

Economic and Marketing Parameters of the Greek Marine Aquaculture Industry during Growth and Recession

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Abstract

Per capita consumption, flow of trade and production of fish of the EU market varies significantly between nations. In the EU about 26% of the total fish market volume is based on Aquaculture and about 13% of this production is based on Mediterranean Marine fish species cultivated in South European countries. Marketing data were collected from published online databases, annual reports of major Greek Aquaculture companies. Some data were also collected on a confidential basis from fish farms (which are not named in the preset manuscript) operating in West Greece. During the last two decades, the ex-farm price of the farmed fish decreased dramatically but the volume of production increased and are currently stabilised. Over the years, while the ex-farm price decreased dramatically, the production cost decreased, mainly due to technological improvements and increased volume of production of the fish farms. The future trends of the aquaculture sector include the possible reduction of the cost of feed and the diversification of the products such as the cultivation of new aquaculture species and the marketing of value added products processed farmed fish.

Keywords: economic, marketing parameters, aquaculture, recession, human resources management, Greece

JEL classification: M3, P42

Introduction

Economic growth and increased wealth are usually followed by a change in the dietary patterns, which result in greater demand for meat products (Tveteras & Lien, 2009).

During economic recession the consumption patterns may change and this may influence the demand and supply curves of several sectors of the economy including the agricultural production in general and the aquaculture particularly (Falguera et al, 2012).

The production cost of aquaculture can be influenced by the cost of inputs, including cost of borrowing, total production cost, cost of processing, transporting and marketing of farmed fish.

The legislation enforced in a particular region can also influence the cost of production; the requirements for the provision of minimal wages for example, taxation policies, labour law, environmental legislation, etc. In the European Union, for example, an important barrier has been the long license application periods - up to three years mainly due to numerous points of governmental contact required for final approval - which increase uncertainty and risk for start-up businesses (Guillen and Motova, 2013).

Furthermore, the aquaculture operational cost can be influenced by other parameters such as; accesses and cost of credit, the location of the production unit in terms of accessibility to utilities, roads and marketing channels (Losordo & Westerman 1994).

All the above parameters can influence the production cost and the retail price of farmed fish and all these parameters can vary from region, country and the prospects of business can dramatically change when all these parameters are altered by a financial crisis. This became evident during the Greek economic recession. The Greek financial crisis resulted in adverse business environment for all sectors of the economy, including the previously thriving Marine Aquaculture business of the country.

The purpose of the present work is to review some important economic and marketing parameters of the Greek aquaculture during the last two decades.

Methodology: Data were collected from published online databases from the Food and Agricultural Organization (FAO), the Federation of European Aquaculture Producers (FEAP) and from the Annual reports of major Greek Aquaculture companies. Data on the cost of production, ex-farm prices of farmed fish were collected on a confidential basis from fish farms (which are not named in the present manuscript) operating in West Greece.

Important economic and marketing parameters in the Greek Aquaculture Industry

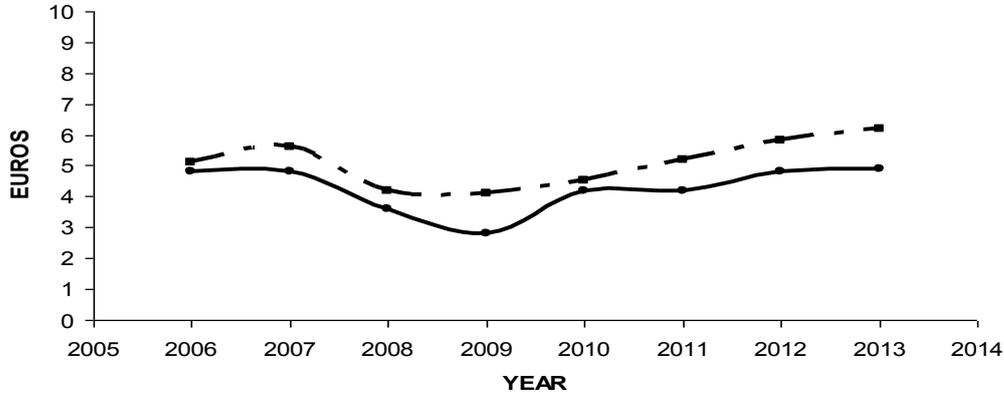
Past and Present status of the Greek Mariculture Industry

Since the first adoption of semi-intensive and intensive marine aquaculture technological methods in Greece, the number of fish farms and the volume of production increased dramatically from less than 30.000 during 1986 to well above 120.000 tonnes during 2009.

The average and minimum ex-farm price of Mari-cultured fish in Greece exhibited fluctuations over the past decade (Figure 1).

On the onset of the international financial crisis, the sector had a peak in the volume of production. During the financial crisis though, large unsold stock of fish farms resulted in a dramatic drop of the price with farms holding their unsold stock of fish in an effort to control the falling prices. During the year 2009, in some cases fish farms sold their fish at prices well below the cost of production.

For the first time in the post 1990s era of Greek Mariculture, all major fish farm companies reported massive financial losses during that year.



Source: Data from the FEAP (Federal European Aquaculture Producers) and a sample of local fish farms in West Greece.

Figure 1: Average (dashed line) and minimum (solid line) recorded ex-farm price of Mediterranean Aquacultured fish species

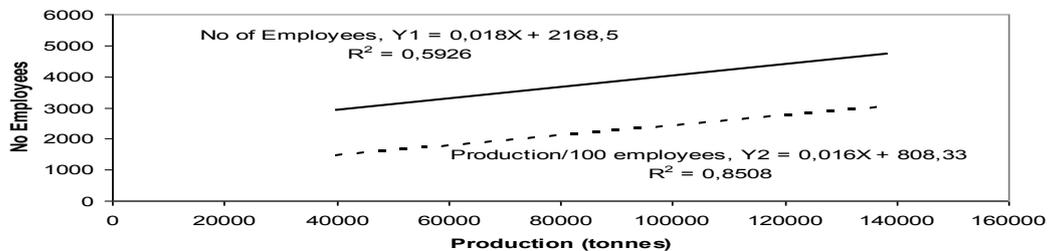
Production cost

The total volume of production and the cost of production including the labour cost of the marine fish farms in Greece changed dramatically during the financial economic crisis.

During the early 1990s, several small fish farms were bought or merged with larger companies with benefits for the cost of production through scale economy, technological changes and labour productivity.

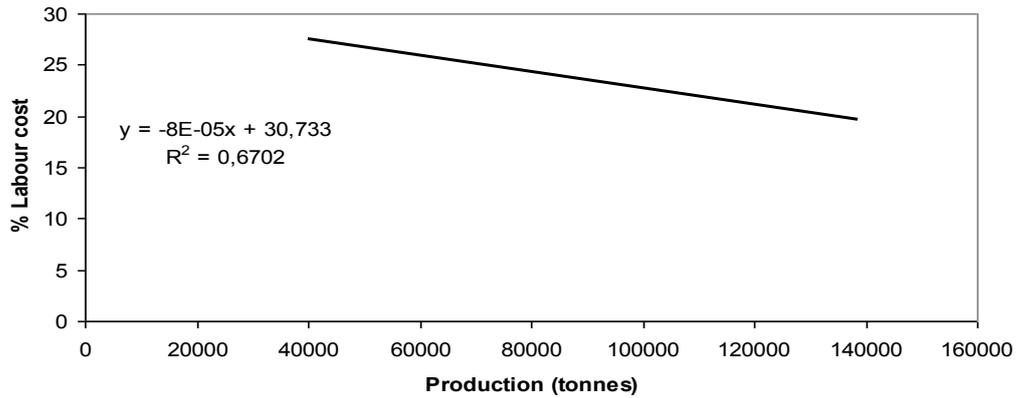
The number and the productivity of employees of Greek marine fish farms increased with the increased volume of production of the industry, with a significant correlation between this two parameters and the volume of production (Figures 2, 3, 4).

During 2000, prices fell sharply, revealing that the industry's firms were not prepared in having set up strategies to prevent/reduce possible negatives events and deal with the costly operating demands for food, nets, cages and other running costs such as their labour cost.



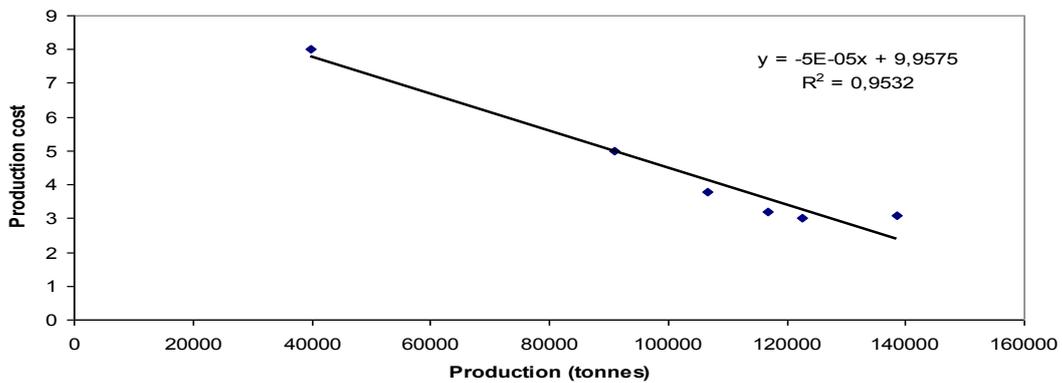
Source: Data from the FEAP, ELSTAT, Tyligadas et al 2014

Figure 2: Correlation between (X) The volume of production and Y1: the number of employees (solid line) or Y2: the Productivity of the Employees (dashed line)



Source: Data from the FEAP, ELSTAT, Tyligadas et al 2014 and estimation of % labor cost from one major fish farm company in west Greece

Figure 3: Correlation between (X) The volume of production and % of labor cost over the total cost of production.



Source: Data from the FEAP, ELSTAT, Tyligadas et al, 2014 and estimation of % labor cost from one major fish farm company in West Greece

Figure 4: Correlation between (X) The volume (tones) and the total cost of production (Euros/kg)

It has been estimated that the most important costs of the EU marine aquaculture sector are: *feeding costs*, representing about 42% of the total costs, *operational costs* (21%), *livestock costs* (15%) and *wages and salaries* (12%) (Guillen and Motova, 2013).

Economic crisis and Labour Cost in the Aquaculture Industry

The global economic crisis of 2008 created rapid social and economic changes forcing organizations and employees to find ways of adapting to the new adverse conditions through a range of human resource management changes (Naude et al, 2012).

Between 2008 and 2010, Greece lost 1.75% of its output per year causing the public debt to increase more than 160% of GDP in 2011 (McKinsky, 2012).

During the deep economic recession, Greek aquaculture companies were struggling under the weight of cheap credit/loans they piled on during

80s and 90s, the decades of booming economic growth with Greece being the biggest producer of Mediterranean fish and one of the few industries, alongside tourism, that has enjoyed strong demand, especially customers internationally (Tangaris & Georgiopoulos, 2013).

Greek economy has shrunk by a quarter and thousands of businesses have been shut down. In an effort to survive, the aquaculture industry reduced their operational cost by a reduction in the employment of seasonal/temporal workers and a reduction in salaries (Perdikaris and Paschos, 2011) which ranged between 10%-35%. The latest available data in 2011 estimate that there are more than 5000 people employed in the sector in Greece (FAO, 2013), while the total number of employees had fallen by -8% in 2013 (Guillen & Motova, 2013).

The industry is still suffering from the adverse economic environment and frequently workers are paid arrears ranging from two to four months.

Marketing parameters of the Greek Aquaculture Industry

Greece is a major producer of Mediterranean marine fish species in Europe. Above 60% of the Greek aquaculture production is exported (Fig 5)

According to the published statistics of FAO and the Federation of the European Aquaculture Producers, during the year 2012, the fish market the European Union of the 27, exhibited a total supply of 13.7 Million tons of Farmed fish and capture fisheries products with most of this volume (85.40%) destined for human consumption, the remaining for animal feed and other non-food usages, for example the chemical industry. Of the total volume of the EU Market, 64.2% derived from Imports (8.8 Million tons); 27.3% from Capture Fisheries (3.6 Million tons); 9.51% from Aquaculture (1.3 Million tons).

The global fish market volume of fisheries and aquaculture was over 137 million tonnes in the year 2012. In the EU, the volume was over 11.7 Million tonnes, and in Greece 197.600 tonnes (FAO 2013).

Compared to the global fish market, were about half of volume is based on Aquaculture; the consumption of the EU market is dominated by wild fish. During the year of 2012, the EU fish farms produced 1.3 million tons, which corresponds to 26.5% of EU total production of fisheries and aquaculture. Historically, global aquaculture production increased while fisheries landings declined globally (FAO 2013).

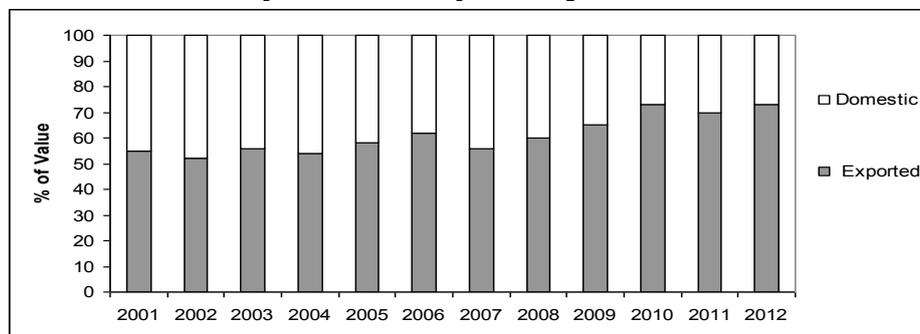


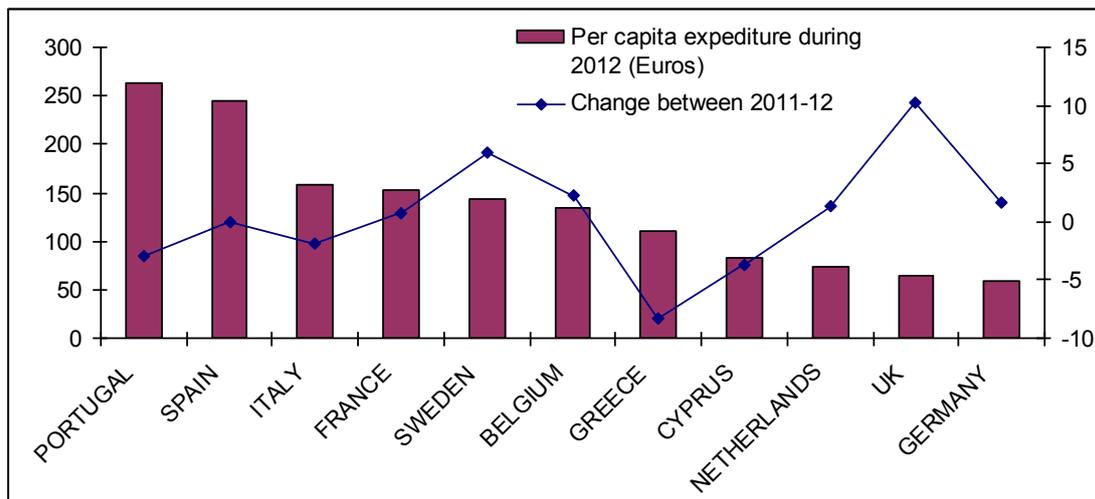
Figure 5: Distribution (as % of value) of farmed marine fish species in the domestic and External Market channels for the period 2001-2012. Data collected from annual from two major Aquaculture producing companies in Greece

In the EU, aquaculture production is based on cold water fish species (for example salmon) which correspond to 71.6% of the total volume, Mediterranean Marine fish species (13.1%) and warm water fresh water fish (15.3%). During 2012, per capita consumption of fish, in the EU was 23.2 Kg/year which is above the 18kg/yr global average per capita consumption (FEAP 2014).

The production of Mediterranean marine fish species during 2013 was 283.755 tonnes and was mainly based on farmed sea bass (42%) and gilthead sea bream (54%). The major producing countries are Greece (43% of the total volume), Turkey (29%), Spain (16%) and Italy (6%). During the last few years, these major producing countries experienced financial difficulties and fluctuating prices and demand, with consequences to the production and cash flow, but volume of production of Mediterranean marine fish species is now stabilised. The market value of farmed sea bass in the EU is exhibiting a rise of +12% in 2012 compared to 2011, while the market value of farmed gilthead sea bream dropped (-6%).

The average EU expenditure per capita for fish in the year 2012 was 103 Euros/capita, but varied between countries. Apparently, the financial problems experienced in several EU countries affected consumers' behaviour and spending habits including the consumption of fish and shellfish. For example compared to the year 2011, in 2012 the per capita spending for fish increased in some countries for example in the UK increased by >10%, in Sweden by 5,9%, but decreased in countries like Greece (-8.3%), Portugal (-2.9%), Italy (-1,9%) (Fig 6) which are the main consumers of sea bass and gilthead sea bream.

The marketing channels of the Greek Mariculture industry changed dramatically since the onset of marine aquaculture in the region during the 1980s. In early days, most of the fish were exported unprocessed and sold in Italy and few other European Markets.



Source: EUROSTAT

Figure 6: Annual Per capita Expenditure (Euros) for Fish and seafood products in the top 10 consuming European countries (Bars) The line indicates the % of change in total expenditure between years 2011 and 2012

Now days the marketing channels include several global destinations in Europe and other continents, the production includes whole fresh fish, gutted fresh fish and filleted fresh or frozen fish and the % of exported farmed fish is above 60% (Fig 5).

A dramatic change in the processing of the fish occurred as the industry grew, the major fish farm companies in Greece, now have their own packaging and processing facilities and some can control the flow of their supply to the market through a combination of year around production cycle, a range of processed products as are the frozen or smoked fillets which allow the control of a continues supply to the national and international market.

In the domestic market, fish farms can now sell directly to big supermarket chains which have their own distribution channels and due to their scale of economy can reduce the cost of marketing and distribution, creating further opportunities for reducing the retail price.

Similar improvements in the global marketing chain of farmed fish are evident compared to the early 1990s.

Conclusion

The future of Greece's aquaculture industry is important for the country, as it tries to come out of the economic crisis and regain its lost competitiveness taking into account that sea bass and sea bream, was Greece's second-biggest agricultural export in 2012, beating even the infamous Greek olive oil ((Tangaris & Georgiopoulos, 2013).

Greece holds an important share in the aquaculture production in the European Union where production is mainly concentrated in 5 countries: France, Greece, Italy, Spain and United Kingdom, making up 77% in volume and 76% in value of EU totals (FAO, 2013).

The volume of farmed fish production in is currently stable at lower than the potential capacity of the national industry. This is due to the national financial difficulties and extremely limited access to credit for the otherwise very healthy Aquaculture companies in Greece. Even under these current difficult financial conditions for the Greek Fish farms, Greece is producing 43% of the total volume of Marine Mediterranean farmed fish.

Aquaculture in Greece has been emphasized as a significant contributing factor to the country's to growth over the next decade, provided that the industry's companies managed to improve their business models (McKinsey, 2012).

As part of the EU aquaculture industry, the aquaculture sector in Greece, faces many challenges that hamper its future expansion; difficulties in competing with third countries with lower costs and less stringent regulatory standards, the fragmented nature of the sector, competition between economic actors for space, difficult administrative procedures in relation to licensing/start-up and obstacles in accessing finance and investment (Sheil, 2013).

Under the evolution of market conditions, Greek aquaculture is facing new challenges and opportunities.

Although, the marketing channels can push for price reduction of the farmed fish and reduce the gains of fish farmers, at the same time, the global market provides the opportunity to sell globally, the farmed fish as an alternative to the rapidly vanishing and overexploited fish of the oceans.

The future evolution of the EU aquaculture sector faces major challenges and difficulties mainly due to three factors: fierce foreign competition that brings market prices down, high labour and capital costs and administrative burdens that slow down investments in the aquaculture sector (Guillen & Tomara, 2013).

The future trends of the aquaculture sector include the possible reduction of the cost of feed, for example from the utilization of alternative raw materials and the diversification of the products such as the cultivation of new aquaculture species and the marketing of value added products processed farmed fish (García & García 2010).

The global economic crisis of 2008 created rapid social and economic changes forcing organizations and employees to find ways of adapting to the new adverse conditions through a range of human resource management changes (Naude *et al*, 2012).

Running an organization at the least possible cost has become the priority of senior management. In order to achieve that, companies must, among other things, keep a pool of competent employees that will help in pushing their sales, expand their market, innovate new products and keep the firm's operations as efficient as possible (Ozlem, 2012).

Practical implications: The consumption of farmed Mediterranean fish is expected to increase when the economic conditions of European nations in the south improve. Greece is the major sea bass and gilthead sea bream producers, these two species are widely consumed in Europe, particularly in the South, and are also winning a market share in other European countries and the global market. There are very good prospects for market diversification with other Marine fish farmed in the Mediterranean sea, including meagre and other fin fish which are considered as "new" aquaculture fish species. There is also the potential of producing organic fish which have a significant share in the global and the European market. The long term prospects of the Greek Aquaculture industry are good, the question is how this industry will progress and move to a growth phase in the next years. In this fierce competitive environment, Greece has a competitive advantage in the European and the global market of farmed fish. The demand for "healthy diet", the technological gain and know-how of the Greek Aquaculture industry, the climatic conditions and the market value of a product labelled as "made in Europe" result in a potential for higher acceptance and value of the farmed fish grown in Greece.

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