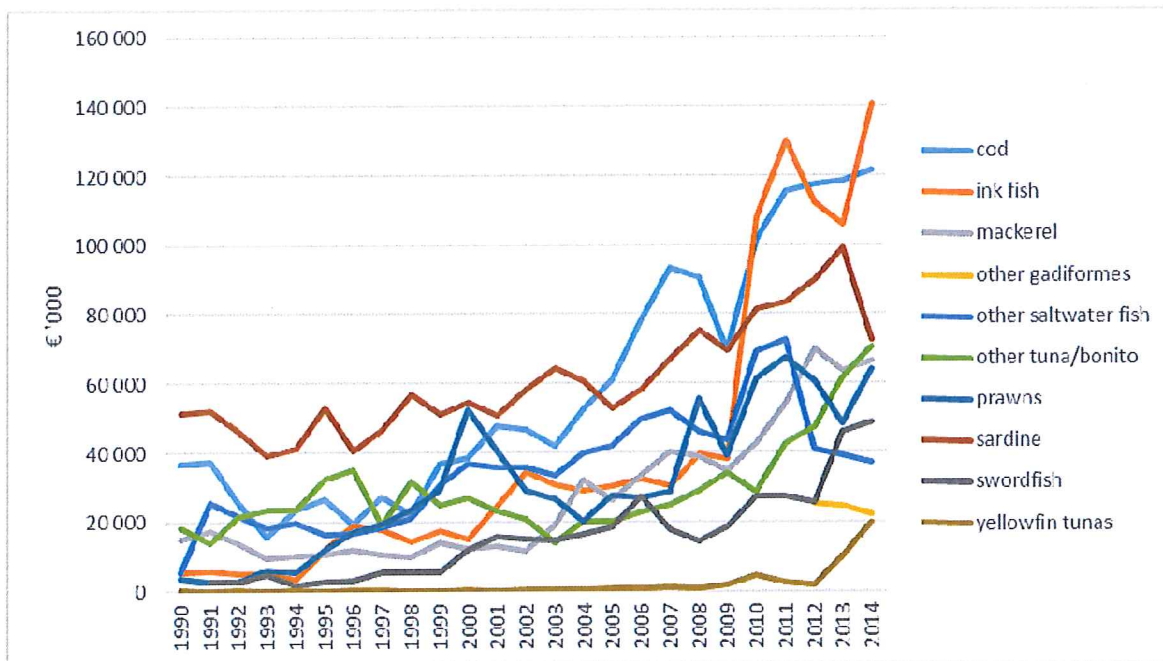


Figure 10: The 10 most important species by export value in 2014. 1990-2014. € '000.  
Source: NSC (2015).

Ink fish exports has increased considerably over the period, from €5.4 million in 1990 to €140.5 million in 2014. The three major importers were Spain, the United States and Italy, together accounting for 90% of the export value (74%, 9% and 7%, respectively).

Cod exports also showed a considerable increase (particularly in terms of value), from 17,793 tonnes valued at €36.8 million in 1990 to 23,328 tonnes valued at €121.5 million in 2014, indicating an increase in price over time. The three major markets were Brazil, Angola and France, accounting for 77% of the total value exported (51% to Brazil and 13% each to Angola and France).

Exports of salted & dried cod experienced an increase in the period – from € 9.1 million in 1990 (25% of all cod exports) to € 59.7 million (49% of all cod exports) in 2014, down from a peak of €75 million (80% of cod exports) in 2007. Exports of salted & dried cod are examined in more detail below.

Frozen cod exports also exhibited an increase in terms of value – from €26.9 million in 1990 to €55.7 million in 2014. However, in terms of value relative to total cod export value, the opposite development was seen: from a share of 73% in 1990, bottoming out at 18% between 2005 and 2007 and then increasing to 46% in 2014.

The overall development for sardine exports was an increase from €51 million in 1990 to €72 million in 2014. The three major importers were France (30%), the United Kingdom (21%) and Spain (12%), accounting for a combined 63%.

### Main export markets

In terms of quantities, the four major export markets - Spain, France, Italy and Brazil – accounted for 83% of the total volume in 2014 (figure 11). Spain dramatically increased its importance over the period – in relative as well as absolute terms – with an export share increasing from 22% in 1990 to 65% in 2014. Meanwhile, the export share of Brazil increased from 1% to 5%, while the relative importance of France and Italy decreased.

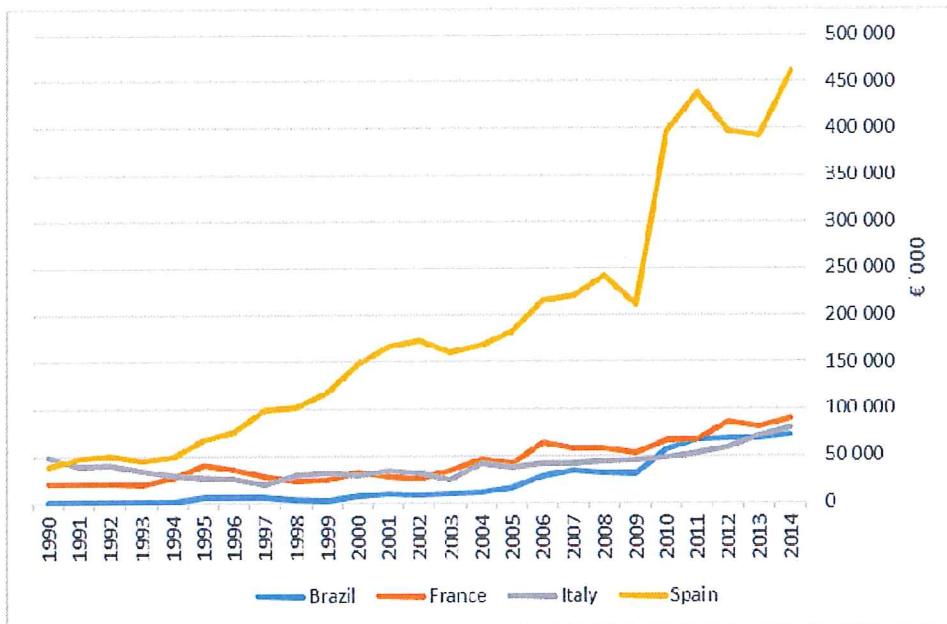


Figure 11: Total export value (€ '000) to the four major markets: Spain, France, Italy and Brazil, 1990-2014.

Source: NSC (2015)

Export quantities to Spain increased considerably throughout the period. In 2014, exports reached 168,262 tonnes valued at €89.8 million, up from 20,023 tonnes at a value of €20.7 million in 1990. In terms of value, the three most important species exported to Spain in 2014 were ink fish, prawns and swordfish, together accounting for 43% of the total value.

Portuguese exports to France experienced an overall increase from 8,500 tonnes in 1990, worth €20.7 million, to more than 19,000 tonnes in 2014, worth € 89.8 million. The three most important species were mackerel, sardine and cod. Combined, they accounted for 70% of total export value.

Export quantities to the Italian market increased from 9,275 tonnes valued at €48.5 million in 1990 to 14,730 tonnes valued at €79.9 million in 2014. The three most important species were other tuna/bonito, mackerel and ink fish, together accounting for 42% of the total value.

Portuguese exports to the Brazilian market increased from 526 tonnes in 1990 to 13,141 tonnes in 2014. The corresponding values were € 20.7 million in 1990 and € 89.8 million in 2014.

The three most important species in 2014 were cod, 'other fish' and saithe, together accounting for 93% of the total value – whereof 86% came from cod.

### Exports of salted & dried cod

The main product of the salting and drying industry is salted & dried cod. Exports from the Portuguese salting and drying industry<sup>7</sup> experienced a considerable growth from 2,016 tonnes in 1990 to 11,777 tonnes in 2014. The exports of salted & dried cod were more or less stable at a low level (1,000–2,000 tonnes annually) from 1990-1999. After 2000, exports expanded quite rapidly. Following an increase in quantities from 2,360 to 10,423 tonnes between 2000 and 2007, a more sideways trend was seen from 2007 to 2014 (with considerable year-on-year variations).

Export value in the same period increased from €8.7 million in 1990, through a peak of €70.8 million in 2007 and down to €57.6 million in 2014 (figure 12). The development in export value seemed to follow the development in quantity up to 2006. Between 2006 and 2008, export value increased more than the related increase in quantities, indicating that higher prices were achieved. However, the value flattened out again after a drop in 2009, and the growth in quantity exceeded the related development in export value, indicating an exacerbation of average prices.

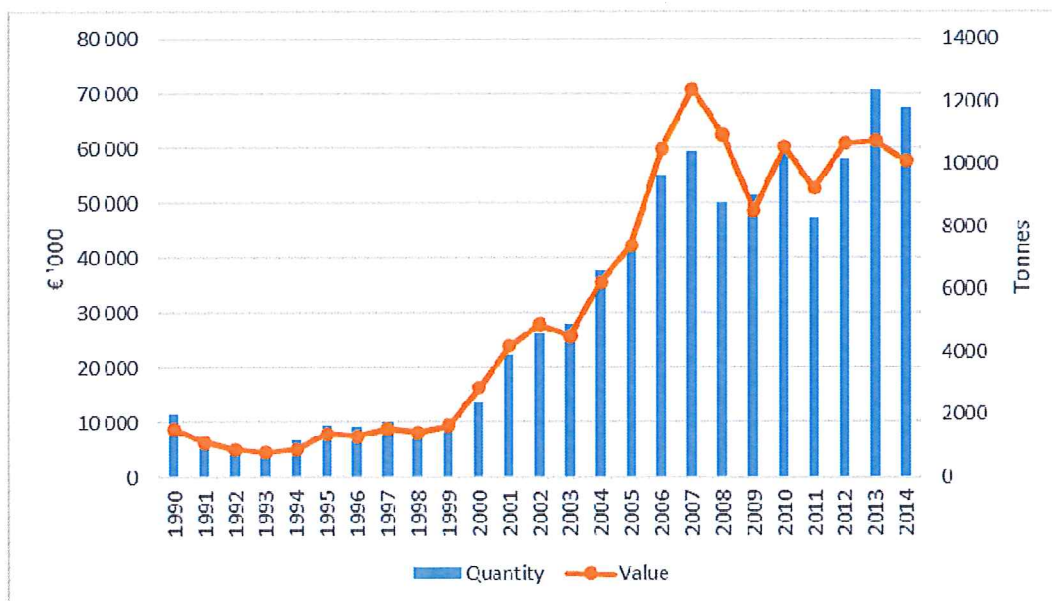


Figure 12: Portuguese exports of salted & dried cod, quantity (tonnes) and value (€ '000). 1990 – 2014.

Source: NSC (2015).

The most important markets for Portuguese salted & dried cod are Brazil, France and Angola. The importance of these markets has been increasing throughout the period. Compared to a

<sup>7</sup> In addition to cod, the following analysis covers salted, salted & dried and dried fish from other species and other gadoids.

35% combined share of total Portuguese salted & dried cod exports in 1990, the countries accounted for 78% of export quantities in 2014 (38% for Brazil and 20% for France and Angola, respectively).

From 1990 to 2014, Brazilian imports of salted & dried cod from Portugal increased from 50 tonnes to almost 4,500 tonnes (figure 13). The quantities exported were insignificant until 1994, followed by a slow growth from 1994-2000. A rapid expansion took place in the period 2000-2007, before it levelled off at quantities of about 4,000-5,000 tonnes annually from 2007 to 2014. As illustrated in figure 13, the development in export value mostly followed the development in quantities exported without major deviations (however, year-on-year variations do exist).

In terms of value, exports to Brazil varied from €100,000 to €3 million in the period 1990 to 1999. A significant increase occurred between 2000 and 2007, reaching a peak of €31 million in 2007. Since then, values have varied considerably year on year, dropping to € 20.5 million in 2009, through a second peak of € 32.5 million in 2010 and down to € 22.4 million in 2014.

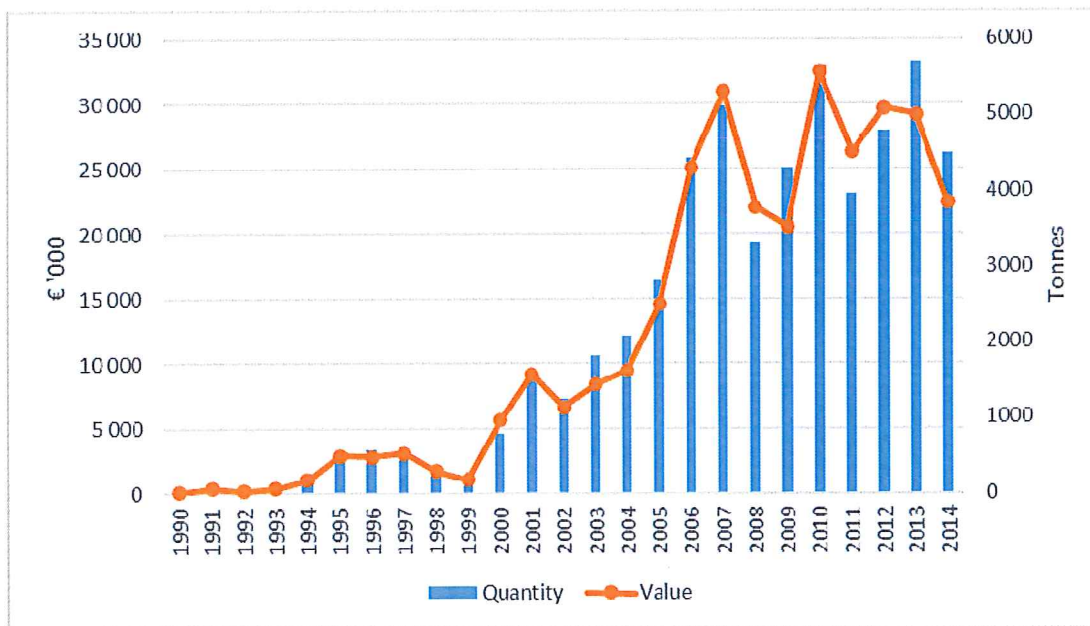


Figure 13: Portuguese exports of salted & dried products from 1990 – 2014 to Brazil. Source: NSC (2015).

Portuguese exports of salted & dried cod to France have gone from less than 200 tonnes in 1990 to more than 2,400 tonnes in 2014 (figure 14). Export quantities to France were low (<250 tonnes) until 1998, followed by a steady growth from 1998–2004. The increase in exports levelled off between 2005 and 2011 at quantities about 1,200-1,500 tonnes per year. After a drop in 2011, the growth seemed to pick up again – reaching new all-time-high levels in each of the three following years.

In terms of value, a rapid increase was seen in French imports from 1996-2008. The growth in value exceeded the related growth in quantity, indicating higher prices achieved or higher valued products exported to the market. In 2009, a sharp decline occurred due to the global financial crisis. However, from that point on the growth seemed to be recovering – export values at € 11.3 million in 2014 were almost back at the levels seen before the crisis in 2009 (€ 11.5 million in 2008).

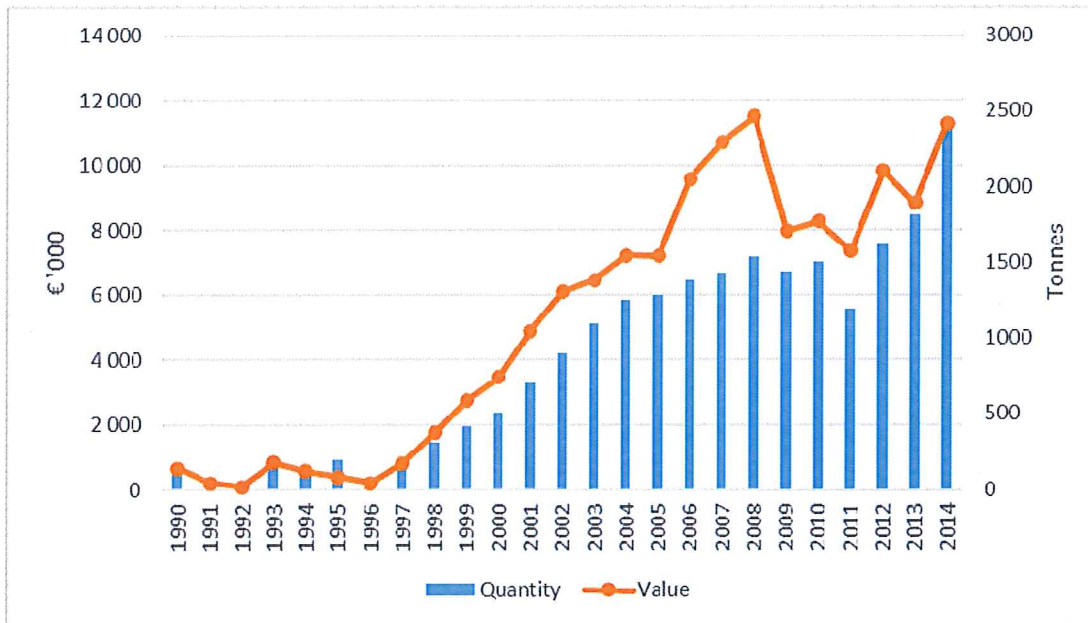


Figure 14: Portuguese exports of salted & dried products from 1990 – 2014 to France. Source: NSC (2015).

The overall development in exports to Angola from 1990 to 2014 showed an increasing trend, growing from 476 tonnes in 1990 to 2,361 tonnes in 2014 (figure 15). Quantities exported were low and stable from 1990 to 2003, followed by steady growth from 2004 to 2009. After a dip in 2010, the growth continued from 2011 to 2014, reaching the highest level recorded in this period of almost 2,400 tonnes in 2014.

In terms of value, exports to the Angolan market increased from €3.2 million in 1990 to €11 million in 2014. The development began in the 1990s, maintaining a flat trend until 2005, when an increase occurred between 2005 and 2008, peaking at € 9.4 million in 2008. This was followed by a sharp decline in 2009 and 2010, before recovering with export value exceeding € 11 million by 2014. In the last decade or so, Angola has experienced high growth rates. However, as the economy is highly reliant on oil, the recent reduction in the oil price has had an impact on the economy including imports.

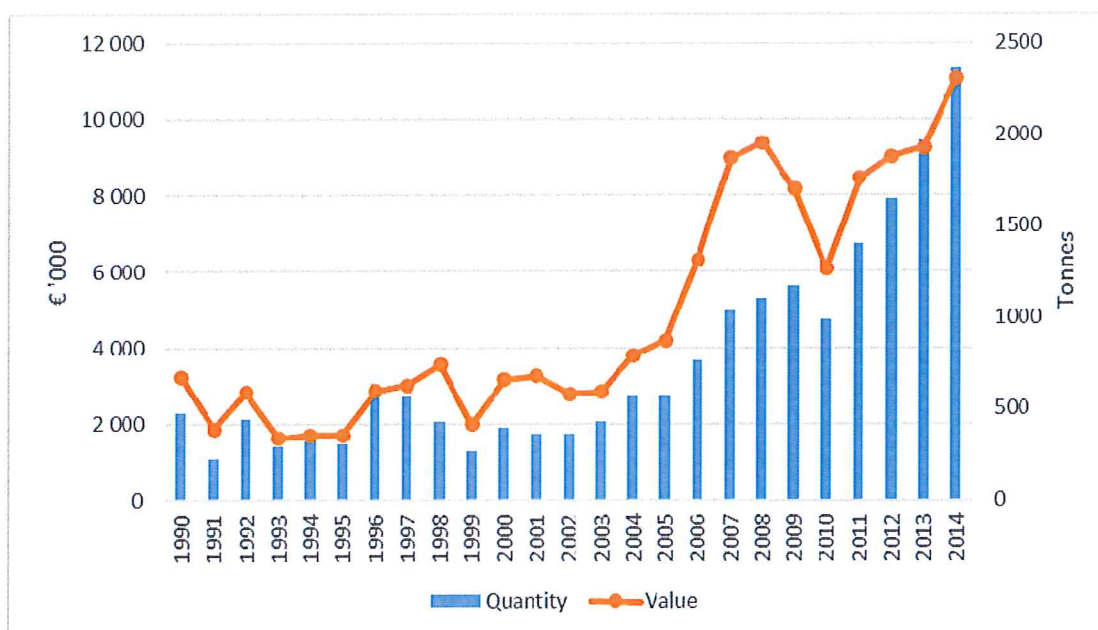


Figure 15: Portuguese exports of salted & dried products from 1990 – 2014 to Angola.  
Source: NSC (2015).

Aggregate quantities over all 24 years showed that salted & dried cod - 'cod, klipfish, not fillet/offals' - was the most imported product in all three countries. However, some differences existed in consumption patterns. Compared to Angola and France, the Brazilian market imported a larger share of salted & dried products from other fish species (i.e., not cod) over the period.

Table 5: Salted and dried cod – main products exported

	Brazil		France		Angola	
Cod, klipfish, not fillet/offals	Q	79 %	Q	95 %	Q	91 %
	V	88 %	V	96 %	V	93 %
Other fish, dried/dried & salted, not fillet Other fish, dried/dried & salted, not fillet/offals	Q	21 %	Q	4 %	Q	6 %
	V	12 %	V	3 %	V	3 %

Source: NSC (2015).

Although there were some differences in the average prices in each of the three markets, the development in price seemed, in general, to follow the same trend. The trend in nominal prices was quite flat from start to end of the period, but with considerable year-on-year fluctuations. The average export price for Portuguese salted & dried cod increased from €4.3 in 1990 to €4.9 in 2014. However, comparing the average price achieved between the three markets in 1990 to the situation in 2014, a notable convergence in prices occurred. From 2009 to 2014, the differences in price level between markets has become less significant.

The average price for total Portuguese exports of salted & dried cod (all products and species) was €4.9 in 2014. Among the top three markets, prices were €5 to Brazil, €4.7 to Angola and €4.7 to France. In contrast – in 1990, the average prices were €4.3 for total exports, €2 to Brazil, € 3.8 to France and €6.8 to Angola.

### Salted & dried cod in the Brazilian market

Cod is one of the main fish products imported to Brazil. There are several types of imported cod products – with salted & dried cod being the most common, followed by dried cod, salted cod and less often smoked cod. In Brazil, salted & dried cod is consumed most by those with higher incomes, due to its high unit value. The total annual imported quantity from 1989 to 2015 (Oct) was on average 9,360 tonnes (Brazil, 2015). The main exporters to Brazil are Norway, Portugal and China (Brazil, 2015); the latter being a recent exporter of this product to Brazil. Figure 16 shows the development in the Brazilian imports of salted & dried cod from the three main exporters. In the first two years of the data series, Norway was the only supplier. Portugal entered the market in 1991, but initially with very small quantities. While Norway has been losing share over time, Portugal increased its share from 10% in 2000 to 40-41% in 2013-2014. China entered the market in 2010 and reached a market share of 7% in 2013, down to 6% in 2014. These developments may be related to the opening of the Brazilian market and the shift to a floating exchange rate in this period (Neto *et al.*, 2016).

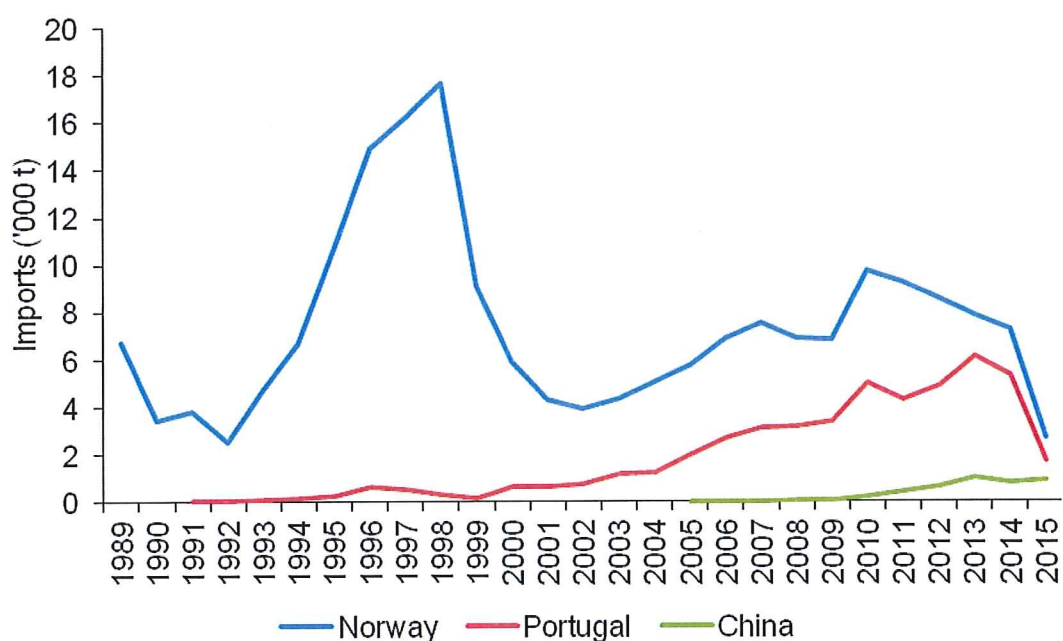


Figure 16. Brazilian imports of salted & dried cod from Norway, Portugal and China (tonnes). 1989 - 2015 (Oct).

Source: MDIC (2015).

Imports from Norway increased significantly from 6,000 tonnes in 1989 to 17,000 tonnes in 1998, but dropped to 4,000 in 2002. Since then, Norwegian imports increased to approximately 7,000 tonnes in 2014. The reason for the import pattern between 1992 and 2002 may be related to the Brazilian economic stabilisation, the increase in purchasing power, and the favourable exchange rate. Moreover, the years with high import volumes are also the years with a fixed exchange rate in the country (1 USD = 1 BR). This stimulated the consumption of salted & dried cod, as the product became cheaper for Brazilian consumers. However, in the following years when the exchange rate was allowed to vary, there was a reduction in consumption and a subsequent devaluation of the currency. The opposite was observed during the periods when the Brazilian currency was revalued. In recent years, there was a reduction in the volume of salted & dried cod imported, which may be explained by the unfavourable exchange rate. However, these imports are higher than the overall average for the period (9,360 tonnes); in 2014, the Brazilian imports of salted & dried cod were 12,610 tonnes.

Figure 17 shows the import prices (\$, FOB) of salted & dried cod from Norway and Portugal. During the whole period, the Norwegian prices were higher than the Portuguese prices, apart from the period 1997 to 1999. The annual average import price of salted & dried cod from Norway and Portugal was \$8 and \$7.5 per kilogram, respectively, for the whole period studied. After 2002, when the imports turned to an upward trend again, the import prices from Norway and Portugal also increased to \$8.6 and \$8 per kg, respectively. Since 2008, both Norwegian and Portuguese prices have had to compete with Chinese prices, which are usually lower than the other prices at an average \$5.6 per kg, except during 2008 and 2009.



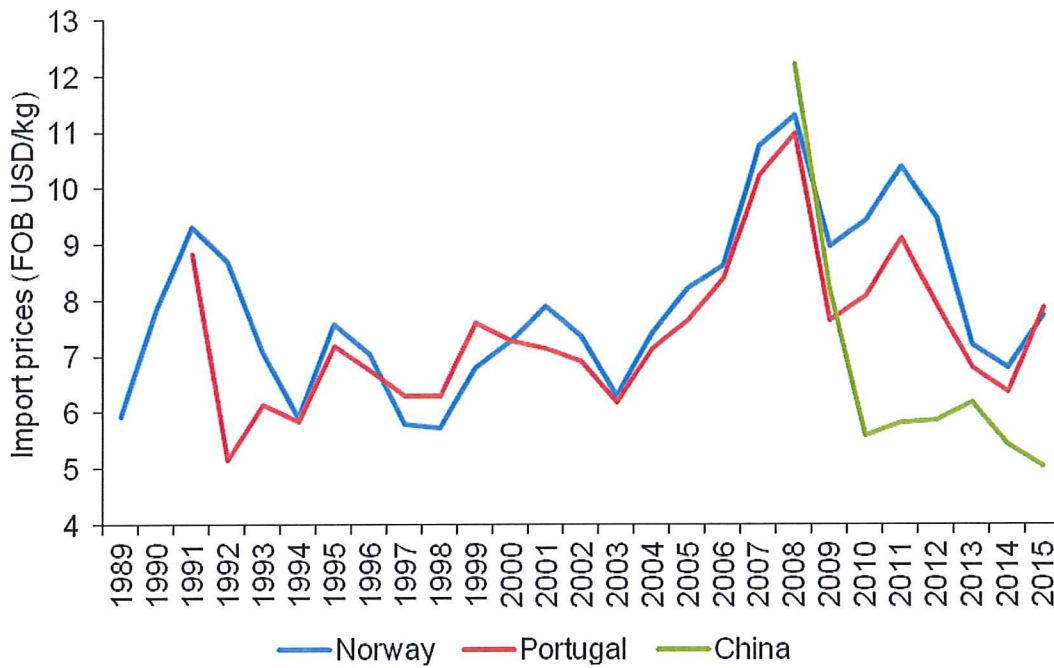


Figure 17. Brazilian import prices of salted and dried cod from Norway, Portugal and China, from 1989 to 2015 (Oct).  
Source: Brazil (2015).

Traditionally, salted & dried cod is consumed most during Easter and Christmas, as suggested by figure 18. However, according to Lopane (2014), regular, daily consumption of salted & dried cod has been increasing, partly due to its availability in restaurants and the increasing trend of eating outside the home.

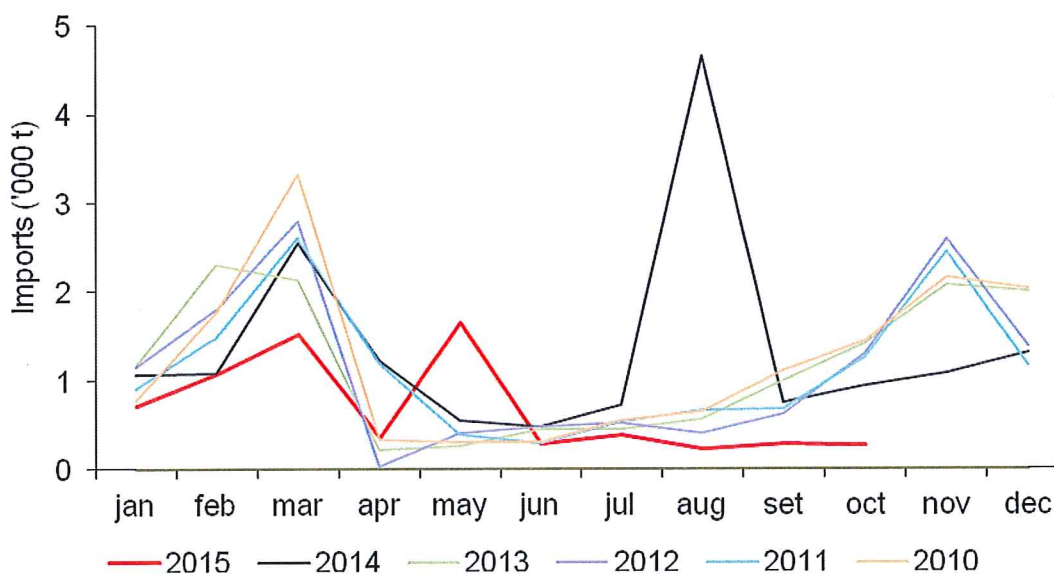


Figure 18. Total Brazilian imports of salted and dried cod from 2010 to 2015 (Oct), by month.  
Source: Brazil (2015).

## 7. DISCUSSION

Portugal has the highest per capita expenditure for fish in the EU at about € 260 in 2012, and with an annual apparent consumption of 62 kg/capita in 2007/2009 (Bjørndal *et al*, 2015) it has one of the highest per capita fish consumption in the world. What is remarkable is the fact that the high per capita consumption has been maintained despite tremendous changes in the fishing industry over the past half century which has greatly reduced Portugal's self sufficiency when it comes to fish supply (Bjørndal *et al*, 2015). This has been possible due to a tremendous increase in imports from 113,500 tonnes in 1976 to more than 400,000 tonnes in recent years.

Overall, the Portuguese fish processing industry has gained importance over the last few decades. Total production increased from 127,000 tonnes in 2000 to 212,000 tonnes in 2012, while turnover increased from €740 million in 2002 to € 1,078 million in 2012. Expansion has been particularly important for frozen and salted & dried production, which experienced major increases in recent years. Canned production on the other hand has been more stable.

From 1990-2014, Portuguese exports were characterised by substantial growth. Quantities were quite stable from 1990 to 1998 at around 90,000 tonnes, followed by a slow growth from 1999 to 2009. Then exports increased from 154,667 tonnes in 2010 to 258,223 tonnes in 2014 - an increase of 68%. Nominal export values varied from €166 million to €213 million during the first half of the 1990s. This was followed by a slow growing trend, increasing from €213 million in 1995 to €482 million in 2008. After a correction in 2009, a rapid increase occurred – and in 2014, export value amounted to €879 million.

For most products and markets, it is difficult to assess the market shares of the different suppliers. Nevertheless, this analysis shows that the share of the Portuguese fish processing industry in the domestic salted & dried cod market has increased. Moreover, when it comes to imports of salted & dried cod to Brazil, Portugal has increased its share at the expense of Norway which used to be the dominant supplier.

The main comparative disadvantage of the Portuguese fish processing is that, to a very large extent, it is dependent on imported raw materials. However, with the globalisation of fish markets, this is less of a disadvantage than in the past. Moreover, the fish processing industry is protected by tariffs. In addition, the industry is supported in many other way – by the EU as well as Portugal. This helps explain the considerable expansion of the industry. Our prediction is that the Portuguese fish processing industry will continue to expand in the foreseeable future.

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APPENDIX

Figure A.1. Economic performance of the Portuguese fish processing industry sector, 2000-12.

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
<b>Turnover (million euros)</b>	-	-	740	739	813	873	958	988	1091	1015	1089	1132	1078
<b>Total production Costs (million €)</b>													
<b>Quantity (tonnes)</b>	126685	126552	142198	154415	161726	158694	179209	189666	198086	211542	211509	206914	212003
<b>Frozen</b>													
<b>Production (tonnes)</b>													
<b>total</b>	47013	54833	63936	62687	69829	66505	82766	87718	109098	109953	109052	103998	105892
<b>cod</b>	1708	2235	3537	3907	4555	6023	13748	14690	15668	22656	25478	30780	27161
<b>% Cod</b>	4%	4%	6%	6%	7%	9%	17%	17%	14%	21%	23%	30%	26%
<b>Sales (tonnes)</b>													
<b>total</b>	45366	53512	58818	53796	59542	59779	67053	69610	88761	86466	90530	84246	85602
<b>cod</b>	1663	2333	3595	4368	4537	5571	8826	8045	10231	12968	16496	21438	18726
<b>% Cod</b>	4%	4%	6%	8%	8%	9%	13%	12%	12%	15%	18%	25%	22%
<b>Sales Value (1000 euro)</b>													
<b>total</b>	148834	189227	207729	200455	212585	223653	258042	267299	320061	303804	310704	338927	329949
<b>Cod</b>	11700	18328	21767	29668	30385	39351	64200	63526	80778	88734	108761	142206	121726
<b>% Cod</b>	8%	10%	10%	15%	14%	18%	25%	24%	25%	29%	35%	42%	37%
<b>Dry and Salted</b>													
<b>Production (tonnes)</b>													
<b>total</b>	40988	33659	35410	50585	47555	48543	53991	58761	44406	60132	60267	58649	61411
<b>cod</b>	37871	32579	33199	45377	43999	42994	46978	47697	35275	51243	50713	50042	50049
<b>% Cod</b>	92%	97%	94%	90%	93%	89%	87%	81%	79%	85%	84%	85%	81%
<b>Sales (tonnes)</b>													
<b>total</b>	37848	30672	40703	40703	40745	41015	42227	42758	39208	44143	45017	43987	47406
<b>cod</b>	34748	29363	37745	36823	37213	36031	35763	34327	31613	36835	36700	36434	38434
<b>% Cod</b>	92%	96%	93%	90%	91%	88%	85%	80%	81%	83%	82%	83%	81%
<b>Sales Value (1000 euro)</b>													
<b>total</b>	256240	227503	284463	254382	248345	260319	293233	313092	277551	236677	241526	255789	258951
<b>Cod</b>	251526	221042	269647	235866	235054	241042	265257	275981	247093	208085	207952	226558	218652
<b>% Cod</b>	98%	97%	95%	93%	95%	93%	90%	88%	89%	88%	86%	89%	84%
<b>Canned</b>													
<b>Production tonnes</b>	38684	38060	42852	41143	44342	43646	42452	43187	44582	41457	42190	44267	44700
<b>Sales tonnes</b>	39495	37544	40698	40130	43745	43771	41789	42211	43533	38503	40671	46864	42808
<b>Sales Value (1000 euro)</b>	123869	138826	107454	116982	149366	151751	156250	164441	168200	169496	176637	200045	194725
<b>Performance indicators</b>													
<b>Gross value added (million €)</b>	-	-	-	-	-	-	-	-	499.6	449	513.3	508.9	421.6
<b>Capital productivity (%)</b>	-	-	-	-	-	-	-	-	48.3	45.4	48.7	50.2	43.2

Source: Döring and Borrello (2014) and INE (2015).