Profitability, strategies and competitive position in the aquaculture sector: the Italian case

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Abstract

The natural market selection of the Italian aquaculture farms, mainly happened in the years’ 90, need to determine and check their strength and weakness points: this will be capable either to modulate the managerial strategies in function of market trend and set up entry barriers.

The study has been carried out in a sample of land-based Italian fish farms, representative of the national reality, taking into account their profitability, production cost trends and managerial strategies. A static comparison in order to focus the position of each firm respect to the others and a dynamic one capable to determine the sector trend is shown. It was then determined, for each enterprise: the production cost, with its main components, the invested capital, to evaluate the congruity of the investment, and budget and ratios analysis has been done. Finally, comparison graphics have determined the global competitive position of the firms, their dynamism and the adopted strategies capable to improve profitability.

The analysis shows a scenery in which only a limited number of firms reaches good efficiency through the adoption both of minimization strategies and production costs checking, capable to have an elastic modulation between managerial profitability and prices level. These firms are more competitive respect to the other ones, that show higher production costs not justifying the production levels.

Concerning the investments, the analysis shows a general trend to technology innovation research of productive process and a widening productive mix taking care of custom need. This trend will allow the firms to go from the actual maturity state of the sector to an innovative one, in order to increase market share and a higher competitiveness.

It is evident that the strategies to be adopted are those relating to minimization production costs, widening of productive mix and technology innovation; in such a way the firm will be capable to set up in a higher competitive scenery, both national and international, with a high qualitative product standards and low costs.

Introduction

The Italian aquaculture in 1995 was 197,500 tons for a value of 595,750 billion Lire. In particular the production of sea bass and sea bream was totally 7,500 tons for a value of 118,250 billion Lire. The Italian market relating to these species was about 15,000 tons in 1994.

The rapid evolution of the productive dynamics relating to the Italian aquaculture has been characterized by a large spreading of the modern rearing technologies, at first developed in a limited number of countries, but now spread in the whole European and Mediterranean area. For instance, Greece had a sea bass and sea bream production of 9,000 tons in 1993 and 12,000 tons in 1994. As a consequence, to satisfy the national demand, Italy imports a large quantity of these
species from other countries, often a price lower than production cost level. Due to this changing in the international competition, a negative impact on prices resulted, especially for non competitive farms.

In such a contest, it is so important to determine and check the strength and weakness points of the Italian firms. This will focus the strategies capable to set the firms in a national and international scenery.

**Materials and methods**

The study has been carried out in a sample of thirteen land-base fish farms, representing international reality, located mainly in the north-east, central-south and southern areas, producing sea-bass, sea-bream, eels and mussels.

The economic and asset data of the firms together with the strategic orientations have been determined during the period 1991-1993. With regard year 1993, the firms hold totally a market share of 11.55% in the sea-bass and sea-bream sector (8 firms) and 21.03% in the mussel-culture sector (2 firms); the total production is 6% higher, both in volume and value, than the eel sector (3 firms).

For each firm of the sample, the reference dimensional aggregates have been calculated: invested capital and gross output, in order to focus at first the dimensional and productive differences of the sampled elements.

Then the profitability ratios together with the main elements of the production cost have been compared, with regard both to year 1992 and 1993 and, in the meanwhile, calculating the changes occurred during the three years.

Finally a static comparison and a dynamic one (1992-1993), in order to focus the position of each turns and the future sector trend, has been determined.

It is clear, in Table I, the differentiation among the sample firms, with regard to the core business, the productive levels and the congruity between Gross Output and Total Assets. It is possible to find out that the firms with the Gross Output and Total Assets ratio lower than 0.35 have a trend to inefficiency if the production cost is too high respect to the output, otherwise, their investment choice has to be directed or to increase the output or to innovate their business, both technologically and dimensionally.

These considerations will be confirmed by the analysis of the production cost elements and the comparison of the firms with regard both to profit components and productive inputs ones.
Table I: Firms dimensional characteristics (1993 - Lit 10 \textsuperscript{9})

<table>
<thead>
<tr>
<th>Firm</th>
<th>Total Assets</th>
<th>Gross Output</th>
<th>G. Output/Total Assets</th>
<th>Core Business</th>
<th>Market Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>324</td>
<td>38</td>
<td>0.12</td>
<td>Sea bass/Sea bream</td>
<td>0.04%</td>
</tr>
<tr>
<td>2</td>
<td>9,399</td>
<td>28,573</td>
<td>3.04</td>
<td>Mussel</td>
<td>15.79%</td>
</tr>
<tr>
<td>3</td>
<td>1,171</td>
<td>352</td>
<td>0.30</td>
<td>Eel</td>
<td>0.85%</td>
</tr>
<tr>
<td>4</td>
<td>1,034</td>
<td>240</td>
<td>0.23</td>
<td>Sea bass/Sea bream</td>
<td>0.27%</td>
</tr>
<tr>
<td>5</td>
<td>3,787</td>
<td>1,233</td>
<td>0.33</td>
<td>Eel</td>
<td>1.39%</td>
</tr>
<tr>
<td>6</td>
<td>1,628</td>
<td>1,231</td>
<td>0.76</td>
<td>Sea bass/Sea bream</td>
<td>2.96%</td>
</tr>
<tr>
<td>7</td>
<td>3,825</td>
<td>1,457</td>
<td>0.38</td>
<td>Sea bass/Sea bream</td>
<td>1.64%</td>
</tr>
<tr>
<td>8</td>
<td>610</td>
<td>311</td>
<td>0.51</td>
<td>Mussel</td>
<td>0.35%</td>
</tr>
<tr>
<td>9</td>
<td>4,564</td>
<td>9,485</td>
<td>2.08</td>
<td>Eel</td>
<td>5.24%</td>
</tr>
<tr>
<td>10</td>
<td>735</td>
<td>532</td>
<td>0.72</td>
<td>Sea bass/Sea bream</td>
<td>1.28%</td>
</tr>
<tr>
<td>11</td>
<td>1,859</td>
<td>1,199</td>
<td>0.64</td>
<td>Sea bass/Sea bream</td>
<td>1.35%</td>
</tr>
<tr>
<td>12</td>
<td>9,040</td>
<td>1,644</td>
<td>0.18</td>
<td>Sea bass/Sea bream</td>
<td>1.85%</td>
</tr>
<tr>
<td>13</td>
<td>8,967</td>
<td>4,139</td>
<td>0.46</td>
<td>Sea bass/Sea bream</td>
<td>4.66%</td>
</tr>
</tbody>
</table>

Table II shows the main production cost component, as resulting from the analysis of the sampled firms. It has to be noted, among the productive process inputs, the relevant impact of the labor cost; this impact, showing a value above the average, has to be modulated also with regard to the Italian tax system.

Finally, the table shows that, among the productive inputs, the liquid oxygen consumption has been increasing during the observed three years.

This increasing is checked with regard both to the number of firms that adopted this technology and to the impact itself among the production cost inputs. In fact, during the three years period 1993/1991, the number of firms increased from 2 to 5, while the impact on the total production cost increased from 2% to 6%. This technology innovation is a consequence of a maximization quality product strategy, that causes the making of distinctive abilities among the firms in order to acquire a leadership position in the market.

Results

Static comparison

A first sign of the efficiency levels and profitable capacities of the firms can be checked through the comparison both of production cost with Gross Output and the
main production cost components with Gross Output. Then, in a dynamic context, in order to focus the actual trends of the investigated firms, the trend analysis change both of the production cost and Gross Output is useful.

Table II: Production Costs (percentage of total cost), 1993

<table>
<thead>
<tr>
<th>Firm</th>
<th>Feed</th>
<th>Medical</th>
<th>Maintenance</th>
<th>Liquid Oxygen</th>
<th>Accessory</th>
<th>Energy</th>
<th>Labor</th>
<th>Depreciation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>5.92</td>
<td>1.04</td>
<td>25.18</td>
<td>30.68</td>
</tr>
<tr>
<td>2</td>
<td>21.07</td>
<td>0.09</td>
<td>0.02</td>
<td>0</td>
<td>70.52</td>
<td>0.71</td>
<td>5.55</td>
<td>1.86</td>
</tr>
<tr>
<td>3</td>
<td>20.70</td>
<td>1.03</td>
<td>0.34</td>
<td>2.62</td>
<td>3.25</td>
<td>4.85</td>
<td>20.71</td>
<td>26.05</td>
</tr>
<tr>
<td>4</td>
<td>5.69</td>
<td>0.00</td>
<td>1.67</td>
<td>0</td>
<td>8.54</td>
<td>2.62</td>
<td>42.97</td>
<td>6.81</td>
</tr>
<tr>
<td>5</td>
<td>26.40</td>
<td>0.53</td>
<td>1.36</td>
<td>0</td>
<td>2.06</td>
<td>4.07</td>
<td>23.38</td>
<td>4.29</td>
</tr>
<tr>
<td>6</td>
<td>31.79</td>
<td>3.14</td>
<td>1.45</td>
<td>5.02</td>
<td>4.62</td>
<td>8.67</td>
<td>7.90</td>
<td>6.62</td>
</tr>
<tr>
<td>7</td>
<td>19.52</td>
<td>1.48</td>
<td>3.54</td>
<td>0</td>
<td>5.94</td>
<td>12.93</td>
<td>26.83</td>
<td>4.07</td>
</tr>
<tr>
<td>8</td>
<td>23.23</td>
<td>3.11</td>
<td>0</td>
<td>5.47</td>
<td>3.75</td>
<td>9.04</td>
<td>26.86</td>
<td>12.99</td>
</tr>
<tr>
<td>9</td>
<td>0</td>
<td>0.00</td>
<td>0</td>
<td>0</td>
<td>96.85</td>
<td>0.04</td>
<td>1.80</td>
<td>0.57</td>
</tr>
<tr>
<td>10</td>
<td>22.62</td>
<td>0.82</td>
<td>1.41</td>
<td>2.04</td>
<td>4.82</td>
<td>12.01</td>
<td>19.77</td>
<td>9.99</td>
</tr>
<tr>
<td>11</td>
<td>32.66</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>33.43</td>
<td>0</td>
<td>32.68</td>
<td>1.23</td>
</tr>
<tr>
<td>12</td>
<td>29.98</td>
<td>2.05</td>
<td>0</td>
<td>0</td>
<td>4.72</td>
<td>16.05</td>
<td>15.84</td>
<td>25.77</td>
</tr>
<tr>
<td>13</td>
<td>26.57</td>
<td>0.29</td>
<td>5.81</td>
<td>4.29</td>
<td>11.33</td>
<td>11.11</td>
<td>37.30</td>
<td>2.96</td>
</tr>
</tbody>
</table>

The relation between production cost and operating profit, both modulated in function of Gross Output in order to make the firms comparable, is capable to focus the competitive position of the firm in relation to the others. The figures from 1 to 6 show as following.

The firms located on the right border realize a higher cost production check and keep higher cheapness levels, in the meanwhile, they carry out an appropriate productive output with regard to the productive facility.

These firms show high profitability levels and in the meanwhile, they adopt strategies of minimization cost and quali-quantitative production check.

Obviously, they differ according to the achieved competitive advantages, therefore to the commercial policies and the adopted technologies. Mostly it has been found out among them higher market trends through the pursuit of the maximization custom fidelization and the use of productive technologies capable to maximize the quality product.

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1[1]: The analysis of the competitive position aims to elaborate an indicator of growth and long-term profit of the firm activities. The profit firm capacities are influenced by other peculiar characteristics besides its share market. These characteristics are for example the relative quality of the product, the distribution channels, the location of the facilities, specific advantages, helps to main customers.
Fig. 3: Static analysis 1992

Fig. 4: Static analysis 1993
Fig. 5: Static analysis 1992

Fig. 6: Static analysis 1993
Fig. 9: Profit dynamic analysis 1992/1991

Fig. 10: Profit dynamic analysis 1993/1992
The firms above the efficiency border can be distinguished in three groups. In the first one, there are the firms in investment phase, firm 8 and 10; in the second group, there are those firms tending to inefficiency, firm 9 and 11; finally in the third group, there are the inefficient firms tending to go out from the market, firm 1 and 4.

The above mentioned figures show the position of the firms with regard to the total production cost (Fig 1, Fig.2), the feed (Fig.3, Fig.4) and the labor cost (Fig.5, Fig.6).
The least efficient and profitable firms are those showing high cost levels with regard to the output, these firms are not capable to modulate both the productive factors management and the technologies respect to the real need of the productive process and the market share where they address. Usually to this scenery is related a scarce use of the production technologies and in some cases an ineffective commercial network, this last situation does not allow the application of high margins on the sales and consequently causes a profit decrease.

Finally, these firms produce often a low quality product, that can be sold only at a price lower than market one, in such a context, a inadequate financial management with high interests due to liquidity needs, causes a decrease of the profitability loading of the firm, a consequent going out from the market and the business failure.

**Dynamic comparison**

The sample firms can be classified in four main groups with regard to the efficiency or inefficiency levels achieved through the adopted managerial policies and the pursued strategies. At this aim, some trend ratios (Gross Output Increment, Production Cost Increment) have been investigated during the three years period that, together with the static ratios determined in the static analysis, have allowed the firms grading with regard to the following considerations.

The Table III shows the firms performances with regard to the main static and dynamic ratios to which the sensitivity analysis has been afterwards applied, in order to give each firm its belonging class.

Fig.7 and Fig.8 show the firms position with regard to Gross Output change and Production Cost, they are so capable to detect the productive progresses with respect to the cost checking, leaving aside from the firms dimensional characteristics. Then the profitable increments, with respect to the Gross Output change, have been determined (Fig.9, Fig. 10).

Through the dynamic analysis the following four classes have been focused (Fig. 11).

1. **Inefficient firms.**

In this class, there are those firms with a high production cost with regard to the Gross Output and with an investment sources administration inadequate to the managerial needs. Then it has been pointed out an incompetence to adopt, during the firm start up phase, technologies adequate to the productive process, in the meanwhile, during the firm life cycle, it is easy to find out a scarce modulation of the technologies with respect to the stage of the product life cycle.

2. **Efficient firms with appropriate competitive position and entry harriers.**

In this class there are those firms with a high level management, high experience in the sector, that adopts managerial techniques such as the constant check both of the cost production and of the productive process inputs.

These firms aim mainly to increase the production volume and in the meanwhile they pursue minimisation production costs strategies; in such a way they are
capable to place the product on high demand markets (i.e. mussels) or they direct towards their leadership niche markets.

They are the most conservative that try not to make the production cost heavy; this aim is achieved by allocating the investments and innovative policies during a wider time period in order not to undermine the profitability loading and to modulate production prices and production costs with regard to market prices trends.

3. Firms inclining to inefficiency and in decline.

These firms have a static position with high production costs that, during the start-up phase, show a high production level but later revealing a tendency to a production decrease, not balanced by a production cost decrease.

They produce mainly the traditional species and do not adopt diversification productive mix policies capable to allow to enter new market shares.

4. Efficient firms and in investment phase.

These firms show productive costs suitable to the output, these cost are apparently high with regard only to the carried out investments. They are innovative with a tendency to the vertical integration, to the product and productive mix innovation. If their investment choices were inadequate, these firms lean to go, during the observed years, at first in the second class, then in the third one and finally in the first.

Table IV shows the Sensitivity Analysis results of the ratios pointed out in Tab.III. These ratios have been modulated again and counted in such a way to determine two macro-ratios; the first is an efficiency ratio estimating the production cost level, the second is an effectiveness one estimating the Gross Output level, the product diversification and quality product.

It is worthwhile to note the performances of three firms among the investigated ones (Fig. 11).

The firms 2 and 5 were both in the investment phase during 1992 with high production cost even if with a good output: during 1993 the firm 2 went among the efficient firms, while the firm 5 went among the declining, inefficient ones.

Infact the firm 2 during 1993 benefited by the impact of the investment phase started during the previous years; in the meanwhile the firm 5 leans to decline, due to an incorrect investment and productive policy.

Finally the firm 7 in 1992 was inefficient, while during the following two years was capable to change this tendency with an adequate investment policy; if the firm is capable to rule this policy in the next years, it will point out good profitable and productive results.
Fig. 11: Strategy and competitive position

- Tending to inefficiency and to decline
- Efficient firms and in a leadership position

- Efficient firms and in investment stage

Gross Output, diversification and quality product