Competitiveness strategies in the Greek dairy industry

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ABSTRACT

The dairy industry is one of the most important sectors of the Greek food industry having great impact on the gross domestic product (GDP) and other economic sizes such as the turnover, the value added of the production and the number of the employees. It is characterized by a high degree of concentration and intense competition between the big enterprises and the small local enterprises of the dairy sector. The present study investigated the factors that determine the competitiveness and the selection of the strategy of the dairy industries using indicators such as profitability and market share. The results obtained show that the dairy firms undertake profit investments and use debt financing in order to be extended and acquire a bigger share of the market.

INTRODUCTION

The dairy industry is one of the traditional fields of the manufacturing sector occupying in its industries a great number of active Greek population. In the previous years and especially before the economic crisis the participation of banks through financial investments in fixed assets of industries and the acquisition of production equipment was significant; and led to the modernization of the dairy industry. Furthermore, the addition of the investment motives through development laws adopted by the government had as a result the development of the sector as small businesses managed to industrialize and become a powerful and highly developing sector of Greek economy (ICAP, 2020 p.2).

According to ICAP (2020) regarding the dairy products there is a considerable number of industries in the dairy sector. Specifically, there are large enterprises which have an extensive distribution network covering the entire territory of the country. The majority of the small and medium size enterprises (SMEs) of the sector are local, covering the demand in small distances around them. Therefore, the observed competition in the sector is intense and requires the development of strategies and the determination of the factors that will increase it giving at

the same time competitive advantage in each business against its competitors.

The study aims at investigating competition in the dairy industry and the strategies that dairy enterprises have to develop in order to achieve their goals. For this purpose, in the following sections the Greek dairy industry sector is presented, and its principal characteristics followed by a theoretical overview of competition and its growth models. The methodology of the study is presented in parallel with the estimation of the competitiveness model and the identification of the factors determining it and defines further development of the strategy. Finally, the results of analysis and findings to emerge from the study are presented, followed by conclusions drawn from the findings, a discussion, and recommendations for further study.

The dairy industry in Greece

As referred in the introduction, the Greek dairy industry is one of the most traditional manufacturing sectors having a serious impact on Greek economy, contributing at a

high percentage on the GDP, a fact relating to major investments and high growth rates. Big industries are investing in development, technology and research and thus gaining competitive advantage. One of their characteristic features is their high quality insurance both in the production process and the supply of the final product to the customers.

According to the Greek Foundation of Economic and Industrial Research (2019, p.23) the sector of dairy products compared to the total food and beverage industry has the fourth position in the gross value added of the production with the percentage of 12%, the second position in the production value with a percentage of 15%, the fourth position in the number of industries with a percentage of 6%, while as for the turnover, has the first position with a percentage of 17% and the second with 12% based on the number of the employees.

Another feature of this sector is the high percentage of concentration in spite of the fact that the number of operating industries is high. The industries have modern equipment, taking care to maintain and renovate it, spending significant amounts of money. Furthermore, one of the features of the dairy industry is its high quality products especially because of the modern administration methods applied by the enterprises.

As regards the number of the industries in the sector, the majority are small local production units while there are also large enterprises too. The small units cover especially the needs of the local market while the large enterprises satisfy the nationwide needs. The majority of large enterprises have developed also export activity in the framework of development of new exporting strategies with serious economic impact, improving at the same time their distribution network within Greece (Foundation of Economic and Industrial Research, 2019 p.16). Finally, when it comes to the products of the dairy industry, they can be identified as:

- Fresh milk, long life and evaporated
- Milk desserts
- Milk cream
- Cheeses
- Ice creams (Foundation for Economic and Industrial Research p. 24)

Definition of competitiveness in the literature

Competitiveness is a wide concept in the literature having several meanings. It covers many aspects and many times is difficult to be defined accurately (Fischer and Schroneberg, 2007). Though, it constitutes an essential measure for the selection and the definition of the proper

strategy of each enterprise (Porter, 1985).

According to the literature, there are two ways to measure competitiveness. The first one which was mainly expressed and established by Michael Porter, aims at the development of the competitive advantage against the competitors while the second one is based on the creation and study of economic measures, especially by using measurable indicators.

Porter (1985), in his book "Competitive Advantage", raises the well-known Porter's Five Diamond according to which the enterprise has to be aware of the intensity of the competition in the sector in which operates. This intensity is defined and formed by the following five factors: the threat of the new entrants, the threat of the substitutes, the bargaining power of the suppliers and customers and finally the rivalry among the existing competitors.

The second category of studies, starting with Fischer and Schornberg (2007), competitiveness is estimated, as a system of equations with dependent variables: profitability, market share and productivity. According to their results, the beverage industry is more competitive for the period 1995-2002, while the United Kingdom has the most competitive industries in the European Union that then consisted of 15 member countries.

Similarly, Notta et al. (2010) found that for the period 2002-2007, the competitiveness of the European Union member countries, for the food and beverage sectors, differs significantly from country to country and depends to a large extent on the geographical location of each of them.

Mattas and Tsakiridou (2010) concluded that a competitive food industry not only provides safe and quality food to consumers, but is also able to contribute to the development of the entire national economy by contributing to employment as well as to the entire supply chain from producer to consumers. Similarly with Mattas and Tsakiridou (2010) and by using the quality as competitiveness measure, Suchánek and Králová (2019) studied the extent to which consumer satisfaction, product information, compliance with all legal procedures on the part of the company and other relevant factors affect the competitiveness of food businesses. Their results showed that the qualities of the products as well as the correct information of consumers are the main factors that affect the competitiveness of the food industry.

Lauretti and Viviani (2010) studying the impact of certain economic factors on the competitiveness of the Italian food industry concluded that productivity has a significant effect on the competitiveness of all sectors of this Italian industry.

Crescimanno et al. (2014) dealt with whether and to what extent the international financial crisis has affected the competitiveness of the agri-food sector in various Mediterranean countries such as Italy, Spain, Turkey, and France. The results show that the competitiveness of the agro-food sector of all the countries under study has been reduced by the economic crisis, but to a lesser extent in

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Turkey, the country with the lowest per capita income.

Wijnands et al. (2015) assessed the competitiveness of the food industry in Switzerland using indicators such as profitability, various trade indicators and the achievement of a competitive advantage. The results show that achieving a competitive advantage is perhaps the most important factor in making a food industry more competitive with the rest of the under study business in the area.

Firlej et al. (2017) studied the competitiveness of the Polish food industry using as criteria the exports, the import-export balance and the adoption of innovations. Their results show that the implementation of innovations increases the competitive advantage of the country's food industry.

Harvey et al. (2017) examining how competitive the agro-food sector is in the European Union of 27 member countries concluded that the adoption and implementation of innovations as well as the production of diversified products is what satisfies consumers and stimulates business competitiveness.

In the present study competitiveness is estimated with the use of traditional measures such as profitability and market share. The effect of different economic factors will be studied in order to be identified the factors which affect them and identify the choice of a proper strategy for the dairy processing firms.

RESEARCH METHODOLOGY

In the present study, data were collected from all the dairy processing firms listed on the Athens Stock Exchange which published balance sheets during the years 2015-2019. In Greece, the publication of balance sheets is now mandatory for companies.

The data were collected from the ICAP database, and based on these data the variables that are shown in the next section (where the estimated equations are presented), were constructed. The variables used to estimate the equations were calculated as follows.

Profitability as the ratio of the company's net profits each year to its sales for each year. The market share as the ratio of the company's sales each year to the total sales of the industry each year, the sustainable growth rate as the annual percentage change of the total capital of the company, while the debt ratio (leverage) as the ratio of the total annual loans of the company each year to the total capital of the company for the same year. The age and operating costs that were also included in the equations were used directly from the balance sheets.

Model specification

In the present study, as referred above competitiveness

is defined as the ability of the firm to achieve higher profits and maintain a high market share (Fischer and Schornberg, 2007). According to the definition above, there are two indicators of competitiveness that arise and can be used to measure it, profitability and market share. Therefore the two equations to be estimated with dependent variables are profitability and market share. According to Scherer and Ross (1990) and other previous works (Levy, 1986; Geroski and Jacquemin, 1988; Bhattacharya and Bloch, 2000), both profitability and market share are adjusted to a long-run equilibrium level as a result of various factors which affect them and also affect a company's entry conditions in Industry. So both profitability and market share can be described through a partial adjustment mechanism (McDonald, 1999).

The general form of a partial adaptation model is as follows:

$$Y_t^* = a_o + a_1 x_t + u_t \tag{1}$$

$$Y_t - Y_{t-1} = \lambda (y_t^* - y_{t-1}) \text{ with } 0 < \lambda < 1 \tag{2}$$

Where y is the variable in question, while y * is the desired level of y. Substituting y * in Equation 2, the equation takes the following form.

$$Y_t = a_o\lambda + (1-k) y_{t-1} + \lambda a_1 x_t + \lambda u_t \tag{3}$$

Following other papers in the literature (Vlachvei and Oustapassidis, 1997; Notta, 2000) profitability is influenced by various factors such as market share, capital intensity and elasticity of demand of the price. In addition, taking into account the partial adjustment mechanism of profitability, the profitability equation can take the following form:

$$PNP_t = a_0 + a_1 MS_t + a_2 PNP_{t-1} + a_3 OPC_t + a_4 GROWTH_t + a_5 KS_t + u_t \tag{4}$$

Where PNP is the desired level of profitability, MS is the market share, OPC is the operating cost, GROWTH is the rate of sustainable growth, KS is the intensity of capital and u_t the disturbance term.

Continuing with the market share according to the literature (Vlachvei and Oustapassidis, 1997; Gomez and Lorente, 2004; Yoo, 2005; Ameniya, 1984) it is also influenced by various factors that affect the entry of a company in an industry such as profitability, age, loans, and capital intensity. In addition, taking into account the partial adjustment mechanism, the market share equation can take the following form:

$$MS_t = b_0 + b_1 PNP_t + b_2 MS_{t-1} + b_3 AGE_t + b_4 KS_t + b_5 LEV_t + u_t \tag{5}$$

Where MS is market share, PNP profitability, AGE years

of operation, KS capital intensity, LEV the leverage and u_t the disturbance term.

In the two above equations the values of the dependent variables, both profitability and market share truncate in the case of market share between 0 and 1, while in the case of profitability between -1 and 1. In these cases the least squares method is considered inefficient and biased, so it is not used appropriate for the check of the existence or no correlation between the parameters and factors (Ameniya, 1984; Yoo, 2005). The tobit method is proposed as the estimation method which corrects the least square method bias (Yoo, 2005).

Moreover, the two equations are checked for the existence of autocorrelation and heteroskedasticity bias with the use of proper methods. The check for the existence of autocorrelation takes place with the Wooldridge method, while the corresponding one for heteroskedasticity with the Breusch-Pagane (Drukker, 2003).

Therefore, taking into account the possible interdependence of the two variables, the limited range of their values and the possible endogeneity between them, the two equations are evaluated simultaneously as a system of equations. In these cases where we have a system of equations the tobit model takes the following form:

$$Y_i^* = x_i\beta + u_i, i = 1,2, \ldots\ldots n \tag{6}$$
$$Y_i = L_i, \text{ if } y_i^*, < = L_i, \tag{7}$$
$$Y_i = x_i\beta \text{ if } L_i < y_i^* < U_i, \tag{8}$$
$$Y_i = U_i \text{ if } y_i^* > = U_i \tag{9}$$

Where Y_i^* is the dependent variable, x_i is the group of independent variables, β is a group to estimate parameters, and u_i the errors that result from the hypothesis (Yoo, 2005).

The results from the Wooldridge test show that we can accept the null hypothesis that there is no autocorrelation both for the profitability and market share equations because $F(1,58) = 1.056$ and Prob > F = 0.4711 for the profitability equation while $F(1,58) = 2.011$ and Prob > F= 0.1123 for the market share one. The same occurs for the heteroskedasticity (Breusch-Pagane) test where $x^2(1) = 0.12$ and Prob > x^2 = 0.7238 for the profitability equation while $x^2(1) = 0.15$ and Prob > x^2 = 0.7336 for the market share one.

RESULTS

For the reasons referred above in the model specification, the two equations are estimated as a simultaneous equations regression system with the use of Tobit model. The factors which used as independent variables and may affect or not the dependent variables derided from the literature studied, for both the two equations, taking into account the Industrial Organization Theory and other related papers (Vlachvei and Oustapassidis, 1997; Gomez and Lorente, 2004; Yoo, 2005; Ameniya, 1984).

Starting with the profitability equation, the market share (coefficient = 0.405, probability value = 0.048), impacts on profitability. The positive and statistically significant effect of the market share on the profitability of dairy industries confirms the aforementioned sectoral studies, that the dairy industry in Greece is a highly concentrated sector with a small amount of large enterprises that form the market development. The lagged profitability shows a coefficient equal to 0.365 while the probability value (p value) is below 1%.

The sustainable growth rates shows a positive and statistically significant impact on the profitability (coefficient = 0.014, probability value = 0.004). A 1% increase in growth rate will have as a result the increase of the net profit margins by 0.014%. The effect of the operating costs on the profitability showed negative and statistically significant (coefficient = -0,231, probability value = 0.002), in contrary to the capital intensity which had no impact on the net profit margin of the studied dairy industries (coefficient = 0.001, probability value = 0.708).

Continuing with the market share equation, it is positively and statistically significant affected by the profitability (coefficient = 0.274, profitability value = 0.708) while the market share rate of the previous period was 0.832 and the probability value was below 1% which means that big enterprises invest their profits on size developing strategies intending to increase their dominance on the market. Similar to the profitability equation on this sector, not significant, seems to be the effect of the intensity of the available capitals (coefficient = 0.003, probability value = 0.983).

In contrary to the capital intensity, positive and statistical significant seems to be the effect of the operating years (coefficient = 0.002, probability value = 0.081) indicating that the older operating industries are also the biggest and they control an important section of the market. Finally, positive and statistically important is the effect of the leverage (coefficient = 0.003, probability value = 0.001) which possibly arises from the fact that the dairy industries are implementing a strategy of expansion and stimulating the competitiveness using debt investments. Specifically, a 1% increase in debt investments will lead to a 0.003% increase of the dairy industries under study.

Following below in Table 1 the results of the simultaneous equation tobit estimation are presented.

DISCUSSION AND CONCLUSIONS

Dairy industry is an important sector not only for manufacturing but also for the Greek economy as a whole, as it highly contributes to GTP and other economic sizes such as value added of production, turnover, and number

Table 1. Tobit estimates of the simultaneous equations system. Log likelihood: 491.85; Wald χ^2: 352.87; Prob>χ^2 (2): 0.000.

Variables	Profitability (PNP)	Market share (MS)
Profitability (PNP)		0.274(0.056)*
Profitability (-1) (PNPLAG)	0.365(0.000)***	
Market share (MS)	0.405(0.048)**	
Rate of growth(GR)	0.014(0.004)***	
Operating costs (OPC)	-0.231(0.002)***	
Capital intensity (KS)	0.001(0.708)	0.003(0.983)
Market share (-1) (MSLAG)		0.382(0.000)***
Operating years (AGE)		0.002(0.081)*
Index of loans (LEV)		0.003(0.001)***

Where *** signals statistically significant at 1% level, ** statistically significant at 5% level and * statistically significant at 10% level.

of employees. A significant number of big enterprises with a wide distribution network exist in the industry along with small enterprises that meet local needs. The competition that is observed is intense despite the high degree of concentration that characterizes the industry.

The positive influence of profitability to the market share and vice versa indicates the fact that the dairy industries implement their development strategies through investing their profits on the increase of their market share, and thus controlling the bigger part of the market. The older operating enterprises are also the bigger ones holding a serious part of the market share. It is evident that they use debt investments as developing strategies and investments in order to be extended.

Comparing the dairy industry with the total of food and beverage industry in Greece in terms of the impact of various economic factors as for their competitiveness and consequently on the formulation of their development strategies is an issue that concerns the authors of this paper.

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