

The Portuguese Fish Processing Industry from the 1960s to the present

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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 fish. These changes have also affected fish processing. Moreover, the development of this industry has been promoted in several different ways, and Portugal has now also become an important exporter to several countries. The purpose of this report is to highlight and analyse these developments. In a sense, it is an extension of Bjørndal et al., (2015), who analysed the development in Portuguese fisheries from the 1960s to the present.

1. INTRODUCTION

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 traditionally Portugal was a distant water fishing state (DWFS), this changed with the introduction of Extended Jurisdiction, which led to the demise of Portugal as a DWFS. Thus, while Portugal used to be nearly self sufficient in the supply of fish, the country has become a net importer of fish and has maintained one of the largest per capita consumption of fish in the world. These changes have also affected fish processing. Moreover, the development of this 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. For example, much cod is now processed in Portugal. Moreover, the country has also become an important exporter to several countries, e.g. increasing market share for salted & dried cod in Brazil at the expense of Norway. For example, Portugal is now an important supplier of salted & dried cod to Brazil which is sold in competition with Norwegian exports. The purpose of this report is to highlight and analyse these developments and to consider future developments. In a sense, it is an extension of Bjørndal et al., (2015), who analysed the development in Portuguese fisheries from the 1960s to the present.

Data from different sources have been collected for the preparation of this report. All monetary values are nominal, unless otherwise noted.

This report is organised as follows. In the next section, the macroeconomic and political development of Portugal from the 1960s to the present will be described. In section three, the economic environment of the industry will be 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 will be quantified in section four. Section five deals with fish processing, while exports from the industry are given in section six. Some issues pertaining to the domestic fish market will be addressed in section seven, while section eight provides some concluding remarks.

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

In 1960, Portugal was a colonial power and a dictatorship lead by Oliveira Salazar. The country had large overseas territories in Africa comprising of Angola, Mozambique, Guinea Bissau, Cape Verde, São Tomé and Príncipe; in Oceania, East Timor; in Asia, Macau and in the Indian subcontinent, Goa, Daman and Diu (Chabal, 2002). India gained independence in 1947, but the Salazar regime refused to recognise the sovereignty of the Indian Republic over those territories despite pressure from the United Nations and the International Court of Justice (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 (Marcos, 2007). The military coup resulted in the 25th April 1974 Revolution which, until the late 1970s, led to a mass exodus of citizens from former African territories (the Retornados) (Pinto, 2003). The aftermath of the coup resulted not only in a Democratic regime, but also in other changes. For instance, the integration of nearly one million returning Portuguese and the political and economic turmoil following the coup, left Portugal in difficulties. The IMF intervened on two occasions in order to re-establish the economy (Ferreira and Marshall, 2011). In 1986 Portugal became a member of the then European Economic Community (EEC) and left EFTA where it had been a founding member in 1960. Structural and cohesion funds from the EU have subsequently permitted the Portuguese economy to recover and in 1999, Portugal adopted the Euro replacing the former national currency, the Escudo.

In the last fifty years Portugal has made a remarkable transition from an agrarian society to an industry- and service-based economy, but the country has still not been able to successfully move on to a knowledge-based economy. The main reason for this is that, even after the return to democracy, the educational gap between Portuguese human capital and other European core countries persists (Pereira and Lains, 2012). 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). During this period, Portugal also experienced a number of macroeconomic shocks and structural changes.

Political evolution

Overseas territories had their contextual importance, but over time, that importance diminished. Costa et al. (2010) have stressed that those territories were of little relevance for the growth and modernisation of the Portuguese economy, notwithstanding their importance for some economic groups and for the definition of national politics. Rocha (1977) has demonstrated that economic growth in the convergence period, specifically during the 1960s, was not triggered by colonial exploitation, but by the industrialisation process because it was this that developed most, particularly in sub-sectors such as basic metallurgy, chemicals, metal products and machinery/transport equipment. The main industries did not spread out due to the expansion of the colonial markets, and the overseas territories were not an important source of raw materials at privileged price for the dynamic sectors of the Portuguese economy. The reason for this was that the imported products did not match the manufacture of the heavy industry. Essentially, overseas territories were a centre of power for the financial and industrial groups who obtained cheap raw materials, but increased the industrial gap in the Portuguese economy because they were a source of growing unproductive spending (Costa et al., 2010).

The colonial wars in Angola, Guinea and Mozambique caused an important macroeconomic shock during the 1960s and early 1970s. Portugal was handling three war fronts at the same time and faced high financial costs that represented on average 20% of total public expenditure. This was one of the main reasons to cease the traditional rigorous balance in the public finances (Mata and Valério, 2003). With the colonial wars, the military contingent almost doubled in a decade and spending on this at its peak represented around 40% of state finances (Rocha, 1977).

The tremendous increase in the price of oil in the winter of 1973 was due to a boycott by Arabic countries, ending two decades of economic growth on an international scale. This led to the 1973 oil crisis, where world economies slowed down and became unstable, and fulfilling the obligations of social spending was only possible via a rise in taxation (Carreira, 2011). Portugal was facing a growing popular discontentment during this time which resulted in the coup of 25th April 1974. Notwithstanding the crisis, the first few months after the Revolution brought a new wave of optimism concerning the future of the country. However, that optimism was short lived, because the commercial deficit grew considerably in relation to the previous period (Costa et al., 2011). Until 1975, the Social State provoked a significant growth in public debt, without fiscal sacrifices, only possible due to the high economic growth rates of the previous decades (Carreira, 2011).

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. Just by the 1980s there was some strong industrial diversification due to export growth and domestic consumption (Costa et al., 2011). By 1990 due to the weakening of the European economies and the excessive fiscal burden, some reforms became necessary. Portugal entered into the reforms late, and while by 1975 the tax burden was around 21% of the GDP, by 2005 it had attained 36%. Europe of the 15 has risen its tax burden from 33% to 41% in the homologous period (Carreira, 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 *Estado Novo*), and the question of the overseas colonies with the Portuguese position being criticised in the international arena (Wohlgemuth, 1963; Pinto and Teixeira, 2002; Marcos, 2007).

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. Special clauses were renegotiated which allowed room for the development of emergent industrial sectors. Portugal was allowed to enter in certain markets by processing some agriculture products for export as industrial goods and therefore benefiting from lower tariffs within the EFTA partner markets. The effect of EFTA on Portuguese exports was of major importance during the early 1960s and the country began to industrialize as a result (Barreto, 2002). By that time, the regime had opened up to foreign capital and investments were made particularly in the chemical, metal-mechanic and energy industries with other sectors developing later (Lains, 1994). In this period, hundreds of thousands of people left their occupations in the countryside and flocked mainly to coastal cities while others chose to emigrate. Lisbon and Oporto received most of the people searching for urban and industrial jobs and consequently metropolitan areas developed (Silva et al., 2012). During the 1960s and early 1970s, due to the absence of employment opportunities in rural areas and in order to avoid the colonial war, a substantial number of men emigrated from mainland Portugal to Europe, particularly France (Barreto, 2002). Geographic vicinity and the ease in crossing borders were the main motivational factors

(Rocha-Trindade, 1986). There was also emigration from Madeira to South America (mainly to Venezuela) and from Azores to the US (Costa et al., 2010).

From the institutions created under the Bretton Woods agreements, Portugal joined the IMF, the World Bank and the GATT by the early 1960s. The agreement with the EEC was signed in 1972 by which time the country was also becoming involved with other international bodies such as the OECD and NATO, although the ongoing entanglement with the colonial wars in Africa greatly influenced the low profile of Portugal's role in the international economic arena (Bruneau, 1982). An opening in terms of trade with other countries occurred just after the April 1974 Revolution, when the newly established democratic regime set about creating stronger economic ties with western countries (Santos, 1999). However, the regime change in Portugal also led to an overnight modification from it being the Western European country with the highest growth rate to the one with the lowest – in fact it experienced several years of zero or negative growth between 1974 and 1984. The International Monetary Fund (IMF) intervened twice during this period, first in 1977 and a second time in 1983 and Portuguese export growth to EEC countries only became more robust later.

Economic policy

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, on the demand schedule and technological progress. Sousa (1969) has characterized this as an extremely unbalanced distribution of both functional and personal national income.

From 1960 to 1973, despite Portuguese public accounts having a negative balance, the economy was booming, reaching one of the highest growth rates in the world. This growth created opportunities for real integration with the developed economies of Western Europe and Portugal started to invest capital in industry instead of agriculture. There were some increasing signs of openness in the Portuguese economy to other countries (Bastien and Cardoso, 2003). Individuals and firms changed their patterns of production and consumption through emigration, trade, tourism and foreign investment, leading to a structural transformation. Public investments were made to the traditional public works and new firms were created using private capital. There was a great deal of investment in transportation, while at the same time, the increasing complexity of a growing economy raised new technical and organisational challenges, stimulating the formation of modern professional and

management teams (Leite, 2006). Illiteracy rates started to decrease by the 1970s (Mata and Valério, 2003).

During the period 1959 to 1973 the growth rate in exports of Portuguese merchandise was notable – 11% per annum. According to Neves (1996), 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.

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. Many sectors of Portuguese industry became export-oriented, and in the year before the coup, over one-fifth of Portuguese manufactured output was exported (Baklanoff, 1979).

Portuguese economic growth slowed down after the year of the coup, not only due to the collapse of the protected trade with its former overseas territories as these gained independence, but also due to the general instability felt soon after the arrival of democracy. An additional reason was the increasing lower foreign demand caused by the first oil crisis and the subsequent recession. The post Carnation Revolution period was characterised by negative economic growth, as industries were nationalised, skilled workers emigrated and the worsening effects of decoupling Portugal from its former territories were felt. Heavy industry almost collapsed as all sectors of the economy went into free fall (Baklanoff, 1979; Lewis and Williams, 1981). During this period, many firms under foreign control dramatically reduced their investments due to the imposition of very limiting labour laws. This 'reverse' macroeconomic policy gave up the former objectives of price stability and budget equilibrium, and the role of the state in the economy increased dramatically (Confraria, 1999).

The slowdown in the economic growth was amplified by the mass emigration of skilled workers and entrepreneurs due to political intimidation, and the costs of accommodating thousands of refugees in Portugal from the former overseas territories in Africa (mostly from Portuguese Angola and Mozambique) and Portuguese Timor – the retornados. During the Colonial War (1961-1974), 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 total number of refugees who arrived in Portugal from May 1974 to the end of the 1970s is not clear, but estimates range from 500,000 to one million (Carrington and De Lima, 1996).

The retornados increased the Portuguese labour force by roughly 10% in just a few years and had a strong adverse effect on Portuguese wages. As a result, between 1973 and 1986, Portuguese real per capita income moved away from the European core at a rate that oscillated around 0.5% per annum.

In 1986, the economic growth trend accelerated after Portugal's accession to the EEC, which saw a wave of institutional reform, an ambitious agenda of economic liberalisation and the privatisation of several of Portugal's major companies. Membership of the European Community resulted in increased trade ties and an inflow of funds allocated by the European Union to improve the country's infrastructure. By the early 1990s, Portugal was praised for its economic successes (Tomé, 2011), for its economic miracle (Mateus, 2006; Neves, 1994) and for its speed of convergence (Barry, 2003).

However, acceleration of the economic growth was short-lived. 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). After a recession in 1993, the economy grew at an average annual rate of 3.3%, well above EU averages, but well behind the growth of the Portuguese economy before the military coup of 1974. 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 adherence to the EMU led to the imposition of certain macroeconomic restrictions on the Portuguese economy. The relatively recent EMU framework involved a strong common currency and budget rigour, which was substantially different from the one at the time of accession.

During the 1990s Portugal became an open economy and presented good transport infrastructures, while it had also reduced income inequality (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 of 2007 amplified the situation. GDP per capita growth in 2008, at 1.3%, was the lowest, not just in the European Union, but in the whole of Europe. Unemployment increased from about 270,000 in 2002 to about 450,000 in 2007 reaching to about 820,000 in the first trimester of 2012 (INE, 2014).

Between 1990 and 2005 Portuguese GDP grew in average 2.4%, meanwhile current primary expenditure rose by 5%, social expenditure by 6% and pensions by 7%. The economy has been in a long fall (6% growth between 1960-75, 4% growth 1975-90 and 2.4 growth 1990-05) (Carreira, 2011).

The trade regime

The peak of the cod fisheries took place during the Estado Novo, although there was always the necessity to import. The importance of cod as a source of protein to the population and as an important factor in the trade deficit led to an investment 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 foreign products. However, a residual list of foreign imports remained, of which olives, olive oil, cod, metal-mechanic products were amongst the most important restrictions (Rocha, 1982). During the first half of the 20th century, the need to acquire raw materials in the colonies was low due to the small size of the Portuguese market and the low level of industrialisation. Most of the products needed in the overseas territories were simple and could be supplied by mainland Portugal, so the country had surplus. However, during the 1960s the situation started to change. In this period, economic growth was higher in the overseas territories and more sophisticated products were in demand that could not be satisfied by Portugal (Rocha, 1982).

The recent recession

The period 2002-07 is considered a worldwide unsustainable boom. Several forms of external finance fed the increase in the consumption that occurred 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 both in terms of hours and employment (just 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 (Portugal included), reaching a stagnation point afterwards. Unlike the 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 from the year of 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 labour costs decrease, which in Portugal amounted to 6.2% from a 2007-12.

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

Concerning per capita expenditure on fish, in 2012 the average was €103, and the variation was large between countries. According to Anastasiou et al., (2014), 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, the countries affected by the crisis exhibited decreases in expenditures on fish led by Greece (-8.3%), followed by Portugal (-2.9%) and Italy (-1.9%).

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.

Export duties and quotas

Cod is the most important fish product in the Portuguese market, as will be demonstrated in sections four-six. Moreover, essentially all cod is imported. For this reason it is of interest to look at duty for cod exports to the EU originating in different countries as well as duty free quotas (table 3.1). The rates for Most Favoured Nations (MFNs) apply to all members of the

WTO and are intended to ensure non-discrimination. GATT quotas apply to all members of the WTO.

Table 3.1: Duty and quotas for exports to the EU

	Duty for exports to the EU					Quota (tonnes)
	MFN	Canada ^{a)}	Iceland	Russia	Norway	
Frozen cod	12%	12%	0	8.5%	0	Autonomous 70,000 tonnes
Frozen cod fillet	7.5%	7.5%	0	7.5%	0.9%	Compensation quota 9,000 tonnes ^{b)} . Autonomous 30,000 tonnes
Salted cod	13%	13%	0	13%	0	GATT 25,000 tonnes. Autonomous 2,600 tonnes
Salted fillet of cod	20%	20%	0	20%	0	
Salted fillet of <i>Gadus macrocephalus</i>	16%	16%	0	16%	0 ^{c)}	
Salted & dried cod	13%	13%	3.9%	13%	3.9%	GATT 25,000 tonnes

a) Canada and the EU have negotiated a trade agreement that is to be ratified by the two parties.

b) The “compensation” quota for frozen cod fillets applies to Norwegian exports only.

c) In reality this rate cannot be achieved. This is because salted fillet of Pacific cod will not fulfil the requirements regarding origin.

MFN = most favoured nation

For Norway, there is no duty on exports of frozen, salted and salted fillet of cod, while there is a 0.9% duty on frozen cod fillets, once total exports exceeds 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 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 also 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. Russia faces considerably higher duties than Norway and Iceland.

Canada faces the same duties as Russia, except for a higher duty on frozen cod. Under an agreement called CETA, from 2015 Canadian products will enjoy preferential access to the EU. This agreement will benefit the salted & dried fish industry in Canada. Canadian fish and seafood exports to the EU have faced tariffs of up to 25 percent, before this agreement. When CETA comes into force, almost 96 percent of EU tariff lines for fish and seafood will be duty-free. Seven years later, 100 percent of these tariff lines will be duty-free, making Canadian products more competitive¹.

Labour markets

Fish processing is considered a labour intensive industry. For this reason, labour costs are important. In 2012, average wage cost including social costs for one man-year in the fish processing industry in Portugal was €12,000².

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 costs³. Foreigners working in the fish processing industry, mainly from Eastern Europe, are paid the same wages as Norwegian workers.

Investment support

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). Funds are available for investments in the area of processing and marketing of fish products with the objective to strengthen the competitiveness of the sector.

The nature of these funds is in the form of non-refundable or refundable subsidies. The public support for investment projects with value under €100,000 is in the form of a non-

¹ http://www.geraldkeddy.ca/media/CETA%20Backgrounder_Nova%20Scotia.pdf

² Source: http://stecf.jrc.ec.europa.eu/documents/43805/861045/2014-12_STECF+14-21+-+EU+Fish+Processing+Industry_JRC93340.pdf

³ Salary group 1, fish processing industry, production work: the minimum wage at 37.5 hours per week is NOK 162.85 per hour. <http://www.arbeidstilsynet.no/fakta.html?tid=90849/#Fiskeri>

repayable grant. The public support for investment in projects with value in the range €100,000 - €2,500,000 is in the form of a non-repayable grant of 80% of its value and in the form of repayable aid for the remaining 20% value. The public support for projects of €2.5 million or more are provided in the form of a non-repayable grant by 40% of its total value and with a repayable subsidy for the remaining value. The maximum value of non-repayable grant is €4.2 million and the total value for public support is €6,000,000.

The refundable subsidy takes the form of a loan with zero interest rate, 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 period⁴.

These subsidies are available for financing systems and equipment necessary for the process preparation, processing, handling, storage, wrapping and packaging, final storage, marketing and traceability of dried & salted fish products⁵.

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

The Portuguese government also supports investments through the Investment Tax Code and Portugal2020⁶. 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 €3,000,000. Recipients can get a corporate income tax credit from 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 received up to a 10-year period after the conclusion of the investment.

Productive investments in new products, services, production methods or processes may also receive financial incentives in the form of a loan: 35% of eligible expenses as an interest-free loan; eight years reimbursement period; 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).

⁴ http://www.promar.gov.pt/Download/EIXOS/EIXO2/Medida2/Port_424_C.pdf

⁵ Idem

⁶ <http://www.portugalglobal.pt/EN/InvestInPortugal/Documents/Incentives%20Overview%20in%20-Portugal%20%202015.pdf>

Other areas

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

Export finance and guarantees: In the framework of the Anti-Crisis Measures adopted by Portugal, SMEs' access to finance has been a major priority for the government.⁷ In this context, 12 'SME Invest and SME Growth' credit lines were 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, which cover between 50% and 75% of the loan. These credit lines aim to support the financing of fixed investments and also 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 was provided to about 69 000 SMEs (20% of SMEs), supporting more than 907 000 jobs. As part of the global package of the SME Invest 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 Portuguese government guaranteed loans in total SME loans have grown significantly during the latest years from 0.9% in 2007 to 7.8% in 2013, demonstrating the sustained public efforts to maintain SME access to finance⁷.

State Guaranteed products managed by COSEC⁸ cover the risks associated with export and investment, especially to political risk 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. Insurances cost from €250 (the minimum premium) plus a document fee⁹.

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.

Research and development: Investments in R&D activities to develop new products, services or new production methods and processes are supported by the government through

⁷ <https://g20.org/wp-content/uploads/2015/05/OECD-Financing-SMEs-and-Entrepreneurs-2015-An-OECD-Scoreboard-April-2015.pdf>

⁸ <http://www.cosec.pt/index.php?id=1>

⁹ Bjørndal and Ellingsen (2015)

financial incentives (Portugal 2020) and tax incentives (SIFIDE II)¹⁰. 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.

Financial incentives are distributed in the form of a base rate covering 25% of eligible expenses; bonuses up to 60 percentage points according to project scope and company size; cash grant up to €1,000,000 of incentive; and for incentive amount that exceeds €1,000,000, 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, up to €1,500,000.

Summary

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 tax in 2014, and a sustained public effort to maintain SME access to finance. Moreover, labour costs are very competitive, and fish processing is protected by duty on exports from other countries.

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.

4.1 Domestic production

Fish landings

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,

¹⁰ http://www.portugalglobal.pt/PT/geral/Seminarios/Documents/InvestInPortugal_Right_Choice_Right_-_Time_April2015.pdf

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. Several reasons explain this. Not only the internal developments, mostly related to consequences of the Revolution in terms of economic conditions and demography, but also others such as: overexploitation of fish stocks, access restrictions to the waters of former colonies, the introduction of 200 mile Exclusive Economic Zones of coastal countries, the abrupt end of direct state support to fisheries, and the oil shocks during the 1970s that greatly affected the profitability of distant water fishing 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 1978-83.

In 1986, the year Portugal joined the European Union, there was a substantial increase in harvest to 407,000 tonnes, after which there was a gradual decline to a bottom level of 198,000 tonnes in 2000. In 2013, total landings amounted to 196,250 tonnes. Catches of the 10 largest landings are given in table 4.1. 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 4.1: Catches of the 10 most important species in 2013 (tonnes)

Species	Tonnes
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
Sum	138,749

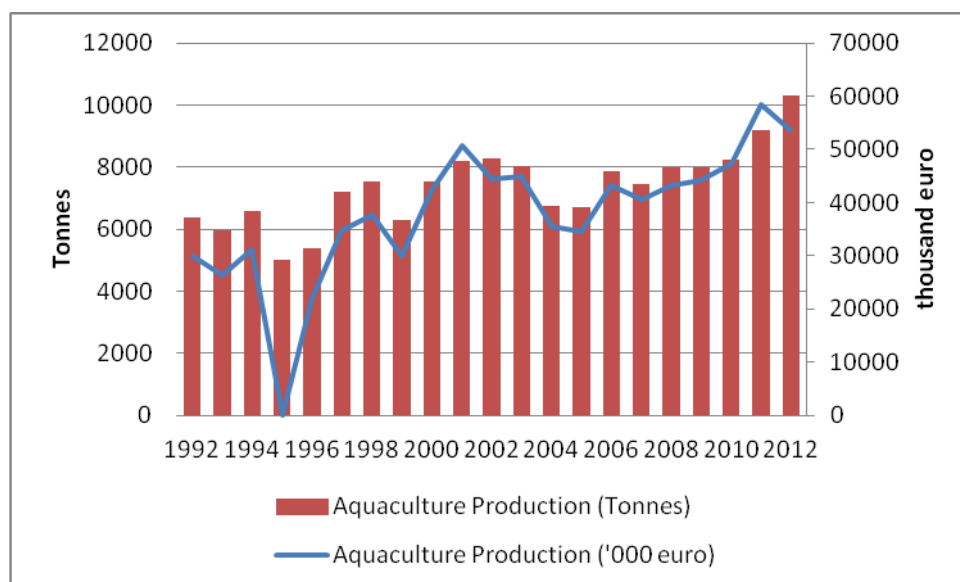
Nei = not elsewhere included

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, got the opportunity to be renewed.

Aquaculture Production

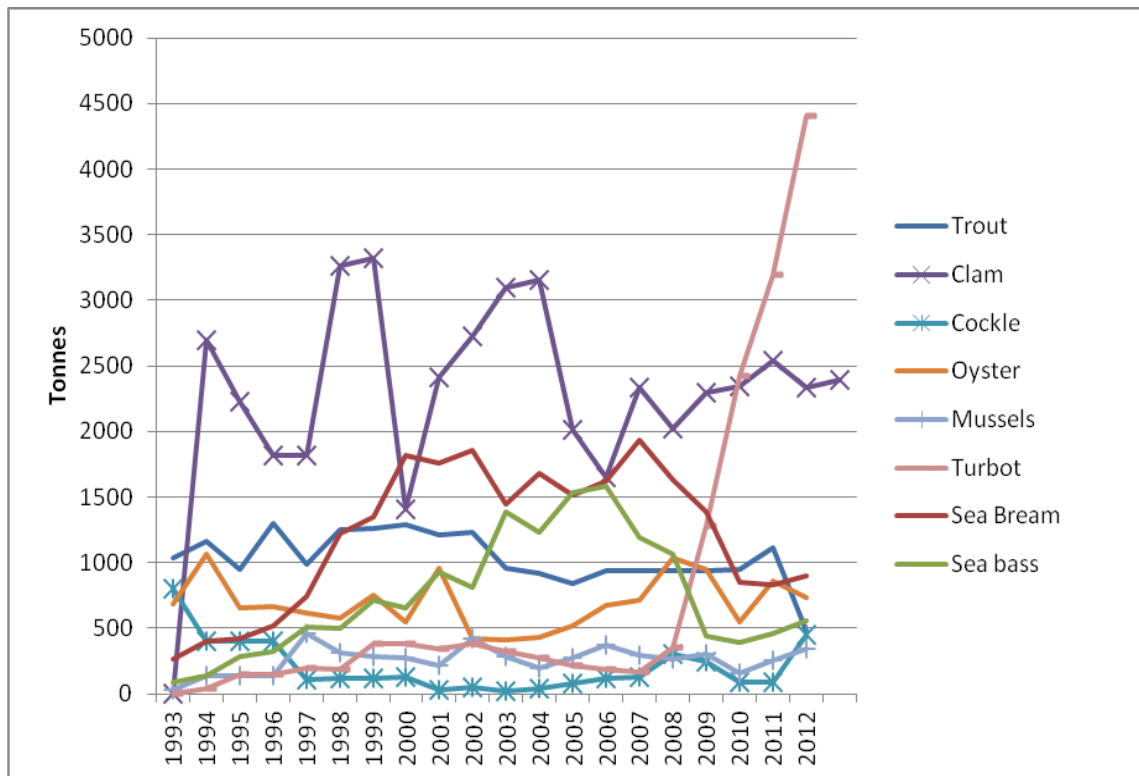
Aquaculture in Portugal is quite recent but is believed to have a great future potential. We can see from figure 4.1 that the levels of aquaculture production are still low although there has been an increase. In 1993, aquaculture production was 6,391 tonnes. There was a decrease in 1995 to 5,001 tonnes. Thereafter it increased to 8,287 tonnes in 2002. In 2004 and 2005 it decreased again and in 2006 increased until 2012 when it reached 10,317 tonnes. A similar trend is observed in the value of production. Note that no data are available for 2005.



Source: INE (2015)

Figure 4.1: Aquaculture production. 1993-94 and 1996-2012

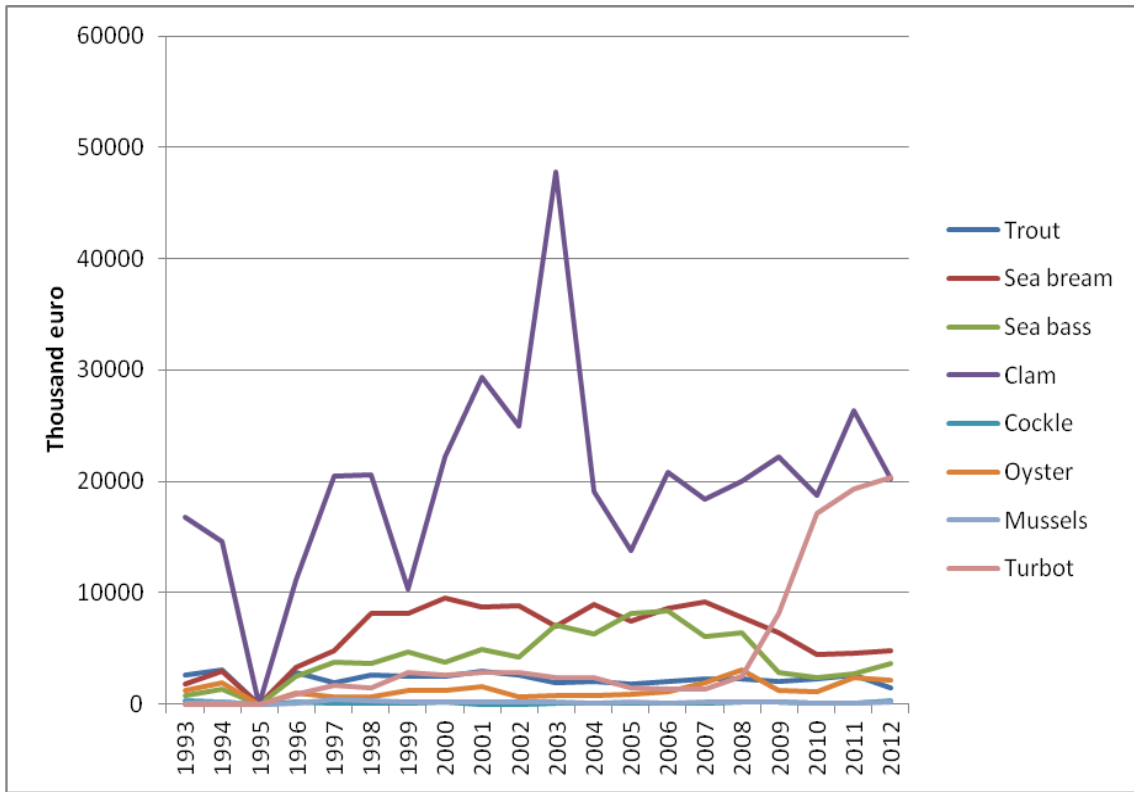
Throughout this period the farmed species have not changed significantly and are basically trout, sea bream, sea bass, clams, cockle, oysters, mussels and turbot, as can be seen in figure 4.2. Turbot has gained importance in the last few years due to investments in production capacity. From 2008 onwards, turbot has been the most important aquaculture product reaching 4,406 tonnes in 2012. Clams are also very important.



Source: INE (2015)

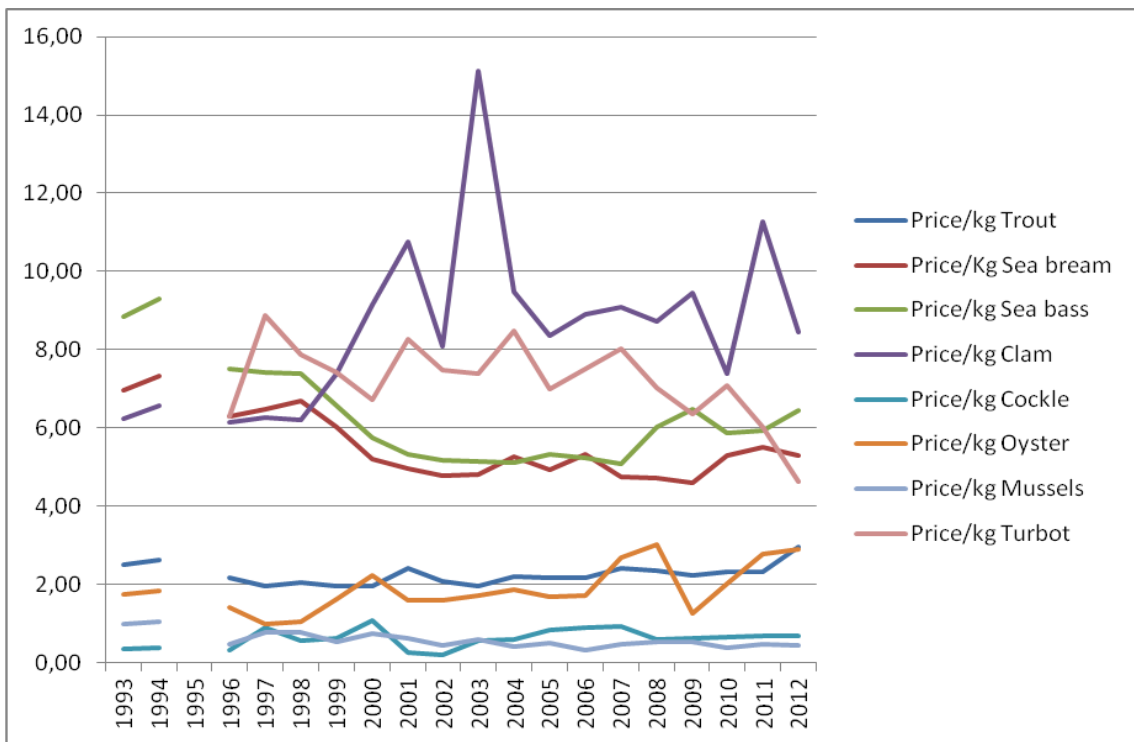
Figure 4.2: Aquaculture production by species. 1993-2012

In figure 4.3, we can see that clams have always had the higher production value. However, since 2008 turbot has gained importance with about the same production value as clams for 2012. From figure 4.4 it is seen that clam fetches 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.



Source: INE (2015)

Figure 4.3: Value of aquaculture production. 1993-2012. Monetary values in € '000

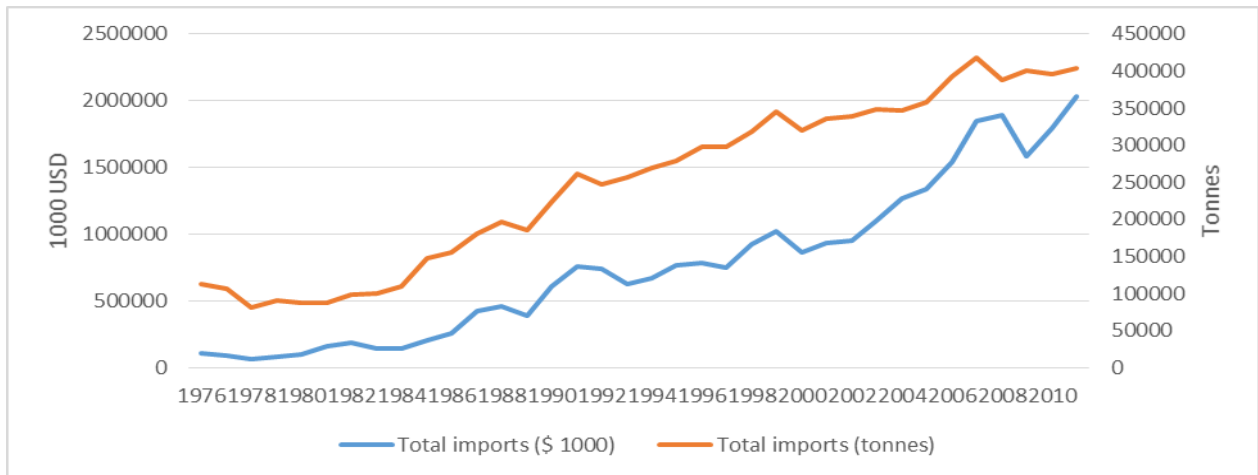


Source: INE (2015)

Figure 4.4: Average price/kg per species. 1993-94 and 1996-2012

4.2 Portuguese fish imports

Although there were substantial variations from year to year, import volume was on an upward trend from 113 500 tonnes in 1976 to 403 900 tonnes in 2011 – corresponding to an average increase of 3.7% per year (figure 4.5). The nominal value of fish and fish product imports to Portugal has also shown a significant increase during the period – from \$110 million in 1976 to \$2 030 million in 2011, an average growth of 8.7% annually.



Source: FAO (2015)

Figure 4.5: Portuguese fish imports 1961-2011. Quantity (tonnes) and monetary values in USD '000

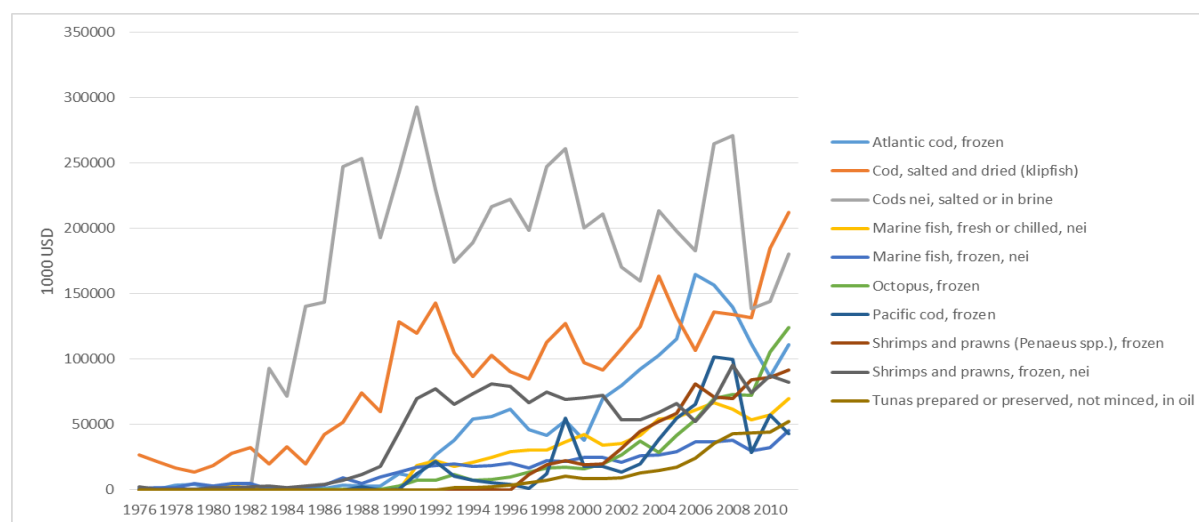
The top 10 import products in terms of value in 2011 are illustrated in table 4.2. The listed commodities accounted for 50% of the total import value, whereof 35% from the top five products. In comparison, the top 10 commodities in 1976 accounted for 95% of import value, 81% from the five most important products. The difference between the years illustrates the noticeable diversification of imports that has evolved throughout the period, particularly after the late 1980s (figure 4.6).

Table 4.2: Imports of the 10 most important commodities by value in 2011. \$1 000

Commodity	\$1 000
Cod, salted and dried (klipfish)	212,130
Cods nei, salted or in brine	180,502
Octopus, frozen	123,993
Atlantic cod, frozen	111,343
Shrimps and prawns (Penaeus spp.), frozen	91,841
Shrimps and prawns, frozen, nei	82,345
Marine fish, fresh or chilled, nei	69,742
Tunas prepared or preserved, not minced, in oil	52,552
Marine fish, frozen, nei	45,667
Pacific cod, frozen	43,049
Sum	1,013,164

Source: FAO (2015)

In terms of value, the five main products in 2011 were salted & dried cod (\$212 million), cod salted or in brine (\$180 million), frozen octopus (\$124 million), frozen Atlantic cod (\$111 million) and frozen shrimps and prawns (\$92 million). The three types of cod combined represent \$503 million or 25% of total imports in 2011. As illustrated in figure 4.6, all of the commodities experienced considerable increase in import value from start to end of the period, although with substantial variations from year to year.



Source: FAO (2015)

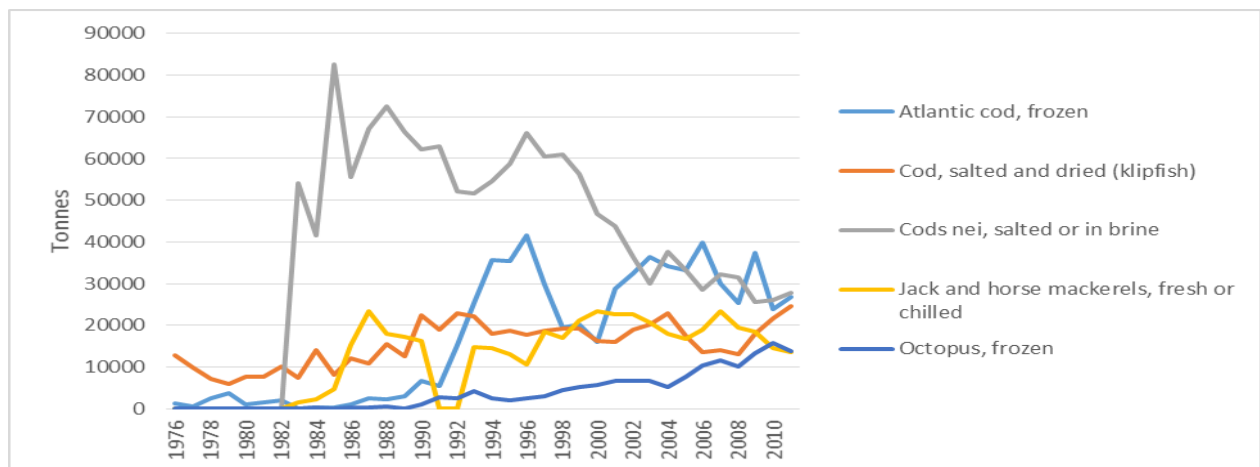
Figure 4.6: Imports of main fish products 1976-2011 - the 10 most important commodities in terms of value in 2011. Monetary values in USD '000

Imports of salted & dried cod followed a flat trend in the period 1976-85 at about \$15-30 million (figure 4.7). An increase was seen after 1985, reaching a peak of \$143 million in

1992. The growth levelled off during the following years, however, with considerable year-on-year variations. However, import levels at \$185 million in 2010 and \$212 million in 2011 might indicate an improvement after 2009.

Portuguese imports of cod, salted or in brine started in 1983. From 1983-91, a rapid increase occurred – from \$93 million in 1983 to \$293 million in 1991. A correction was seen after 1991 and in 1993, the import value had decreased to \$174 million. Since then, imports have developed at a sideways pattern with considerable variations between years.

As shown in figure 4.7, imports of frozen octopus started in 1984, but were insignificant up to 1990. From 1990 to the early 2000s, import values increased steadily from \$3 million in 1990 to \$38 million in 2003. The positive trend continued even steeper after 2004, and in 2014 import value of frozen octopus reached \$124 million.



Source: FAO (2015)

Figure 4.7: Imports of main fish products 1976-2011 – the five most important commodities in terms of volume in 2011. Tonnes

Frozen Atlantic cod experienced a considerable increase in import value from 1989 to 2006. From \$3 million in 1989, imports reached \$165 million in 2006. A decrease occurred in the following years, and in 2011, the import value of frozen Atlantic cod amounted to \$111 million.

Imports of frozen shrimps and prawns started in 1997, initially amounting to \$12 million. The import value grew steadily from 1996 to 2011, reaching \$92 million in 2011.

In terms of quantities, the top 10 import products in 2011 accounted for 40% of total imports, whereof 26% from the top five commodities (table 4.3). The corresponding numbers

in 1976 were 94% for the top 10 commodities, whereof 80% from the five most important products.

Table 4.3: 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
Sum	162,356

Source: FAO (2015)

As illustrated in table 4.3, the five main products by volume in 2011 were cod, salted or in brine (27,800 tonnes), frozen Atlantic cod (26,800 tonnes), salted & dried cod (24,600 tonnes), frozen octopus (13,900 tonnes), and fresh or chilled Jack and horse mackerels (13,400 tonnes). 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). As seen in figure 4.7, all five commodities experienced an increase in imports from start to end of the period.

Portuguese imports of cod, salted or in brine started at first in 1983 at a quantity of 54,000 tonnes. In 1986, the imported volume reached a peak of 82,000 tonnes. Since then, quantities have exhibited a decreasing trend, falling to 28,000 tonnes in 2011.

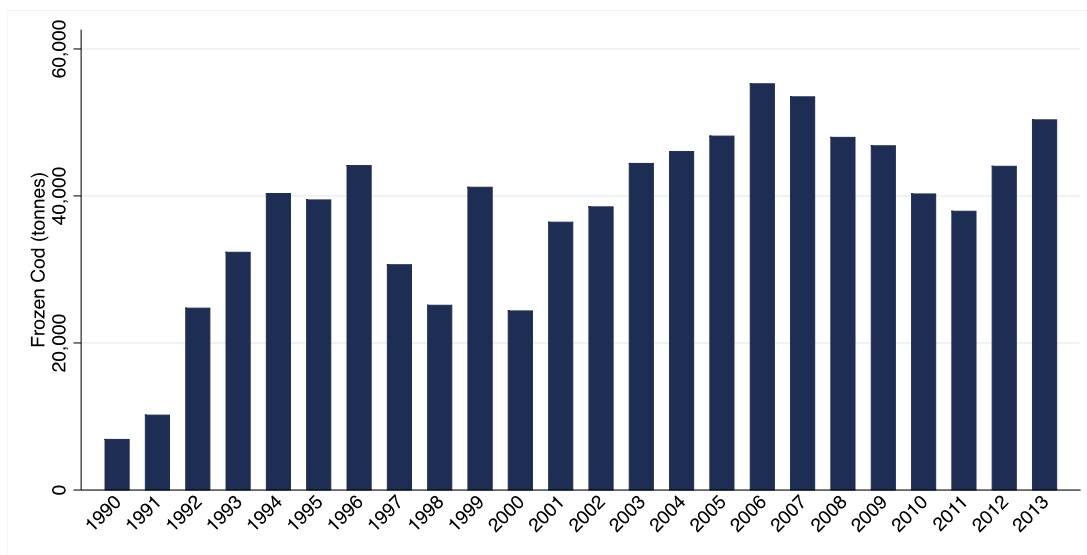
Frozen Atlantic cod experienced a considerable increase in import volume from 1991 to 1996. Imports reached a peak of 41,500 tonnes in 1997, before it decreased to 16,000 in 2000. From 2001-2011, imports varied between 24,000-40,000 tonnes at a sideways pattern.

The imports of salted & dried cod have exhibited a flatter development throughout the period, with an overall growth from 13,000 tonnes in 1976 to 25,000 tonnes in 2011. Imports of frozen octopus started at first in 1984 at a quantity of 300 tonnes. However, the imported volume was insignificant up to 1990. Since then, imports increased steadily from 1,000 tonnes in 1990 to 14,000 tonnes in 2011.

Fresh or chilled Jack and horse mackerel was first imported in 1983, initially at a volume of 1,500 tonnes. Imports increased rapidly over the first years, reaching 23,000 tonnes in 1987. Apart from a break of zero imports in 1991 and 1992, quantities have exhibited a sideways trend after 1987, varying between 10,000-23,000 tonnes.

Cod Imports¹¹

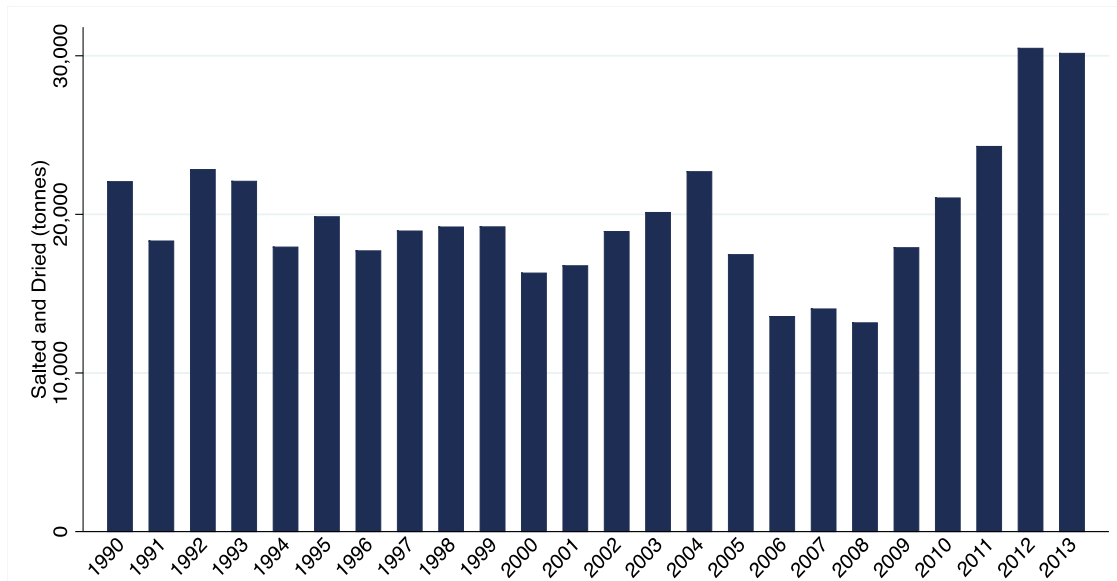
Data are available on exports of frozen, salted & dried and salted cod to Portugal for the period 1990-2013. Figure 4.8 (a, b, c) shows annual quantity (tonnes) imports of frozen, salted & dried and salted cod, respectively (note different units on vertical axis). The three figures show different patterns of development for each of the three products. On the one hand, both frozen and salted & dried show a general increase over the period but frozen product shows considerable variation over time starting from a very low level of only 7,000 tonnes in 1990 to a high of 55,000 tonnes in 2006, then dropping to under 40,000 tonnes in 2011 to increase again to about 50,000 tonnes in 2013. Salted & dried cod shows a very stable import path from 1990 to the mid 2000s, however, for the period 2006-08 imports fall by about 9,000 tonnes to rise again to over 30,000 tonnes by 2013. On the other hand, salted product shows a serious and steady decline in imports from a high of 66,000 tonnes in 1996 to less than half this quantity (24,000 tonnes) in 2013.



Source: Asche and Gordon (2015)

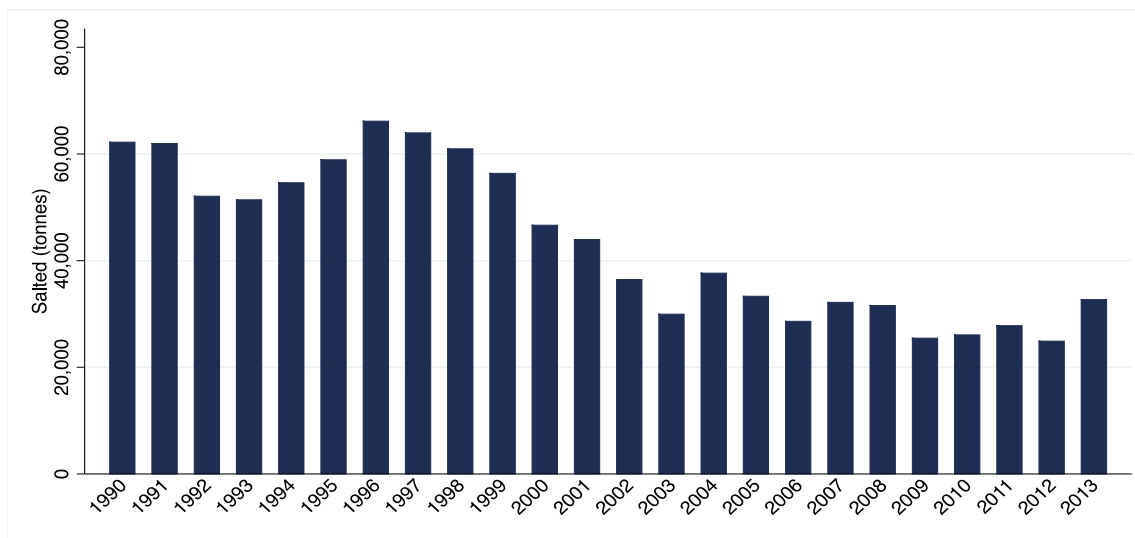
Figure 4.8a: Total imports of frozen whole cod to Portugal: 1990-2013

¹¹ This section about cod imports is largely taken from Asche and Gordon (2015).



Source: Asche and Gordon (2015)

Figure 4.8b: Total imports of salted & dried cod to Portugal: 1990-2013



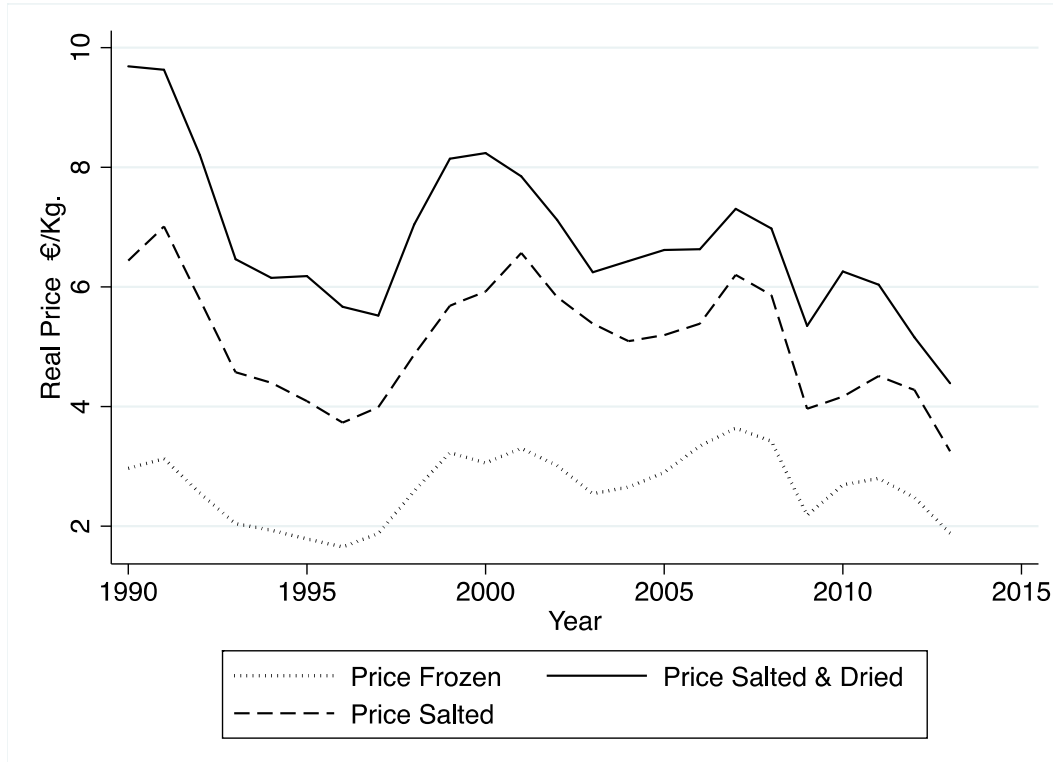
Source: Asche and Gordon (2015)

Figure 4.8c: Total imports of salted cod to Portugal: 1990-2013

Figure 4.9 graphs out the real price¹² for frozen, salted & dried and salted imported cod products. Over the period salted & dried receives the highest price per kg with salted receiving a premium over the lower priced frozen product. It is interesting that over the period 1990 to 2013 the import prices trend together very closely with an average price difference of €1.7 per kg for salted & dried and salted product and €2.5 per kg for salted and frozen

¹² Price is defined as real revenue divided by quantity.

product. Notice the sharp drop in all prices in 2008 due to the recession (see Verick and Islam, 2010). Keep in mind that salted & dried is a final product, whereas frozen and salted must be processed before final sale. Thus the differences in prices reflect the degree of processing. Nevertheless, prices show that the markets for these three products are closely linked.



Source: Asche and Gordon (2015)

Figure 4.9: Average annual real price: Frozen, salted & dried, salted cod imports Portugal

Country of origin for different cod products is given in table 4.4. For frozen cod, tremendous changes and great variation are observed over time. The most remarkable change is the Netherlands with a market share of 0.494 in 2013. This is 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 in recent years for Norway is remarkable. This is due to the fact that much product is shipped to Sweden, and EU member, so as to reduce duty (Bjørndal and Ellingsen, 2015). A similar development can be observed for salted cod.

Table 4.4: Assigned country of origin; Share of cod products 1990-2013

	1990	1995	2000	2005	2010	2013
Frozen						
Netherlands	0.0	0.008	0.0	0.015	0.224	0.494
Russia	0.0	0.526	0.511	0.408	0.135	0.075
Spain	0.149	0.101	0.02	0.115	0.188	0.208
US	0.414	0.044	0.22	0.287	0.322	0.101
Salted & Dried						
Denmark	0.217	0.388	0.75	0.155	0.021	0.149
Norway	0.427	0.432	0.662	0.218	0.017	0.012
Spain	0.232	0.108	0.171	0.072	0.041	0.081
Sweden	0.0	0.0	0.01	0.379	0.792	0.623
Salted						
Iceland	0.231	0.130	0.482	0.172	0.069	0.048
Netherlands	0.041	0.005	0.008	0.134	0.224	0.262
Norway	0.159	0.626	0.195	0.051	0.001	0.003
Sweden	0.0	0.0	0.0	0.085	0.449	0.471

Source: Asche and Gordon (2015)

In recent years China has become an exporter to Portugal. In terms of quantity supplied, in 2013 China was exporting 82 tonnes of frozen product, 326 tonnes salted & dried product and 3,092 tonnes salted product to Portugal. The market share for frozen is negligible. This makes sense, as China does not have its own cod fishery so that any export would be transshipments from the North Atlantic or North Pacific. In 2013, China's market share for salted cod was 9.45% in terms of quantity, up from only 1.83% in 2005. The value share increased from 1.54% in 2005 to 10.6% in 2013.

5. FISH PROCESSING IN PORTUGAL

The official statistics on fishing are given by the Portuguese National Statistics Institute (INE). The yearly publication called Fishing Statistics published its first volume for the year 1969 and the last one available is for 2013. Throughout this period there were changes in the series: some variables have been discontinued while others have been included later. This is also the case for data for the fishing processing industry.

The fish processing industry in Portugal has gained importance over the past decades, as can be seen by the production figures. The main product of this industry is definitely cod that in 2012 represented 22% of the frozen production and 81% of the dried and salted production as can be seen in table 5.1. The value of sales of frozen cod is 37% of the total

frozen sales. Notice that total frozen products are almost twice dried & salted in quantity. Nevertheless, when it comes to value total frozen products are only 27% higher than dried & salted. This can be explained by the higher price per kg of dried & salted compared with the price of frozen products (see table 5.1 below).

Table 5.1: Quantities sold and value of sales from fish and aquaculture products from the processing industry

Sold Products	2012	
	Tonnes	1 000 Euros
Frozen Products	85,602	329,949
Of those		
Frozen Cod	18,726	121,726
% of Cod	22%	37%
Dried & Salted Products	47,406	258,951
Of those		
Dried and Salted Cod	38,434	218,652
% of Cod	81%	84%

Source: INE (2015)

The number of firms and employees in fish processing in Portugal for the period 1996-2012 is given in table 5.2. Although the year 2001 is missing, it is still possible to examine the trend of these two variables. Initially, the number of firms was in decline from 134 in 1996 to 97 in 2003. Subsequently it increased to a peak of 211 in 2008, down to 180 in 2012. The trend in the total number of employees is largely the same with a peak of 7,314 in 2011, down to 6,823 in 2012. This decrease in the last three years can be explained by the economic crisis that hit Portugal severely.

Table 5.2: Number of firms and employees in the fishing processing industry in Portugal

Year	1996	1997	1998	1999	2000	2001	2002	2003	2004
No. of firms	134	135	111	115	104	-	95	94	143
No. of employees	6,570	5,553	5,893	5,823	5,469	-	5,627	5,429	5,854

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

Source: INE (2015)

Examining table 5.3, it is clear however that the industry has mainly 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 less than 50 employees. A positive remark is the fact that the number of large firms was doubled while the number of small firms has decreased. Note that in the fish processing industry work mainly females, representing 68% of the overall work force in the sector in 2012.

Table 5.3: Overview over the Portuguese processing industry

	2008	2009	2010	2011	2012	Δ 2011-12	Δ 2008-12
STRUCTURE							
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%
EMPLOYMENT							
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%
FULL TIME (FTE)	6 561	6 738	6 916	6 913	6 308	-9%	-4%
FTE females	4 221	4 334	4 449	4 622	4 275	-8%	1%
FTE men	2 340	2 404	2 467	2 291	2 033	-11%	-13%
INDICATORS							
FTE per company	30,8	33,4	35,7	37,4	35,0	-6%	14%
Average wage (‘000 EUR)	10,9	11,1	11,6	12,1	12,0	0%	11%
Labour productivity (‘000 EUR)	76,1	66,6	74,2	73,6	66,8	-9%	-12%
Unpaid work (%)	1,3	1,1	4,7	5,4	6,6	22%	426%

Source: Döring and Borrello (2014)

Table 5.4 presents some information on the economic performance of the Portuguese fishing processing industry sector. While the turnover was fairly stable over time with €1,078 million in 2012, there was an increase both in total quantity as well as quantity and value of dried and salted production. Concerning quantity there was a raise from 45,000 tonnes in 2008 to 61,400 tonnes in 2012. This corresponds to an increase from €254 million to €259

million. Notice also the difference between the quantities which represent production and sale quantities for dried & salted products. This difference gives us exports, which were 14,000 tonnes in 2012.

Turnover during the period showed some variation with €1,078 million in 2012, while the total costs of production increased, reaching €736 million in 2012. 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 2010-11, 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.

Table 5.4: Economic performance of the Portuguese fish processing industry sector, 2008-12

Fish processing total					
	2008	2009	2010	2011	2012
Turnover (million €)	1 091	1 015	1 089	1 132	1 078
Total Production Costs (million €)	666	643	659	710	736
Quantity ('000 tonnes)	149	203	-	207	212
Salted & dried					
Quantity ('000 tonnes)	45	53	58	59	61,4
Sale quantity ('000 tonnes)	36	38,9	-	44	47,4
Value (million €)	254	214	-	256	259
Performance indicators					
Gross value added (million €)	499.6	449	513.3	508.9	421.6
Capital Productivity (%)	48.3	45.4	48.7	50.2	43.2

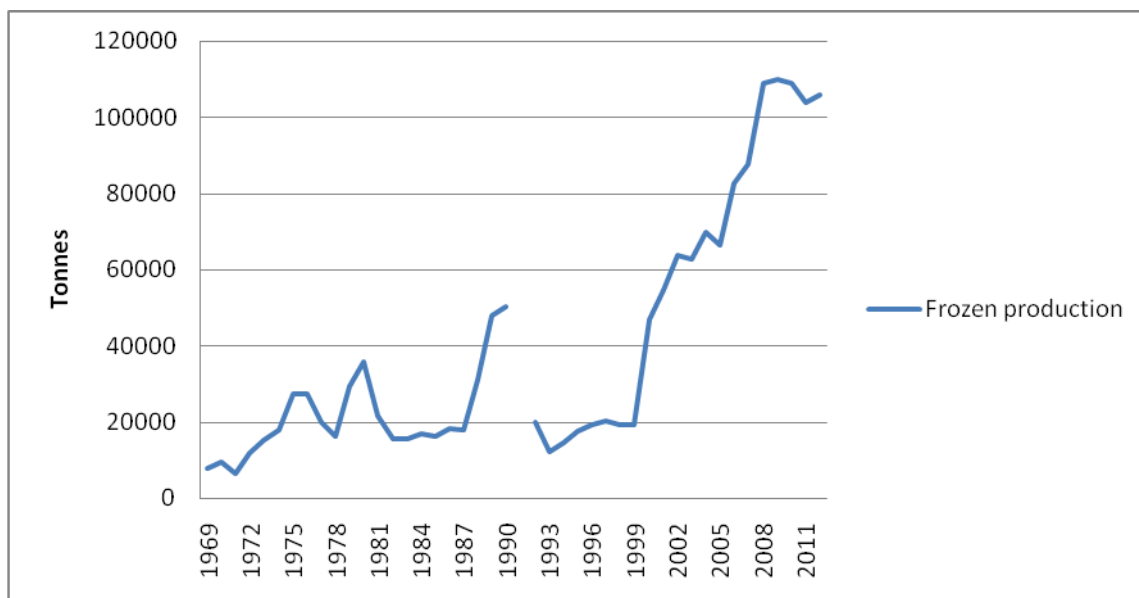
Source: Döring and Borrello (2014)

The fish processing industry is composed mainly of canned, dried & salted and frozen products. The frozen product includes aquatic invertebrates (squid, cuttlefish, octopus, clams, cockles and others), frozen hake, fish fillets sardine, cod and redfish all frozen. It is important to note that before 1990 aquaculture was virtually non-existent.

It is interesting to observe the evolution pattern of some of these variables for the period 1969-2012. During this period, there are missing values for the year 1991, due to a change in the series calculation carried out by INE. Nevertheless, we can draw conclusions on the trend of those variables. Note also that for the period 1969-1990 for canned and frozen products only quantities are available. For dried & salted products only value in euro is available.

Beginning with frozen products, figure 5.1 shows that production was below 40,000 tonnes until 1988. In 1969, the production was 8,118 tonnes. Becoming a part of the European Economic Community in 1986 gave an impulse 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 until 1999 these lower levels of production continued and represented 19,285 tonnes in 1999. This occurred when European economies became weaker and Portugal experienced an unstable period.

From 1999 onwards the quantities have increased significantly and frozen products became an important product form for the fishing processing industry. In 2009 production was 109,953 tonnes with a slight decrease in 2011 to 103,998 tonnes that can be explained by the financial crises that hit Portugal. For 2012, a quantity of 105,892 tonnes was recorded.

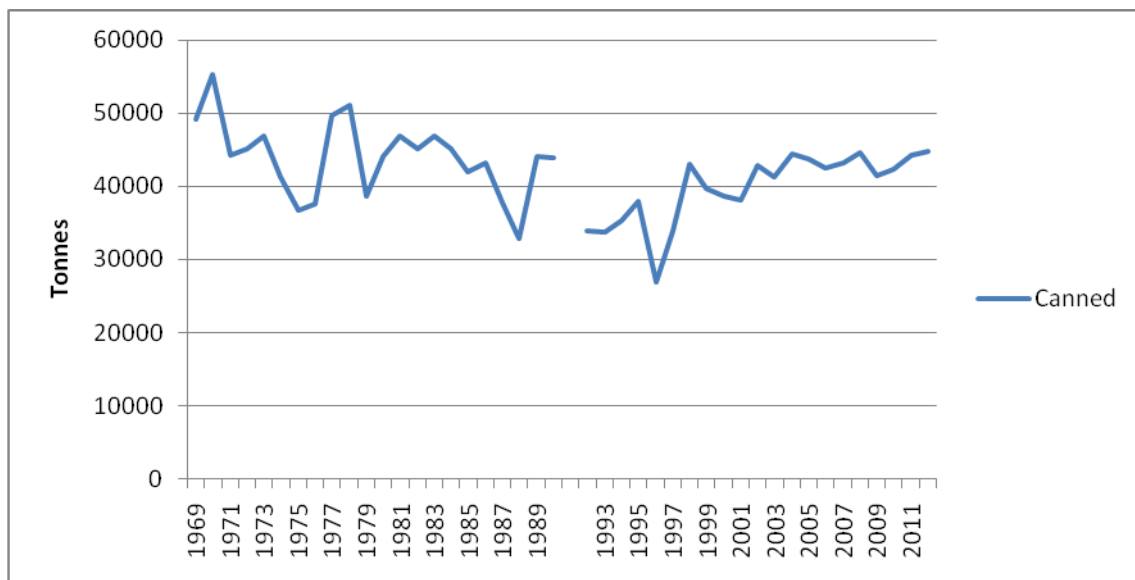


Source: INE (2015)

Figure 5.1: Produced frozen quantities in the fishing processing industry: 1969-2012

Concerning canned production, we can see in figure 5.2 that it has suffered a slight decrease from around 50,000 tonnes in 1969 to 45,000 tonnes in 2012. 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 fall. In 1996 it reached its lowest level at 26,886 tonnes, and has subsequently increased, reaching a quantity of 44,700 tonnes in 2012. More recently, the Portuguese canned products have become more appreciated in other countries.

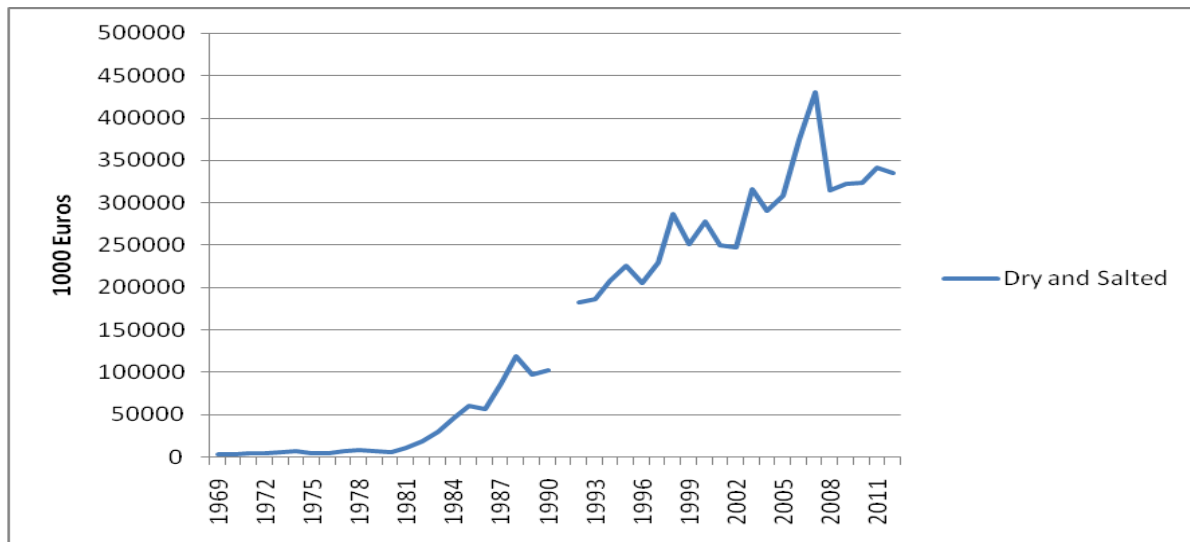


Source: INE (2015)

Figure 5.2: Produced canned quantities in the fishing processing industry: 1969-2012

Comparing the production of frozen and canned fish we can see that frozen has had a significant increase compared with canned production whose evolution has been more regular. Notice that the canned industry was already important during the dictatorship as it employed a significant part of the illiterate population of that time.

The information available for the period 1969-1990 concerning dried & salted products in the INE statistics is given in euro. In figure 5.3 we can see that dry and salted production was almost non-existent until 1981. In 1969 the value of this production represented €2.852 million. From this year on, there has been a substantial increase that has reached its maximum value of €430.273 million in 2007. Afterwards, there has been a decrease in 2008 to €314.347 million and thereafter it has stayed at lower levels, with €335.450 million recorded in 2012. This decrease is explained by the financial crisis in Portugal and the associated instability.



Source: INE (2015)

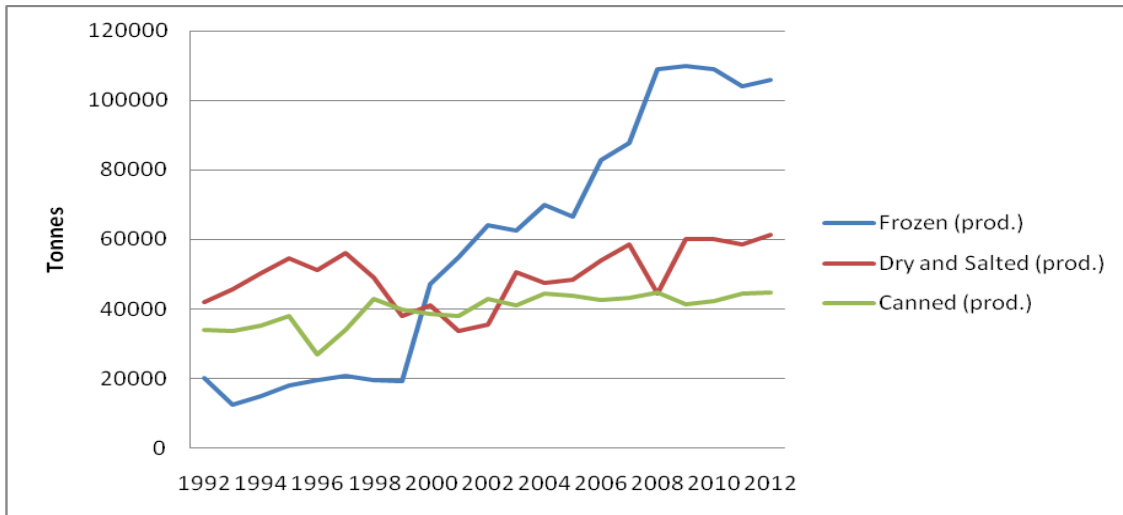
Figure 5.3: Value of produced dry and salted quantities in the fishing processing industry: 1969-2012. Monetary values in € '000

We can conclude that overall, the Portuguese fish processing industry has gained importance over time. This is particularly true for frozen and the dry and salted production, which have had major increases in the period 1969-2012.

The 1992-2012 period

Due to a change in the series calculations by INE, new variables concerning the fish processing industry are available from 1992 onwards, namely sales in quantity and value.

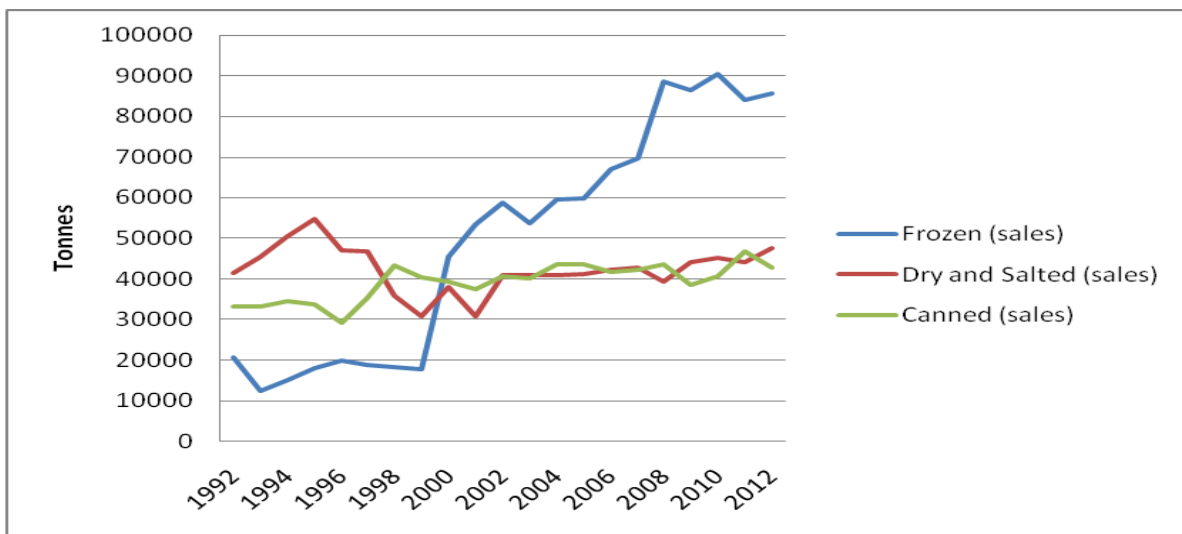
Concentrating our analysis on the period between 1992 and 2012, figure 5.4 gives annual production by main product forms – frozen, dried & salted and canned product. It is interesting to note that until 2000, dried & salted was the most important product form. In 1997, quantities produced were 56,295 tonnes against 20,551 tonnes for frozen production and 33,807 for canned production. However, from 2000 onwards frozen takes the lead being the most important one in 2012. The production of canned products has been more stable. In 2012, the quantities produced for frozen was 105,892 tonnes, for dried & salted 61,411 tonnes and for canned 44,700 tonnes.



Source: INE (2015)

Figure 5.4: Produced quantities in the fishing processing industry from fishing and aquaculture

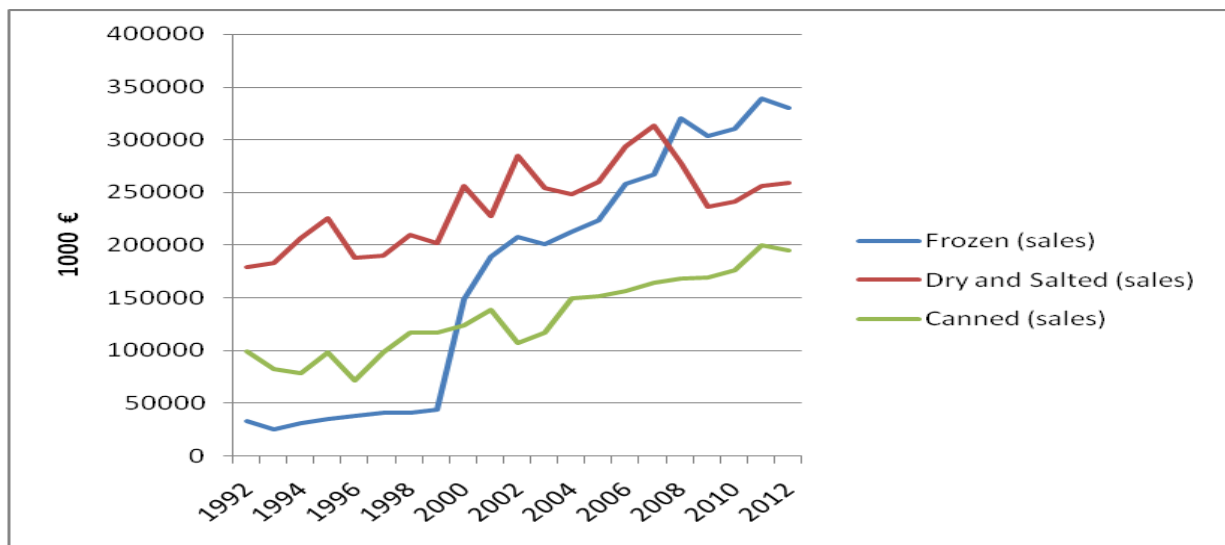
Domestic sales are given in figure 5.5. The difference between production and sales is explained by exports: of the overall production around 62% remain in the domestic market while the rest is exported - around 38% in 2012. Domestic sales of frozen product were slightly less than 20,000 tonnes annually up to 1999; subsequently this increased to 88,761 tonnes in 2008, and reached 85,601 tonnes in 2012. Again the crisis affected the sales negatively. Dried and salted products as well as canned products had very close trends from 2001. In 2012 the quantities sold for dried and salted were 47,406 tonnes and for canned 42,808 tonnes.



Source: INE (2015)

Figure 5.5: Sold quantities in the fishing processing industry from fishing and aquaculture

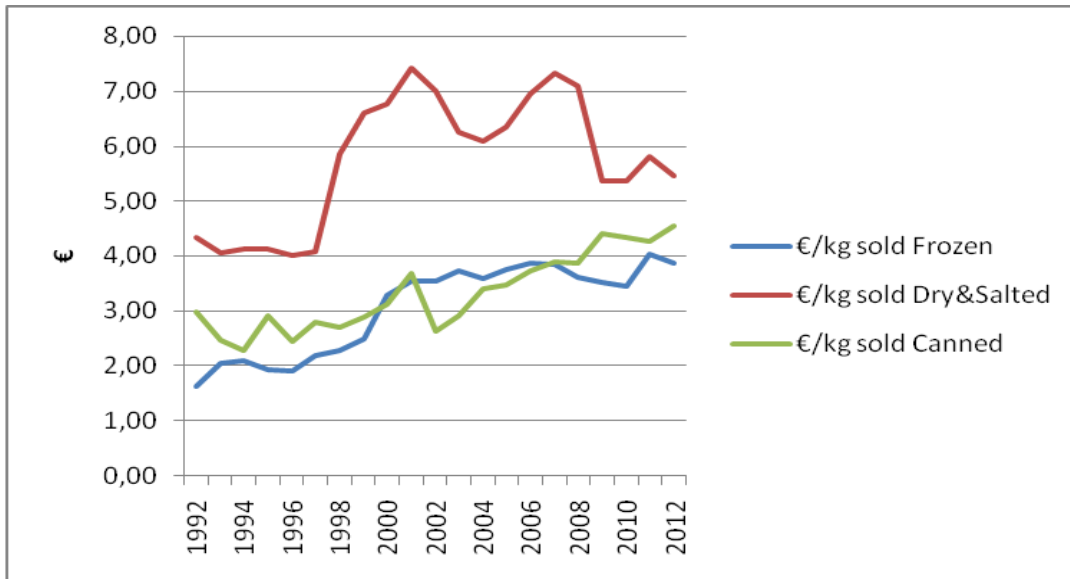
Value of sales is given in figure 5.6. The value of sales for dried & salted was, until 2006, the highest of the three product forms. In 1992 it reached €179,353 thousand compared with €99,070 thousand for canned and €31,150 thousand for frozen. In 2000, the value of sales for frozen products, €148,834 thousand, overtook the value for canned products, €123,869 thousand. In 2006 the value of sales was €293,233 thousand for dried and salted, €258,042 thousand for frozen and €156,250 thousand for canned. In 2012 the value of sales was €329,949 thousand for frozen, €258,951 thousand for dried and salted and €194,725 thousand for canned products.



Source: INE (2015)

Figure 5.6: Value of sales in the processing industry of products from fisheries and aquaculture

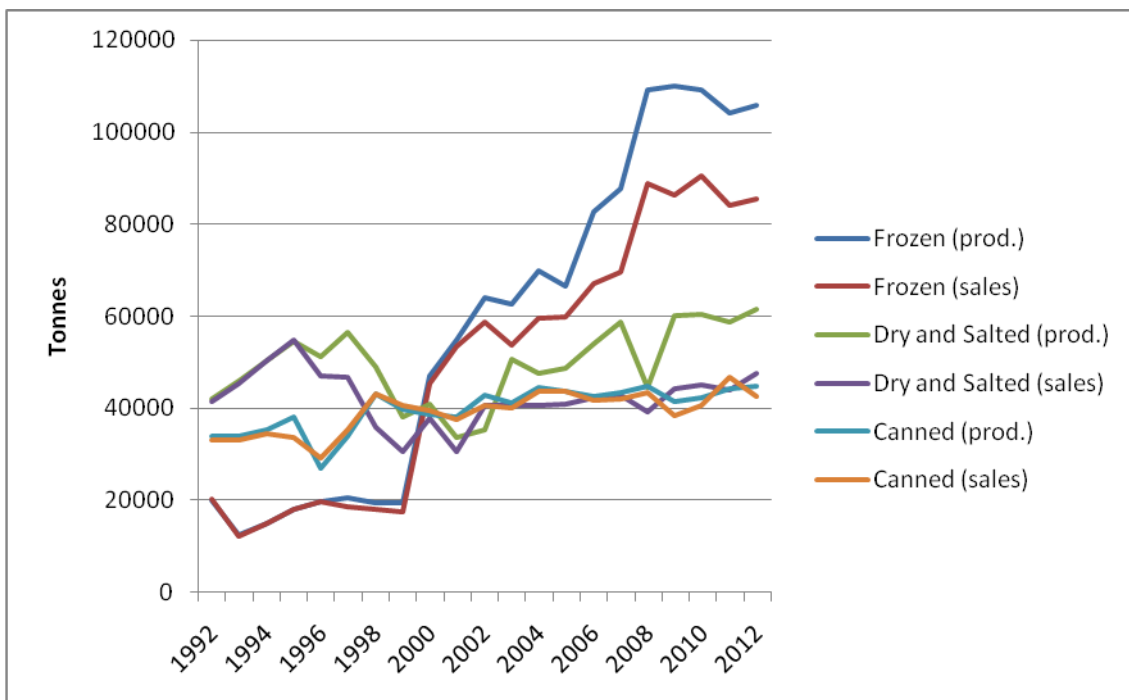
The sale price of dried & salted product is higher than that of frozen and canned products, although the prices of the latter two have shown an increasing trend (figure 5.7). This is a reflection of the fact that dried & salted is more processed than the other two products, and it explains the higher sale values for dried & salted observed. In 1992, the price per kg was €4.32 for dried and salted, €2.98 for canned and €1.62 for frozen. In 2012 the price per kg was €5.46 for dried & salted, €4.55 for canned and €3.85 for frozen products. Notice also that the price per kg for dried and salted products was above €6 from 1999 until 2008 when it dropped from €7.08 to €5.46 in 2012. Observe also that prices for frozen and canned products followed not only the same trend, but are also quite similar.



Source: INE (2015)

Figure 5.7: Average price €/kg Evolution

Figure 5.8 gives produced and sold quantities for the three product forms. As the difference between production and sales represents exports, the figure indicates that net exports of frozen product became positive in the early 2000s and have increased over time. The same development can be observed for salted & dried product, while net exports for canned product are limited.

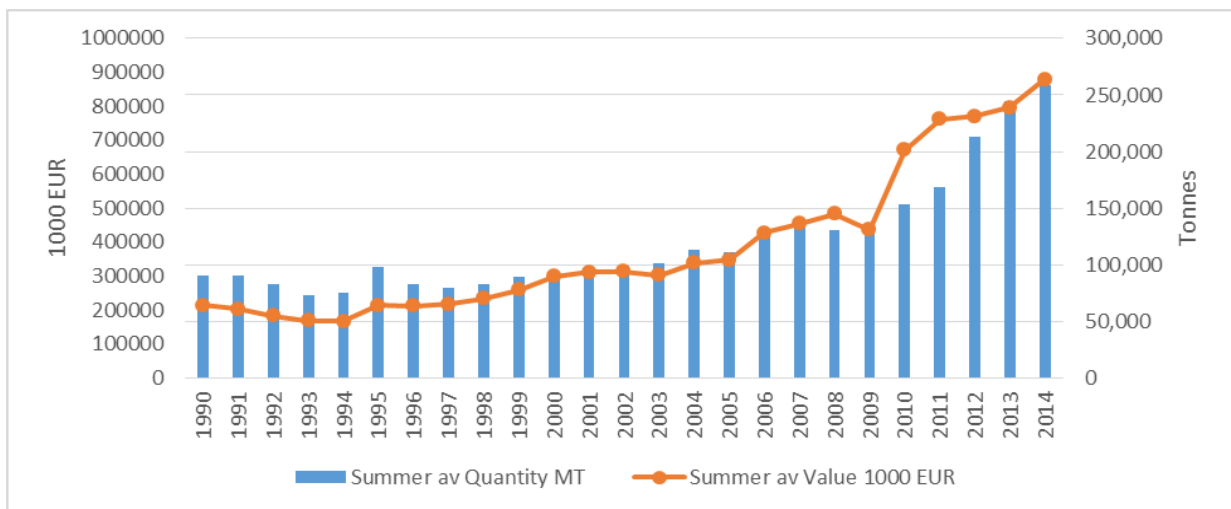


Source: INE (2015)

Figure 5.8: Comparison between produced and sold products in the processing industry

6. FISH EXPORTS FROM PORTUGAL

In this section we will examine fish exports from Portugal in terms of main markets and products. From 1990-2014, Portuguese exports were characterized by substantial growth (figure 6.1) from approximately 90,000 tonnes in 1990 to nearly 260,000 tonnes in 2014. Quantities exported were quite stable from 1990-98, followed by a slow growth from 1999-2009. From 2010-14, export quantity grew rapidly from 154,667 tonnes in 2010 to 258,223 tonnes in 2014, a 68% increase.



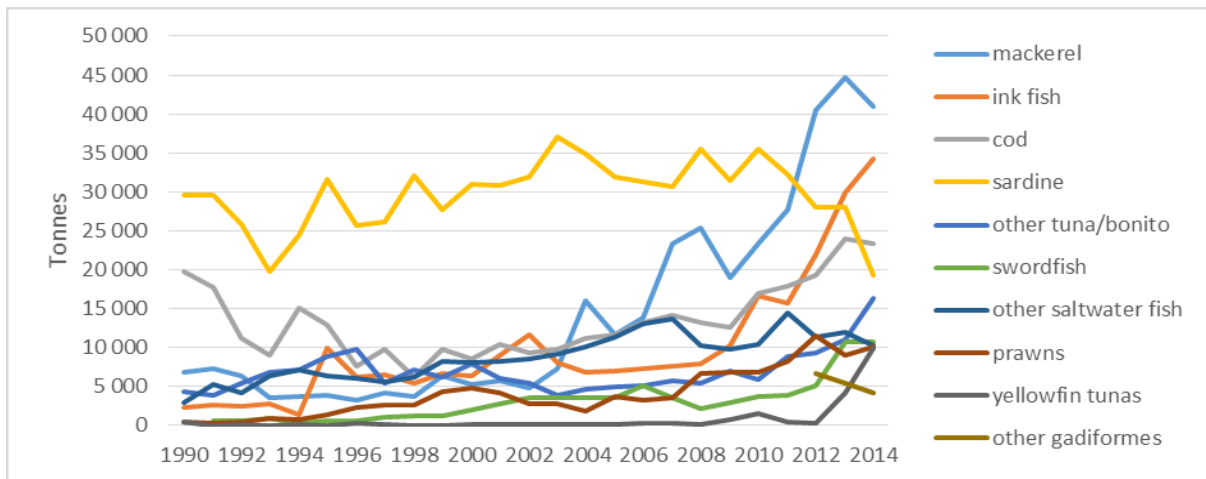
Source: NSC (2015)

Figure 6.1: Portuguese exports quantity (tonnes) and value (€'000). 1990-2014

Nominal export values developed sideways during the first half of the 1990's, varying from €166 million to €213 million. A slow growing trend developed during the latter half of the century, increasing from €213 million in 1995 to €298 million in 2000 and continuing to €482 million in 2008. A correction followed in 2009, before a rapid increase occurred from 2009 onwards. In 2014, exports amounted to €879 million.

Main products

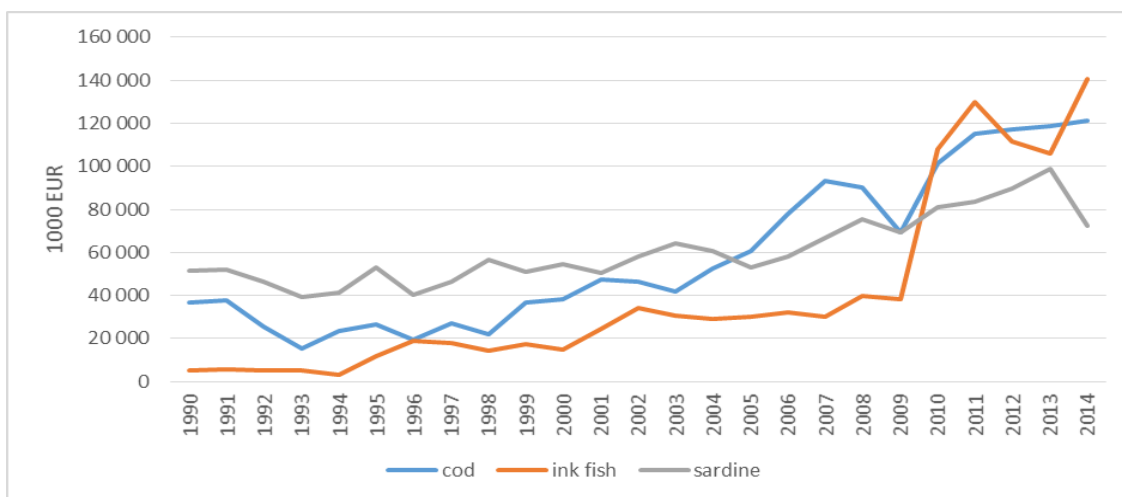
In 1990, the 10 most important species accounted for 91% of total quantities; sardine and cod alone represented 54% (figure 6.2). In contrast, the two most exported species in 2014 (mackerel and ink fish) accounted only for 29% of total quantities, and the top 10 species for 72%. Thus, the mix of species exported has become more diversified over time.



Source: NSC (2015)

Figure 6.2: The 10 most important species by export volume in 2014, development from 1990-2014. Tonnes

In terms of value, the two most important species (sardine and cod) accounted for 42% of total export value in 1990, while the 10 most important species accounted for 86%. In 2014, the 10 most important species accounted for 75%, whereof 30% from ink fish and cod alone. The development in exports from 1990-2014 for the three most important species - ink fish, cod and sardine - are illustrated in figure 6.3.



Source: NSC (2015)

Figure 6.3: The three most important species by value in 2014, development from 1990-2014. Monetary values in € '000

Starting at a level of €5.4 million in 1990, the export value of ink fish reached €140.5 million in 2014. The significant increase in ink fish exports started in 1994 with a growing trend from 1994 to 2009, before a rapid increase occurred after 2009. Following a correction

in 2011-13, export values reached the highest level recorded in the period under consideration in 2014.

The three major importers of ink fish in 2014 were Spain, the United States and Italy, together accounting for 90% of the export value (74%, 9% and 7%, respectively). The majority of revenues came from frozen and live/fresh ink fish, respectively accounting for €113.7 million (81%) and €16.3 million (12%). The two processing forms consistently were the most important ones, with live/fresh ink fish varying from 7-39% of revenues and between 51-90% for frozen ink fish.

Cod also showed a considerable increase over the period 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. With some year-on-year variations, the development in export value started with a downward trend after 1990, before it turned around in 1993. After 1998, the growth rate picked up, and a rapid increase occurred between 1998 and 2014.

The three major markets for cod in 2014 were Brazil, Angola and France, accounting for 77% of the total value exported (51% to Brazil and 13% each to Angola and France, respectively). Most of the revenues came from frozen cod and salted & dried cod; stockfish, salted and salted & dried cod generated approximately half of the revenues, while 46% came from frozen cod.

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

Frozen cod also exhibited an increase in terms of nominal value – from €26.9 million in 1990 to €55.7 million in 2014. However, in terms of value relative to total revenues, the opposite development was seen; from a share of 73% in 1990, through a bottom of 18% from 2005-07, before it turned around and frozen cod amounted to 46% of total revenues from cod in 2014.

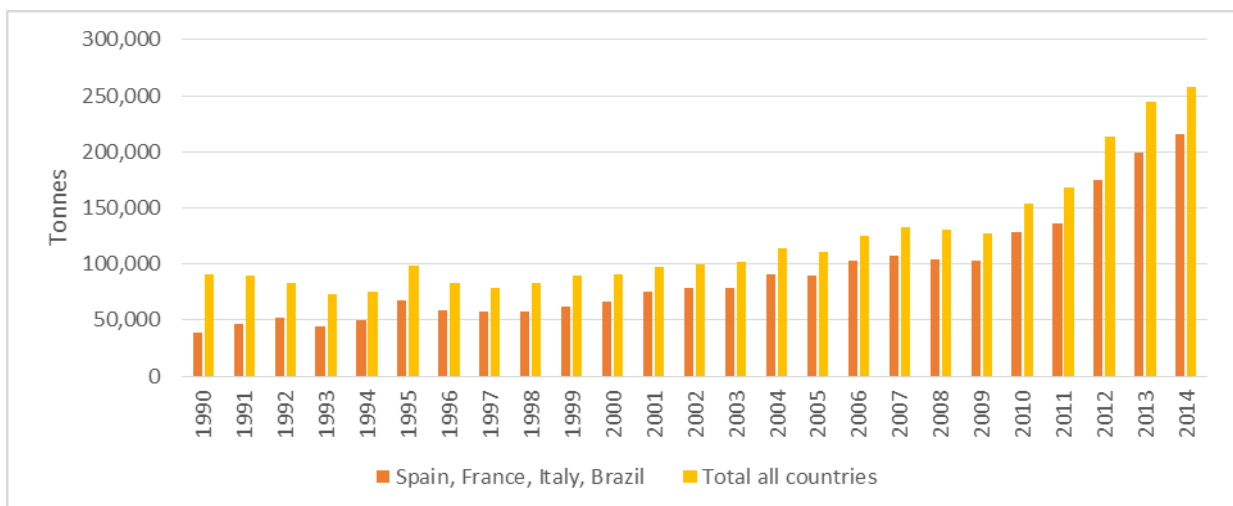
The overall development for sardine exports was an increase in nominal export value, from €51 million in 1990 to €72 million in 2014. With some year-on-year variations, the exports of sardine increased steadily from 1990 to 2013, before a drop occurred in 2014. Down from a peak of €99 million in 2013, sardine exports amounted to €72.4 million in 2014.

The three major importers were France, the United Kingdom and Spain, accounting for a combined 63% of the exported value (30%, 21% and 12%, respectively). The most

important commodity was prepared/preserved sardine with revenues amounting to €47.1 million in 1990 (92% of export revenues from sardine) and €58.5 million in 2014 (81% of revenues). Throughout the period, the share of revenues from prepared/preserved sardine varied between 69-92%. Frozen and fresh sardine accounted for the remaining value, varying from 6-11% for frozen sardine and between 1-22% for fresh sardine. The nominal export value have increased for all three processing forms.

Main export markets

In terms of quantities, the four major export markets - Spain, France, Italy and Brazil – accounted for 83% of total volume in 2014 (figure 6.4). Spain has dramatically increased its importance over the period, from 22% in 1990 to 65% in 2014, while the export share of Brazil increased from 1% to 5%. The relative importance of France and Italy have decreased (table 6.1).



Source: NSC (2015)

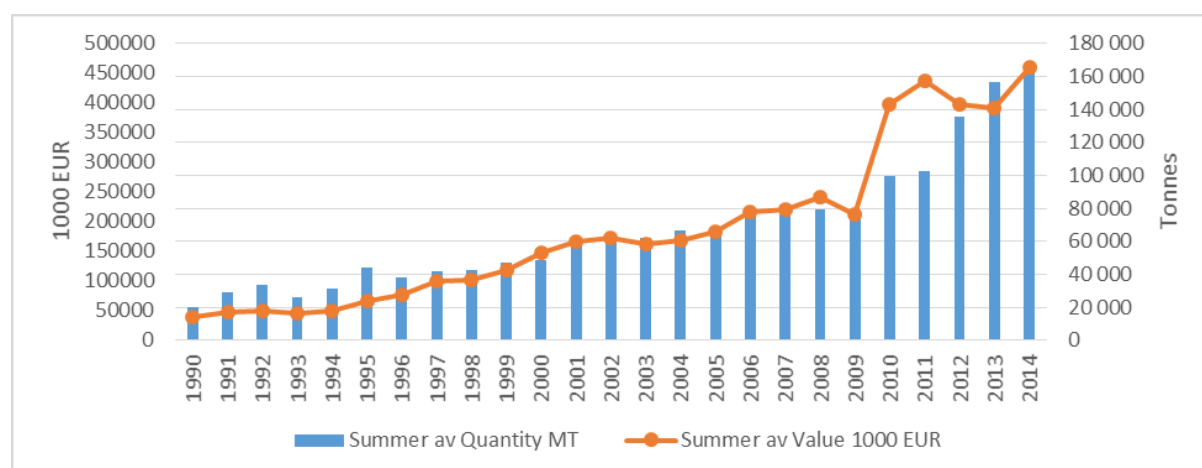
Figure 6.4: Total exports to the four major markets in terms of quantities: Spain, France, Italy and Brazil

Table 6.1: Export shares to the four major markets: Spain, France, Italy and Brazil

	1990				2014			
	Tonnes	%	€1 000	%	Tonnes	%	€1 000	%
Spain	20,023	22%	39,058	18%	168,262	65%	461,048	52%
France	8,515	9%	20,656	10%	19,173	7%	89,811	10%
Italy	9,275	10%	48,486	23%	14,730	6%	79,931	9%
Brazil	546	1%	940	0%	13,141	5%	71,935	8%
Sum	38,359	42%	109,140	51%	215,306	83%	702,725	80%

Source: NSC (2015)

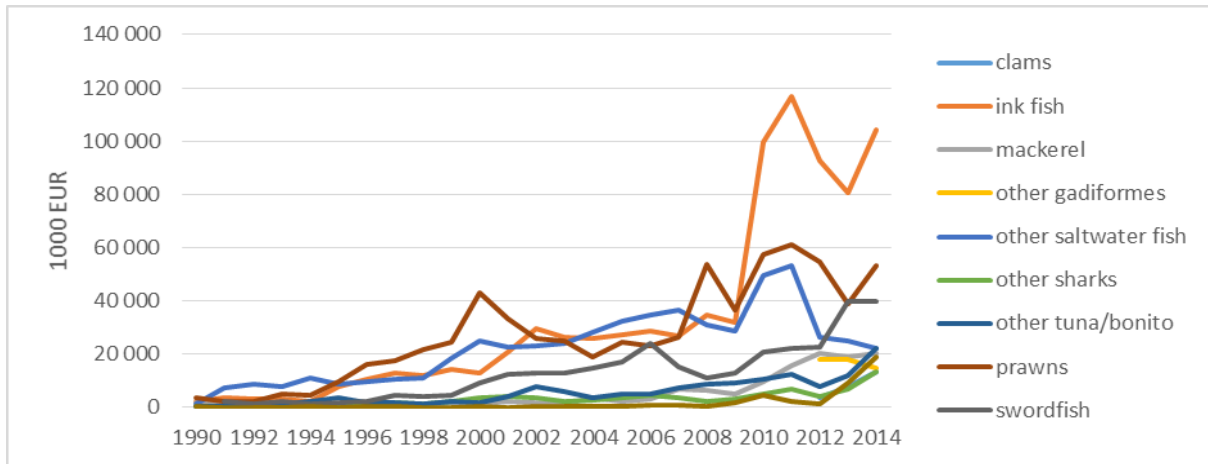
Exports to the Spanish market are illustrated in figure 6.5 (a and b). Export quantities increased steadily from 1990-2009, followed by a faster growth from 2010-14 (figure 6.5a). The export value showed a sharp increase after 2009, while export quantities continued to grow more stepwise.



Source: NSC (2015)

Figure 6.5a: Total Portuguese exports to Spain from 1990-2014. Monetary values in € '000

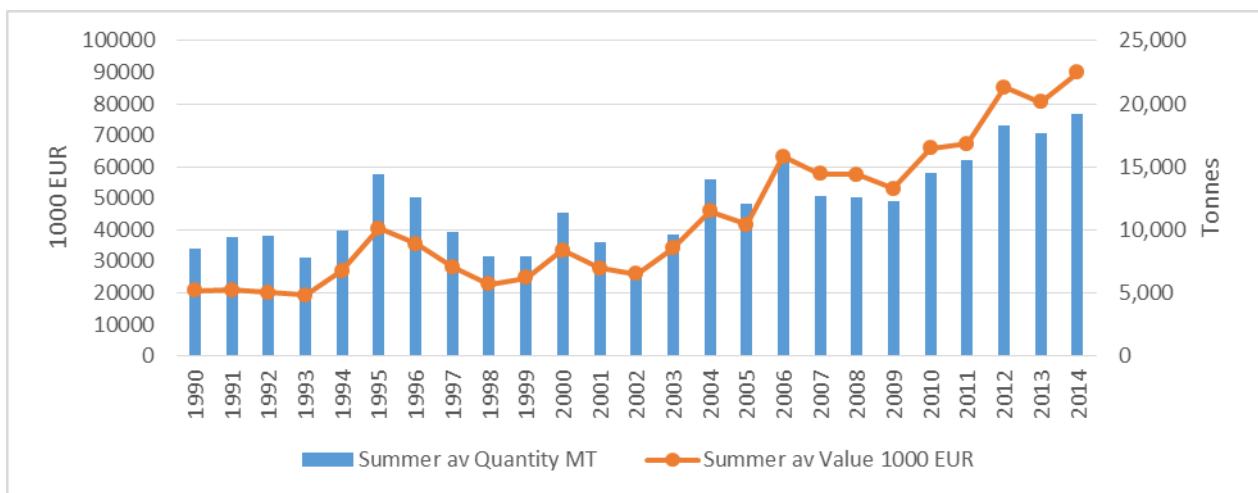
In terms of value, the three most important species exported to the Spanish market in 2014 were ink fish, prawns and swordfish (figure 6.5b). Combined, the three species account for 43% of the total value. Ink fish exports in 2014 amounted to €104.4 million, whereof 86% of revenues came from frozen ink fish, while live/fresh ink fish accounted for 13%. Revenues from prawns amounted to €53 million, 82% from frozen prawns. Swordfish revenues reached €39.8 million in 2014 and were essentially generated by frozen products (86%), while the remaining 14% came from fresh products.



Source: NSC (2015)

Figure 6.5b: The 10 most important species by export value to Spain in 2014, development from 1990-2014. Monetary values in € '000

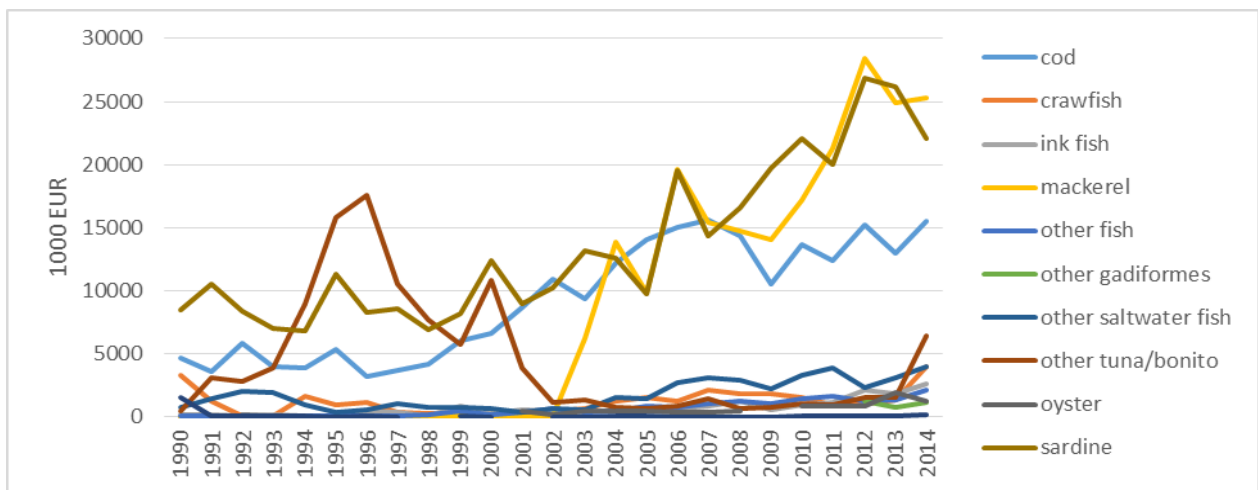
Portuguese exports to the French market are illustrated in figure 6.6 (a and b). Exports to France experienced an overall increase from 1990 to 2014. In 2014, export quantities exceeded 19,000 tonnes, compared to 8,500 tonnes in 1990. The corresponding export values were €89.8 million in 2014 and €20.7 in 1990. As illustrated in figure 6.6a, quantities and value exported varied between years at a sideways pattern from 1990 to 2003-05, while the following years were characterized by a less ambiguous growth pattern. Furthermore, export values relative to quantities exported showed an overall improvement over the period.



Source: NSC (2015)

Figure 6.6a: Total Portuguese exports to France from 1990-2014. Monetary values in € '000

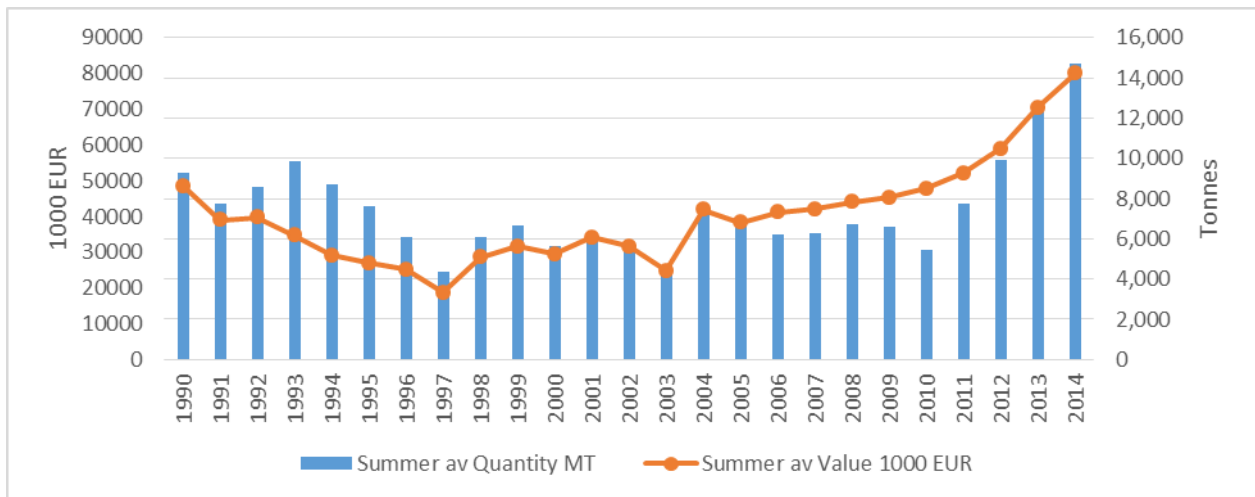
As shown in figure 6.6b, the three most important species exported to the French market in 2014 were mackerel, sardine and cod. Combined, these species account for 70% of the total export value to the market. Revenues from mackerel amounted to €25.3 million in 2014 and came almost exclusively from prepared/preserved products (99%). Sardine exports amounted to €22 million, whereof 97% from prepared/preserved products. Revenues from cod amounted to 15.5 million and were primarily generated by stockfish, salted and salted & dried cod (71%) and frozen cod (20%).



Source: NSC (2015)

Figure 6.6b: The 10 most important species by export value to France in 2014, development from 1990-2014. Monetary values in € '000

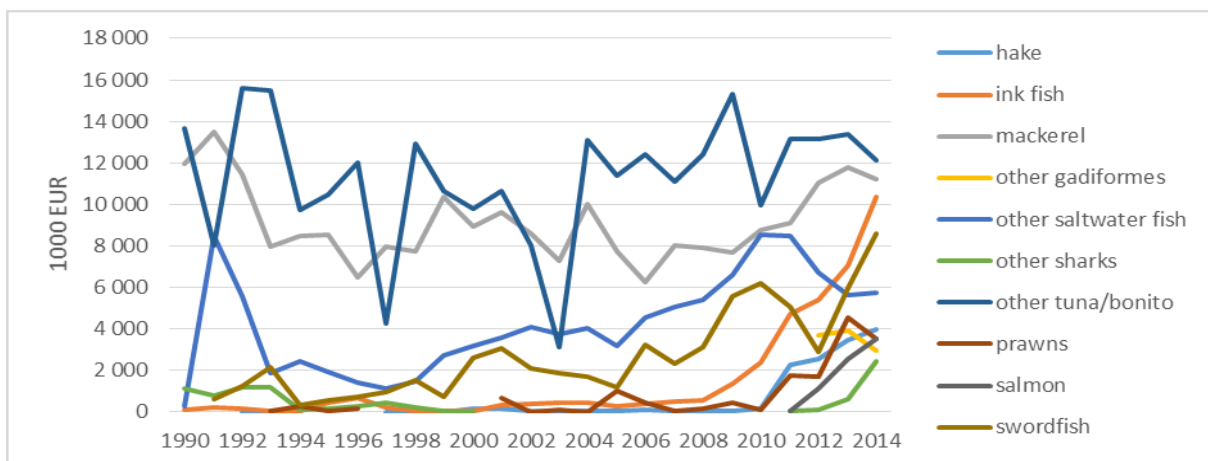
Figure 6.7 (a and b) illustrates Portuguese exports to Italy. Exported quantities to the Italian market showed a slightly declining development from 1990-97, followed by a sideways development up until 2010. From 2011, the exports increased rapidly, from a quantity of 7,756 tonnes in 2011 to 14,730 tonnes in 2014. Export value (nominal) relative to quantities were quite low during most of the 1990's, but have exhibited an improvement – particularly after 2005. As illustrated in figure 6.7b, the mix of species exported have also changed during the same period.



Source: NSC (2015)

Figure 6.7a: Total Portuguese exports to Italy from 1990-2014. Monetary values in € '000

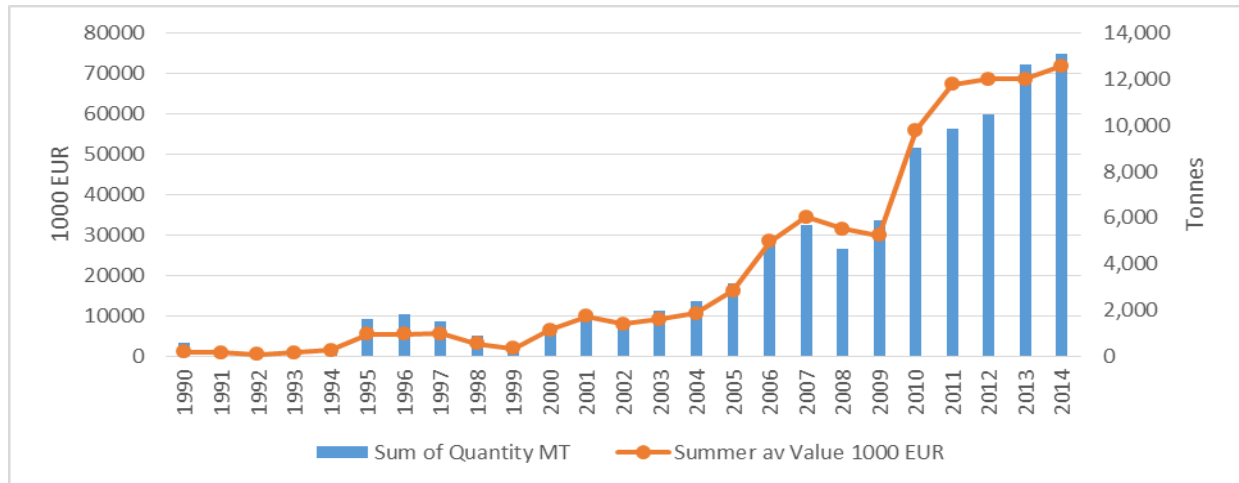
The three most important species exported to the Italian market in 2014 were other tuna/bonito, mackerel and ink fish. In 2014, the three species accounted for 42% of the total value exported to Italy. Revenues from other tuna/bonito amounted to €12.1 million and were largely generated by prepared/preserved products (98%). The export value of mackerel were €11.2 million, whereof 67% of sales were from frozen products and 33% from prepared/preserved mackerel. Ink fish were sold frozen (74%), fresh (10%) or dried/salted (16%) and amounted to €10.4 million in 2014.



Source: NSC (2015)

Figure 6.7b: The 10 most important species by export value to Italy in 2014, development from 1990-2014. Monetary values in € '000

Figure 6.8 (a and b) illustrates exports to Brazil. Portuguese exports to the Brazilian market were low (<2,000 tonnes) from 1990-2003. As shown in figure 6.8a, a rapid expansion occurred from 2004-2014. From a quantity of 2,370 tonnes in 2004, the exports increased more than fourfold over ten years to 13,141 tonnes in 2014.

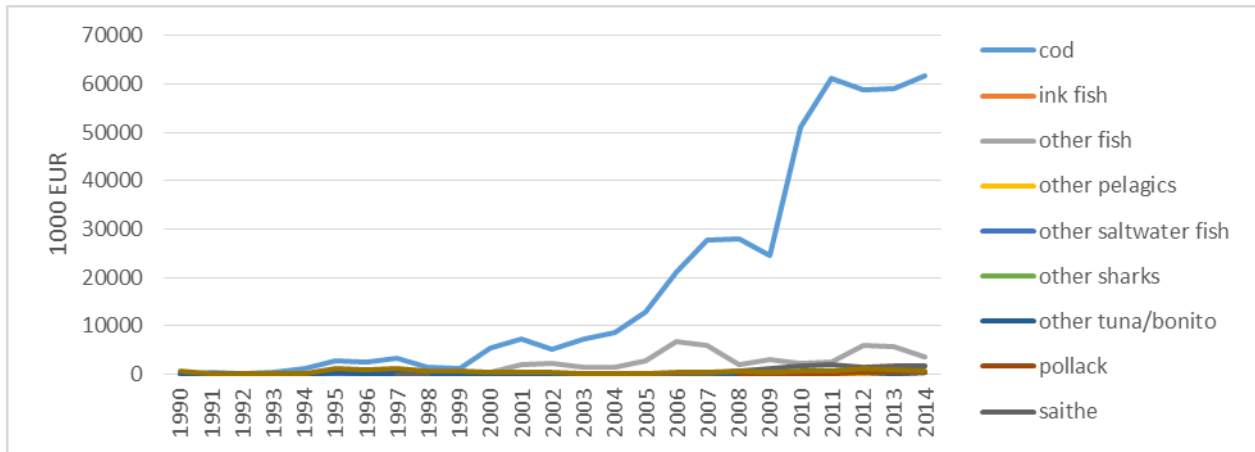


Source: NSC (2015)

Figure 6.8a: Total Portuguese exports to Brazil from 1990-2014. Monetary values in € '000

The three most important species exported to Brazil in 2014 were cod, 'other fish' and saithe (figure 6.8b). The three species accounted for 93% of the total value, whereof 86% from cod. Revenues from cod amounted to €61.8 million in 2014, whereof 64% from frozen cod and 35% from stockfish, salted and salted & dried cod. The exports of frozen cod have increased substantially – from €1.1 million (9% of revenues from cod) in 2005 to €39.4 million in 2014 (64% of revenues). In the same period, stockfish, salted and salted & dried went from €11.7 million in 2005 to €21.7 million in 2014, down from a peak of €30.6 million in 2010.

Revenues from 'other fish' amounted to €3.5 million in 2014 and were mainly prepared/preserved or salted/dried products. Saithe exports amounted to €1.8 million and came exclusively from frozen saithe in 2014.



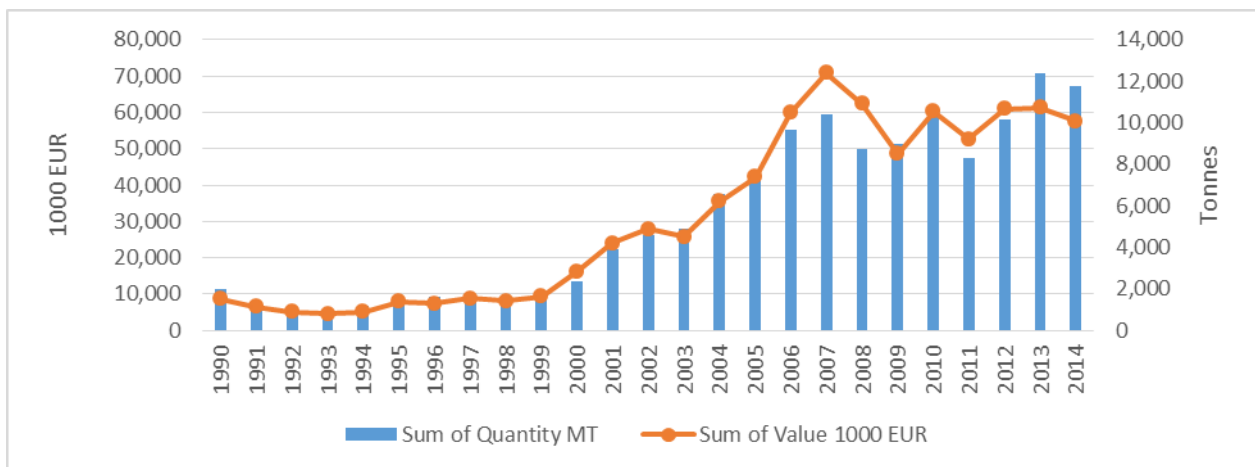
Source: NSC (2015)

Figure 6.8b: The 10 most important species by export value to Brazil in 2014, development from 1990-2014. Monetary values in € '000

Exports of salted & dried cod

The main product of the salting and drying industry is salted & dried cod. In addition to cod, the following analysis covers salted, dried and salted and dried fish from other species and other gadoids. Since 1990, exports from the Portuguese salting and drying industry have experienced a considerable growth from 2,016 tonnes in 1990 to 11,777 tonnes in 2014.

Export values 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 6.9).



Source: NSC (2015)

Figure 6.9: Portuguese exports of salted & dried cod from 1990-2014

The exports of salted and dried cod were more or less stable at a low level (1000 – 2000 tonnes) from 1990-99. After 2000, the exports expanded quite rapidly. Following an

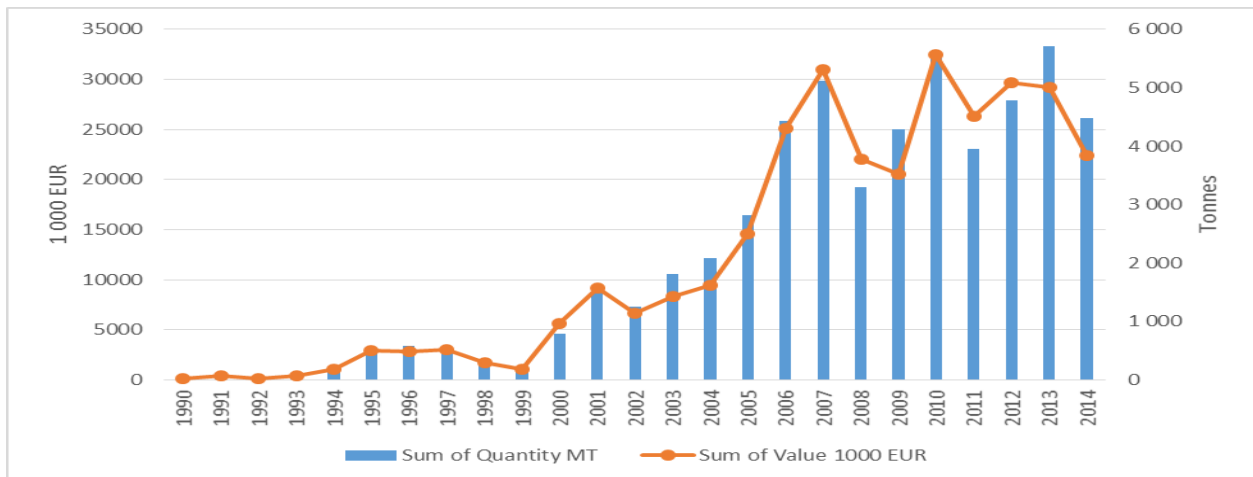
increase in quantities from 2,360 to 10,423 tonnes between 2000 and 2007, a more sideways trend was seen from 2007 to 2014 (with considerable year-on-year variations).

The development in export value seemed to follow the development in quantity up to 2006. Between 2006 and 2008, the export value increased more than the related increase in quantities, indicating higher prices 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.

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 35% combined share of total Portuguese 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 to almost 4,500 tonnes (figure 6.10). The quantities exported were insignificant until 1994, followed by a slow growth from 1994-2000. A rapid expansion took place in the period 2000-07, before it levelled off at quantities at about 4,000-5,000 tonnes from 2007 to 2014. As illustrated in figure 6.10, 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 1990-99. A significant increase occurred between 2000 and 2007, reaching a peak of €31 million in 2007. Since then, values 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.

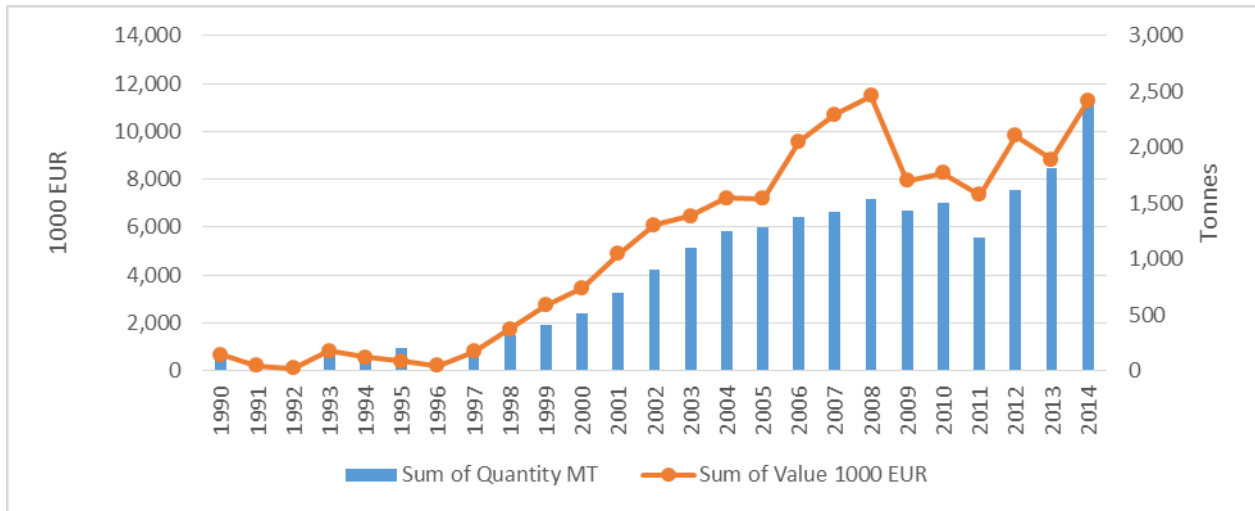


Source: NSC (2015)

Figure 6.10: Portuguese exports of salted and dried products from 1990-2014 to Brazil

Portuguese exports of salted & dried cod to France have gone from less than 200 tonnes to more than 2,400 tonnes from 1990 to 2014 (figure 6.11). 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. After a drop in 2011, the growth seemed to pick up again – reaching a new all-time-high level 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 quantities, indicating higher prices achieved or higher valued products exported to the market. In 2009, a sharp decline occurred due to the world financial crisis. Since then, 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).

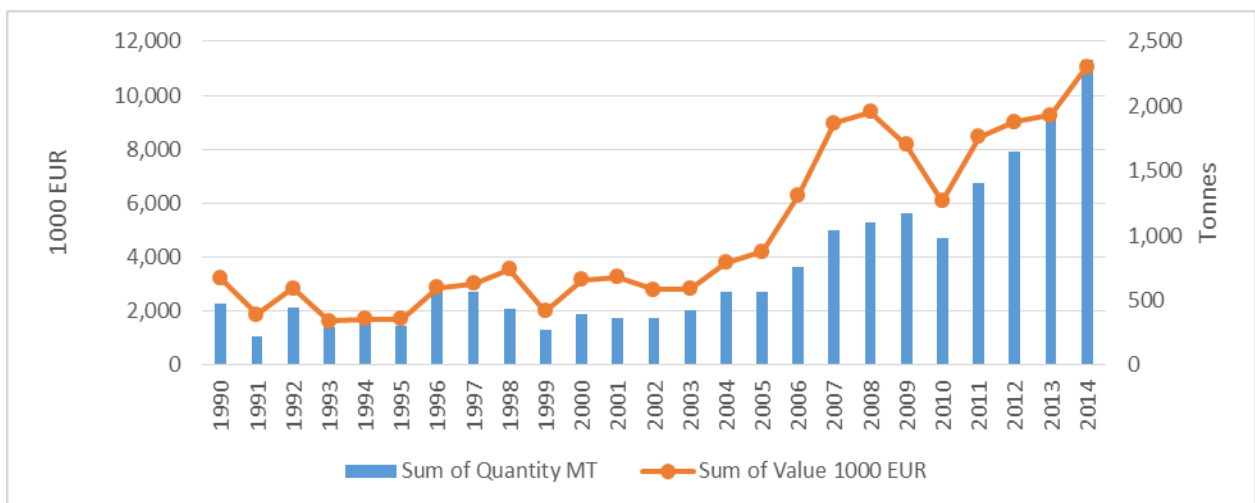


Source: NSC (2015)

Figure 6.11: Portuguese exports of salted and dried products from 1990-2014 to France

The overall development in exports to Angola from 1990 to 2014 was an increasing trend, growing from 476 tonnes in 1990 to 2,361 tonnes in 2014 (figure 6.12). Quantities exported were low and stable from 1990-2003, followed by steady growth from 2004-09. After a dip in 2010, the growth continued from 2011 to 2014, reaching the highest level recorded (in the period) at almost 2,400 tonnes in 2014.

In terms of value, the Angolan market increased from €3.2 million in 1990 to €11 million in 2014. The development started with a flat trend from 1990 to 2005, before an increase occurred between 2005 and 2008, with a peak of €9.4 million in 2008. Following a sharp decline in 2009 and 2010, the positive trend continued. In 2014, the export value exceeded €11 million.



Source: NSC (2015)

Figure 6.12: Portuguese exports of salted and dried products from 1990-2014 to Angola

Aggregate quantities over all 24 years showed that 'cod, klipfish, not fillet/offals' were the most imported product in all three countries. However, some differences exist in consumption patterns. Compared to Angola and France, the Brazilian market imported a significantly larger share of salted and dried products from other fish species (i.e., not cod). As seen in table 6.2, these were lower value products.

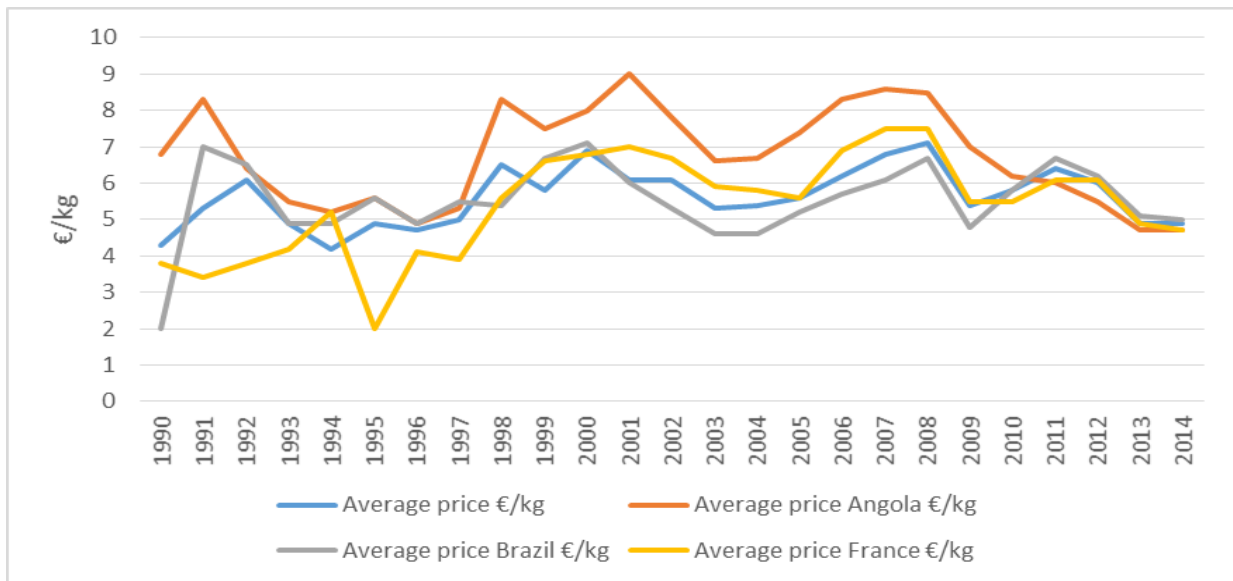
Table 6.2: Salted and dried cod – main products exported

	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 average prices to each of the three markets, the development in price seemed, in general, to follow the same trend. Nominal prices over the period followed a sideways pattern, however with considerable year-on-year variations. The average export price for Portuguese salted & dried cod increased from €4.3 in 1990 to €4.9 in 2014. Comparing the prices in 1990 to the situation in 2014, a notable convergence in prices has occurred. From 2009 to 2014, the differences in prices between markets have become less and less significant.

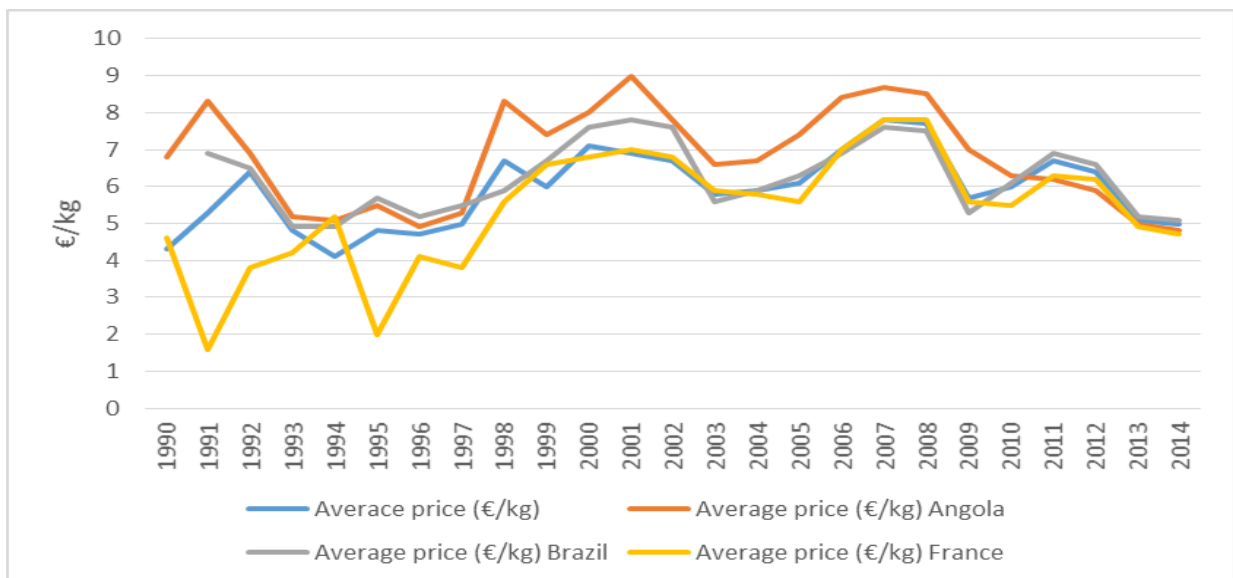
As illustrated in figure 6.13a, the average price for Portuguese exports of salted & dried cod (all products and species) was €4.9 in 2014. The average prices to the three top markets were €5 to Brazil, €4.7 to Angola and €4.7 to France. In 1990, the corresponding numbers were €4.3 for total exports, €2 to Brazil, €3.8 to France and €6.8 to Angola.



Source: NSC (2015)

Figure 6.13a: Average prices – salted and dried cod (all products and species). Nominal values

The average prices for the most important export commodity in 2014 - Cod, klipfish, not fillet/offals - were €4.8 to Angola, €5.1 to Brazil and €4.7 to France, while the average price for Portuguese total exports of the product was €5 (figure 6.13b). In 1990, the corresponding prices were €6.8 to Angola, €4.6 to France and €4.3 for total Portuguese exports. Exports of Cod, klipfish, not fillet/offals to Brazil started at first in 1991, with an average price of €6.9.



Source: NSC (2015)

Figure 6.13b: Average prices for the main salted & dried commodity in 2014, Cod, klipfish, not fillet/offals

7. THE DOMESTIC FISH MARKET

Consumption

According to Docapesca¹³, fish consumption in Portugal is one of the highest in Europe at 55 kg per year in 2010 and per capita just above that of Japan (54.5 kg/capita). The average for Europe is 22.3 kg per year per capita, which is less than half. European countries with high per capita fish consumption include Spain with 41.2 kg per year and France with 35.3 kg per year.

Several different species and products are consumed. More than 300 different species are captured and landed and the more significant ones are sardine, mackerel, octopus, hake and swordfish. From aquaculture trout, bream, sea bass, turbot, sole, eel and clams are the most important, while from imported products - cod, salmon and crustaceans - are among the most important. The most consumed products are: cod, hake, canned tuna, salmon, mackerel and sardine.

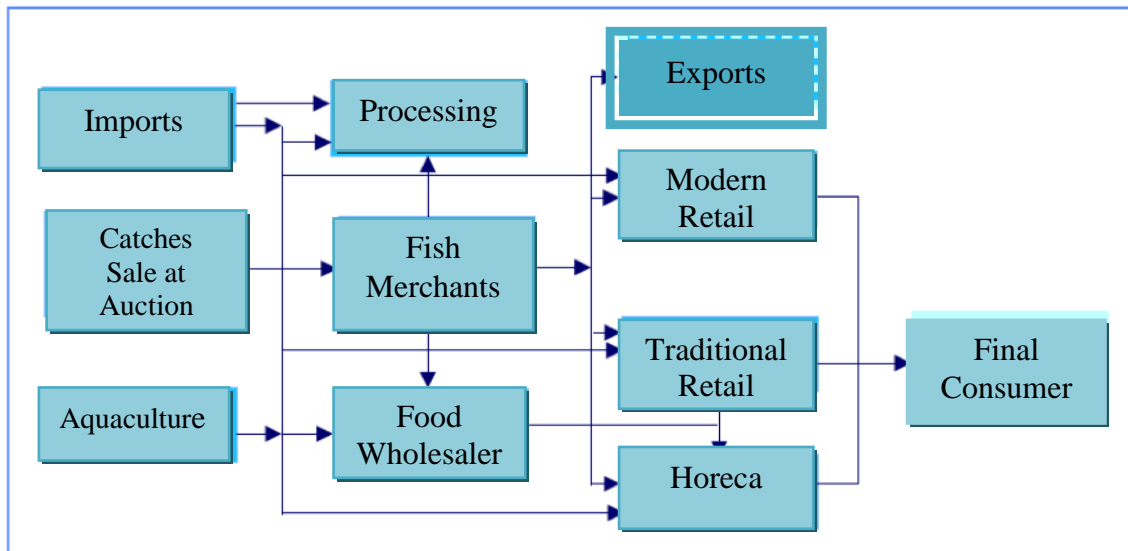
Distribution chains¹⁴

Food distribution at the retail level is dominated by what is called modern distribution with supermarkets taking the lead with 37% followed by hypermarkets with 32% and discount stores with 16% (2007 figures). The same year, the traditional distribution that includes fish retail markets, fish stores and street sales were responsible for no more than 15% of the value of domestic consumption. In 1987 the traditional distribution accounted for 75% food retailed distribution. Thus there have been tremendous changes in the distribution channels over time. Today Portugal is more similar to what is found in other countries and improved efficiency in the distribution channel has allowed prices to come down.

The fresh and frozen fish distribution chains are simplified and represented in figure 7.1, allowing the central role to be played by fish merchants, or traders who buy fish at first sale, i.e., at auction.

¹³ <https://sites.google.com/site/docapescacreative/consumo-de-peixe-em-portugal>

¹⁴ <https://sites.google.com/site/codfishmarketing/family-map>



Source: <https://sites.google.com/site/codfishmarketing/family-map>

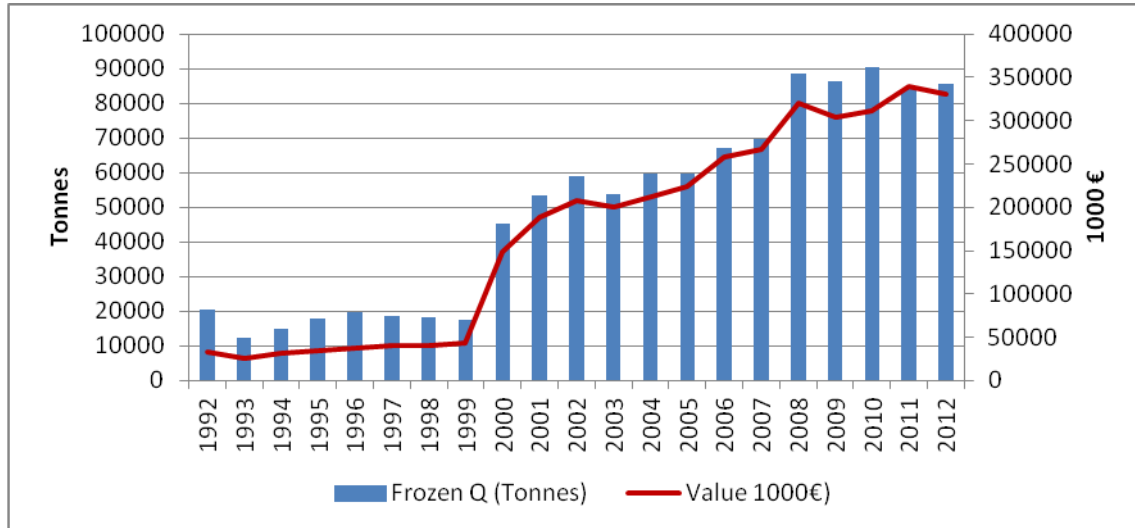
Figure 7.1: Distribution circuits of fresh and frozen fish

As can be seen in figure 7.1, catches, aquaculture products and imports can be purchased by the processing industry, by fish merchants or by food wholesalers. Fish merchants can also sell to the processing industry and food wholesalers. All of these can then sell to modern retail, traditional retail or to Horeca which includes restaurants and hotels. However, each one of these can also buy directly at auction, from aquaculture producers or from imports. Afterwards, the final consumer receives the products from modern or traditional retail or from Horeca. The remaining production not consumed domestically is exported.

Prices, quantities and values

From the processing industry we can see the evolution of quantities and values of sales for frozen, dried & salted and canned products. Dried & salted products include mainly cod. As for canned products, we find mainly tuna, sardine and mackerel. That composition has remained mostly the same throughout the period under consideration. Frozen products include mainly hake, sardines, cod and redfish. Traditionally, frozen cod was not included. In fact, data for frozen cod started in year 2000 with a quantity of only 1,708 tonnes, according to INE. In 2013 frozen cod attained 18,726 tonnes. This significant increase is associated with changes in Portuguese lifestyle. Salted & dried cod needs to be soaked for two days before preparing it, but frozen cod is ready to be cooked. The increase in frozen cod can explain the significant increase in frozen products from 2000.

From figure 7.2 we can see that frozen sales quantities have remained stable from 20,487 tonnes in 1992 to 17,607 tonnes in 1999. Starting in 2000 with 45,366 tonnes there was a substantial increase in sales to 85,502 tonnes in 2012.

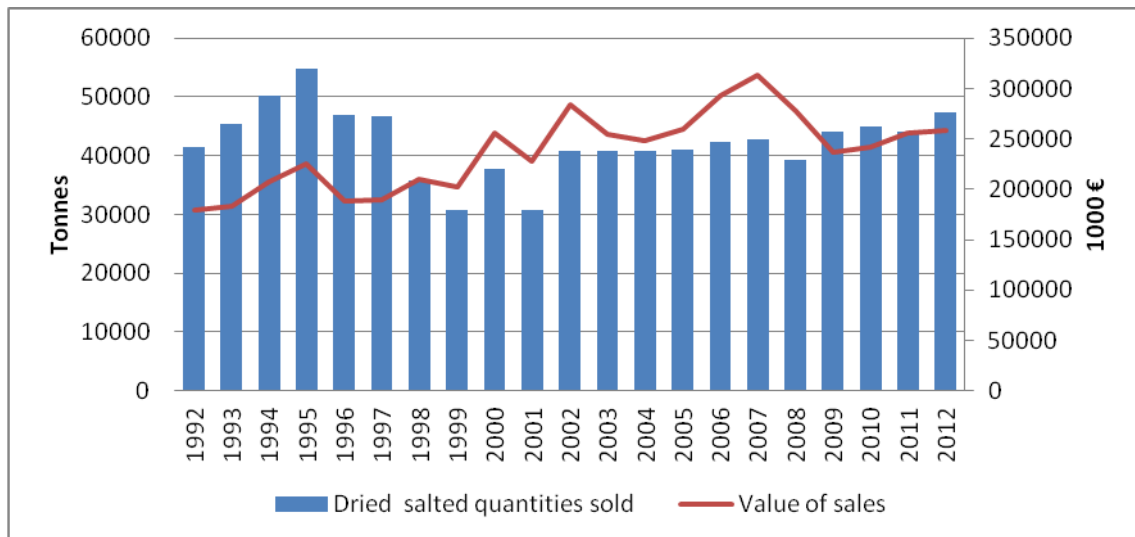


Source: INE (2015)

Figure 7.2: Quantities and value of sales for frozen products. 1992-2012

The value of sales followed a similar trend. From 1992 until 1999 the value of sales was below €45 million. Specifically it was €33.150 million in 1992 and €43.663 million in 1999. There was an increase from €148.834 million in 2000 to €329.949 million in 2012. Concerning the domestic market for frozen products, these numbers reveal that they have gained importance in recent years.

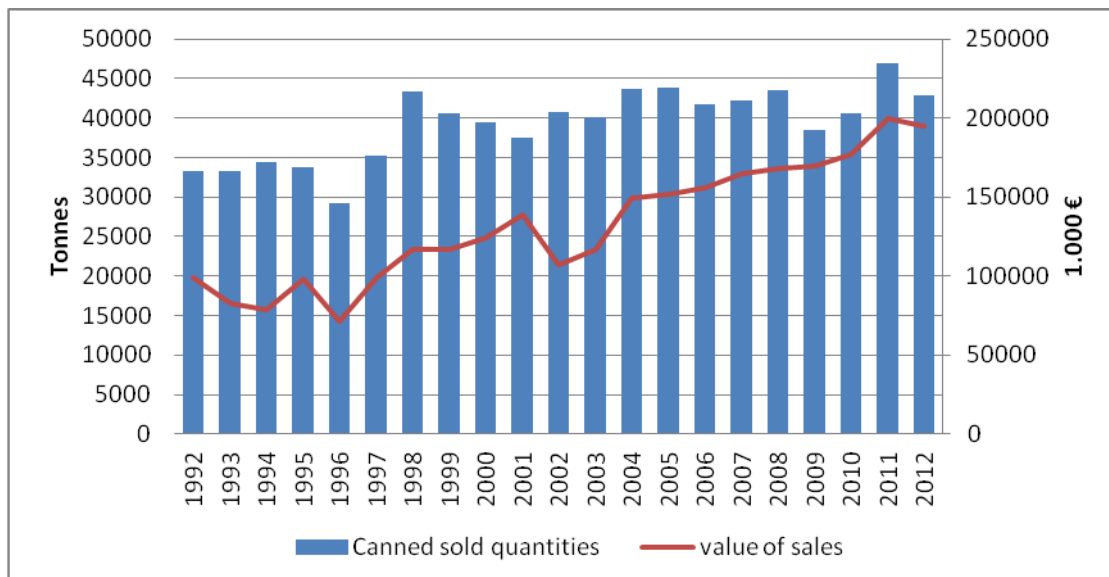
Figure 7.3 shows the sales for dried & salted products in quantity and values. Starting in 1992 with 41,473 tonnes it raised in the next three years reaching 54,685 tonnes in 1995. Thereafter, it decreased and registered 30,672 tonnes in 2001. From 2002 onwards we can see some recovery of these sales which were 47,406 tonnes in 2012. The value of sales followed a similar trend starting in 1992 with €179.353 million and reaching €258.951 million in 2012. The sector for dried & salted products has been more stable throughout this period. Since 1992, dried & salted products whose mainly product is cod have been largely consumed in Portugal.



Source: INE (2015)

Figure 7.3: Quantities and value of sales for dried & salted products. 1992-2012

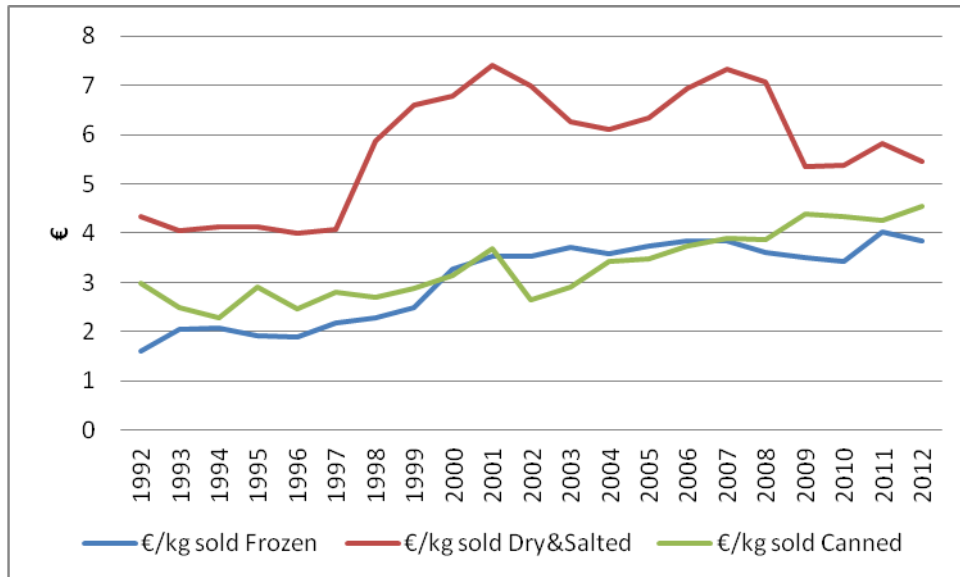
Figure 7.4 refers to canned sales quantities and value. Beginning with quantities we can easily see that canned quantities increased slightly during this period from 33,208 tonnes in 1992 to 42,808 tonnes in 2012. Concerning values we can notice an increase for the same period. Canned products have always been a part of Portuguese consumption and its importance has increased since 1998.



Source: INE (2015)

Figure 7.4: Quantities and value of sales for canned products. 1992-2012

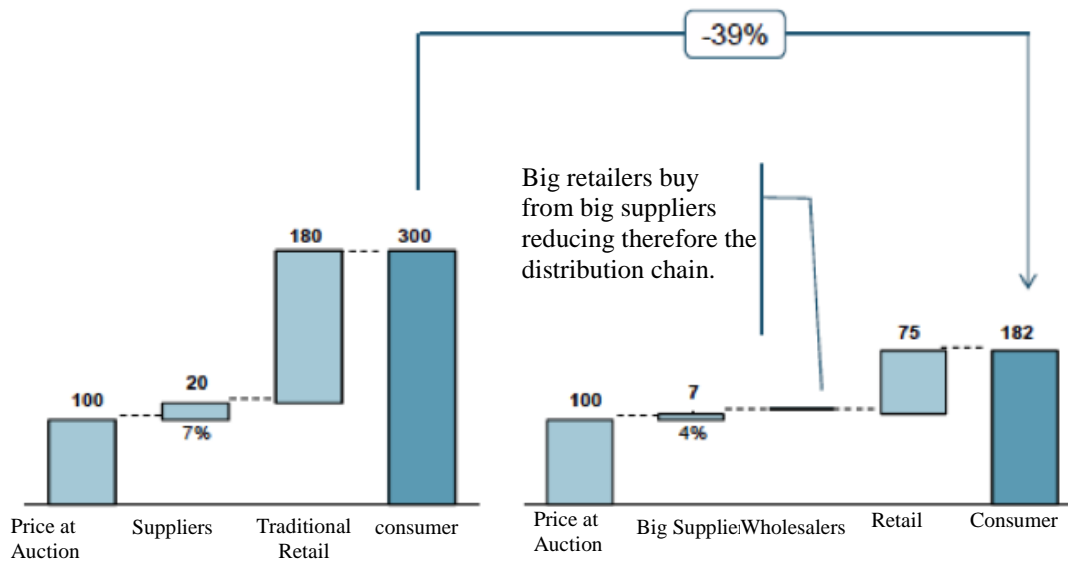
The price per kg for frozen, dried & salted and canned products is shown in figure 7.5. Prices per kg for dried & salted products are the highest although it has decreased from 2008 onwards. The price per kg for frozen products is the lowest since 2008 and this can explain part of the increase in the sales quantities of those products.



Source: INE (2015)

Figure 7.5: Prices per kg. 1992-2012

Figure 7.6 shows us prices over the distribution chain. We can see that along the distribution chains, be it traditional retail or modern distributions, prices increase substantially from auction until they reach the consumer. However, it is clear that the overall price increase is 39% lower in modern retail as compared to traditional retail. As the former distribution chain is now more important, this means that prices have decreased and which has helped to increase consumption.

Traditional Retail**Modern Distribution**

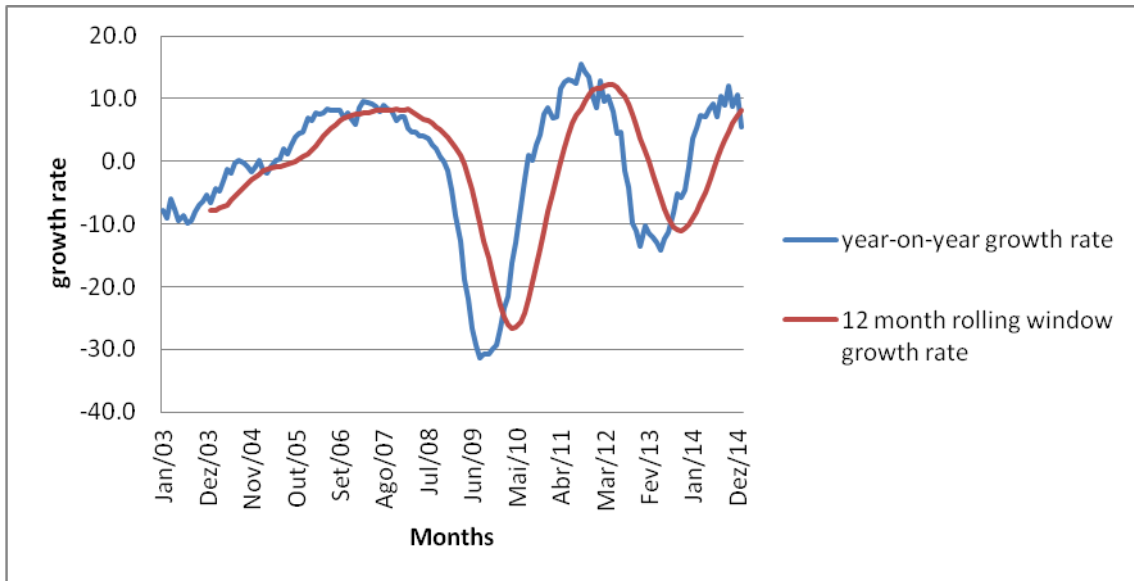
Source: //sites.google.com/site/codfishmarketing/family-map

Figure 7.6: Fish price over the distribution chain

Consumer Price Index

The consumer price index is divided into groups that, in turn are themselves divided into subgroups. In particular, we have a consumer price index for smoked, dried & salted products which includes mainly cod, for frozen products and for canned products. With these variables, we can make inferences about the consumer price evolution for frozen, canned and salted & dried products.

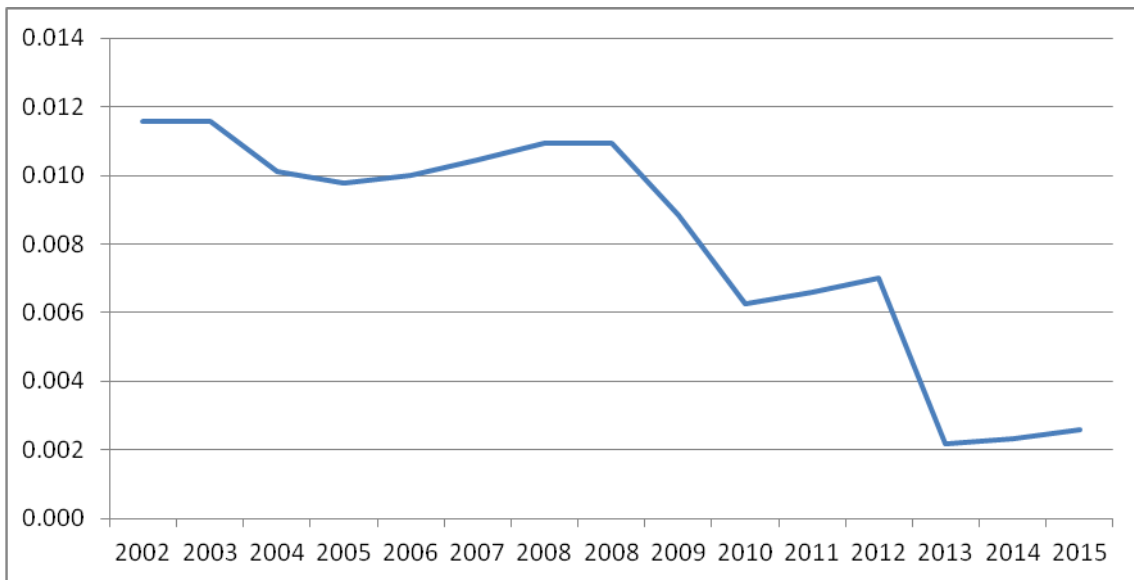
Starting with salted & dried, we can see from figure 7.7 that the consumer price index has had a negative growth in 2009, explained by the financial crisis and became positive in 2010 attaining a growth rate of 12.2 per cent in 2012. This increase can be explained by the rise in the added value tax. Afterwards there was a decrease to negative values again attaining a growth rate of -11 per cent at the end of 2013. In 2014 there has been an increase again to positive values as the national economy started having some signs of recovery. Comparing the year-on-year growth rate with the 12 month rolling window growth rate, we can conclude that the trend is mainly the same.



Source: INE (2015) and BoP (2015)

Figure 7.7: Consumer Price Index – growth rate

Interesting is also the fact that the weight of the smoked, salted and dried products in the overall basket decreased, as can be seen in figure 7.8.



Source: INE (2015) and BoP (2015)

Figure 7.8: Weight of the sub group of smoked, salted and dried products in the overall basket

8. CONCLUDING REMARKS

This report has analysed 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, in the last decades the country has become a net importer of fish. Traditionally Portugal was a distant water fishing state (DWFS), however, this changed with the introduction of Extended Fisheries Jurisdiction, which led to the demise of Portugal as a DWFS. Nevertheless, Portugal has maintained one of the largest per capita consumptions of fish in the world. The exception, with reduced consumption, occurred only during the period that preceded the 1974 coup to the end of the 1970s. These profound changes have also affected fish processing.

The development of the fish processing industry has been promoted in several ways. 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 shown by Bjørndal and Ellingsen (2015), the effective duty on salted & dried cod exports from Norway to Portugal is very high. EU investment funds, designed to promote employment and sustainable development in the Union, have been very beneficial to the Portuguese industry. In addition, several Portuguese policies such as export credits and support of research and development also apply to fish processing. All in all, this report demonstrates how the competitiveness of the Portuguese industry has improved.

As a consequence, fish processing in Portugal has expanded. While in the past salted & dried cod would be imported, much frozen and salted cod is now imported for further processing in Portugal. Moreover, the country has also become an important exporter to several countries. For example, Portugal is now an important supplier of salted & dried cod to Brazil, which is sold in competition with Norwegian exports, and Portugal's market share for salted & dried cod in Brazil has increased at the expense of Norway. As pointed out by Silva (2012), the market for cod in Brazil, as well as that of olive oil and wine, has some cultural origins derived from historical links with Portugal. The Portuguese emigration to Brazil and their establishment of businesses related to the food industry also contributed to the consumption of cod in this South American country (Menezes, 2012).

To the best of our knowledge, this is the first analysis in the literature of the fish processing industry in Portugal. Nevertheless, there is scope for much further research. One area would be cost and earnings studies of processors in order to better study their competitiveness at the micro level. Another area would be closer studies of the market for fish

in Portugal in terms of distribution channels, prices, preferences, consumption and changes in these variables over time.

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APPENDIXTable A1. Total Export – top 10 - 2014 quantities

Species	Tonnes 2014
Mackerel	41,006
ink fish	34,225
Cod	23,328
Sardine	19,312
other tuna/bonito	16,268
Swordfish	10,707
other saltwater fish	10,257
Prawns	10,105
yellowfin tunas	10,009
other sharks	9,741
Sum	184,958

Source: NSC (2015)

Table A2. Total Exports – top 10 - 1990 quantities

Species	Tonnes 1990
Sardine	29,516
Cod	19,793
Mackerel	6,844
Redfish	4,990
European plaice	4,851
Other tuna/bonito	4,279
Seabream	3,892
Other saltwater fish	3,011
Scallops	2,677
Ink fish	2,303
Sum	82,156

Source: NSC (2015)

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 fish. These changes have also affected fish processing. Moreover, the development of this industry has been promoted in several different ways, and Portugal has now also become an important exporter to several countries. The purpose of this report is to highlight and analyse these developments. In a sense, it is an extension of Bjørndal et al., (2015), who analysed the development in Portuguese fisheries from the 1960s to the present.



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