Competitiveness – the case of Greek food manufacturing firms

Ourania Notta
Technological Educational Institute of Thessaloniki, Greece

Aspasia Vlachvei
Technological Educational Institute of West Macedonia, Greece

and

Vagis Samathrakis
Technological Educational Institute of Thessaloniki, Greece

Abstract
While there is much agreement on the economic and social importance of competitiveness, it is less clear what exactly competitiveness is and what its most important determinants are. The aim of this paper is first to present an extensive literature review relative to the question under investigation. Second this study aims to presents the competitiveness in Greek Food and Beverage industry by comparing the mean values of growth and profitability in each of the ten sectors with the mean values of growth and profitability for the whole Greek economy sectors. Finally uses as main competitive indicators firm profitability and growth in order to investigate the relative importance of both firm specific characteristics (eg. size, past profitability, growth, financial ratios) and industry characteristics (e.g.industry growth) on competitiveness of Greek food and beverage manufacturing firms. The empirical work is based on financial data of 300 food manufacturing firms. The financial data set covers the period 2003-2007. The Fixed Effects method is used to estimate the coefficients of the specified empirical model using time series cross-section panel data. This study contributes to the literature on the discussion of the indicators of competitiveness and factors affecting competitiveness, especially in case of Greek food and beverage firms.

Keywords: firm competitiveness, profitability, growth

1. Introduction

Competitiveness has become a central preoccupation in an increasingly open and integrated world economy. Despite its acknowledged importance, the concept of competitiveness is often controversial and misunderstood. There is no accepted definition of competitiveness and no generally accepted theory to explain it. Competitiveness is the fundamental determinant of the level of prosperity a country can sustain (Porter, 2005). To firms, competitiveness meant the ability to compete in world markets with a global strategy (Porter, 1998a, b). Economic success has been closely associated with the level of competitiveness, i.e. the ability to compete. However, there has been controversy in defining the relevant entities involved and the corresponding concept of competitiveness. Specifically, while "competitiveness" is readily defined at the firm level, the concept becomes a bit vague when applied at the industry and national level.

In the literature, different definitions of competitiveness exist. The EU Commission (2003) uses as a definition of competitiveness: "the ability of an economy to provide its population with high and rising standards of living and a high level of employment for all those willing to work, on a sustainable basis". Another definition which is more focused on the manufacturing (Lall, 2001) sectors states: "competitiveness in industrial activities means

developing relative efficiency along with sustainable growth". According to Canada's Agri-Food competitiveness Task Force competitiveness is defined as: "the sustained ability to profitably gain and maintain market share (Martin, Westgren &van Duren, 1991; Fischer and Schornberg, 2007)

At the firm level, the view of competitiveness can be given as (Buckley, et al., 1988): "A firm is competitive if it can produce products and services of superior quality and lower costs than its domestic and international competitors. Competitiveness is synonymous with a firm's long run profit performance and its ability to compensate its employees and provide superior returns to its owners." Hence, a firm's competitiveness can be measured by its relative price, market share, and degree of profitability over a relevant period of time. If the firm is an exporter, market share can be measured at the global level. Product quality can also be assessed and compared.

The Organisation of Economic Co-operation and Development (OECD, 1996) defines competitivenes as "the ability of companies, industries, regions, nations and supranational regions to generate, while being and remaining exposed to international competition, relatively high factor income and factor employment levels on a sustainable basis". The existence of these different definitions indicates that the concept of competitiveness is in fact, multidimentional in nature and that, as a consequence, it is difficult to deal with theoretically as well as empirically. According Fischer and Schornberg (2007) profitability certainly is a key variable for assessing sector competitiveness (EU Commission, 2005) and value added as a percentage of turnover is a kind of profit margin that one often has to rely. Market shares are usually defined as the proportion (percentage) of the total available market (or segment) output or sales that is produced or sold by a company or an industry (Werden, 2002). Fischer and Schornberg (2007) argued that market share is a useful competitiveness indicator at the company level even when analyzing aggregates, market shares may be problematic.

Following Canada's Agri-Food competitiveness Task Force:
Competitiveness is the sustained ability to profitably gain or maintain market share.
The above definition has three measurable aspects - profits, market share and (sustained) time. So, competitiveness is attained if one is profitable with steady or increasing market share over time. The term focuses on results (profitability, market share), not on behavior. So, the distinction between one who is competitive and one who has a high degree of competitiveness is that the first displays competitive behavior, while the second shows results. The last distinction is important in that it implies that an analysis of competitiveness begins with the end – i.e. the industry has shown a high degree of profitability and an ability to gain market share.

The aim of this paper is first to present an extensive literature review relative to the question under investigation. Second this study aims to presents the competitiveness in Greek Food and Beverage industry by comparing the mean values of growth and profitability in each of the ten sectors with the mean values of growth and profitability for the whole Greek economy sectors. Finally uses as main competitive indicators firm profitability and growth in order to investigate the relative importance of both firm specific characteristics (e.g. size, past profitability, growth, financial ratios) and industry characteristics (e.g.industry growth) on competitiveness of Greek food and beverage manufacturing firms.

This study contributes to the literature on the discussion of the indicators of competitiveness and factors affecting competitiveness, especially in case of Greek food and beverage firms

2. State of the Art

2.1 Literature review

An extensive literature on the linkage between technology, trade performance and economic growth provides a solid framework for analysis. Two advances in economic theory have brought technological capability—the major element of non-price competitiveness—to the forefront. The development of the New Trade Theory represented attempts to relax the restrictive assumptions of the neoclassical framework, which assumes the existence of competitive markets, factor substitutability and mobility, and profit maximization. The new theory sought to extend and develop the traditional framework by incorporating in its analysis such issues as the treatment of economies of scale, externalities, technical progress, product differentiation, and monopolistic and oligopolistic situations (Haque, 1995). The offshoot of the new trade theory and endogenous growth theory was to shift the focus on technology capability as the primary determinant of an economy's competitiveness. (Yap, 2004) The first step is to distinguish between the concepts of competitive performance and competitive potential (Buckley, et al. 1988). The simplest way to differentiate the two is by the observation that performance is an outcome of potential. Table 1 gives possible measures of both performance and potential at the firm level.

Table 1. Measures of Competitiveness at the Firm Level

Performance	Potential
Market share (both domestic and export markets); profitability	Price and cost competitiveness; productivity; technology indicators

Source: Buckley, et al. 1988

The elements of competitiveness potential are: price and cost competitiveness, productivity, and technology indicators. Productivity refers to the efficiency in the use of resources and factors of production. Innovation, technological advancement, effective management of organizational activities, brand, quality of products and services, and human capital are now widely recognized as vital sources of competitiveness for firms (Johnson and Scholes, 2002). Innovation includes product and production innovation, business and management innovation, and service innovation. These are achieved through in-house development as well as strategic alliances across organisational boundary. There is a general consensus in the strategic thinking that the ability for an organisation to develop and exploit knowledge faster than its competitors is a key component of its competitive advantage (Porter, 1980; Prahalad and Hamel, 1990; Leonard-Barton, 1995; Nonaka and Teece, 2001). Other studies equate competitiveness with comparative advantage and use trade-based measures such as the index of revealed comparative advantage. That is a sector is perceived as being competitive if a country is specialized in that sector, as measured by a relatively superior sector export performance. (Fertö & Hubbart, 2002; Traill & Da Silva, 1996).

Writers on strategic management have also accentuated the importance of embracing and exploiting externally held knowledge through organizational networks and inter-firm relationship (e.g. alliance and partnership) in a context of accelerating global competition (Castells, 1996; Child and Faulkner, 1998; Powell et al., 1996; Pucik, 1988).

Most of the studies draw on profitability and market shares as relevant sector competitiveness indicators (e.g. Martin et al., 1991; Martin & Stiefelmeyer, 2001). Other studies (Lall, 2001) to asses sector competitiveness use efficiency and growth as indicators. However some argue that competitiveness is more than efficiency. For example Buckley et al.(1988) states that

competitiveness includes both efficiency (reaching goals at the least possible cost) and effectiveness (having the right goals). Finally, some studies use production costs as measures for agribusiness sector competitiveness (Hoste & Backus, 2003; Hitchens et al., 1998)

2.2 Greek food industry
The Food and Drink sector is the most important and most dynamic industrial sector of the Greek Economy. This could be explained partly because it absorbs the country's agricultural production, but also because of its significant contribution to aggregate economic variables, such as Gross National Product, External Trade and Investments, etc. The following data demonstrate the significance of the F&D sector for the Greek Economy. The sector accumulates 25% of the GNP of the industrial sector, thus taking the first place amongst all the industrial sectors (2007). The sector employs 26% of the total employees in secondary sector. Nowadays, foodstuffs and wine together make up 35% of Greek exports. The sector accumulated 14% in 2007 of total investments (including investments in trade and services).

Table 2.Growth of Greek food industry

|	No of firms	Industry growth (%)	Economy 2007
Sausages (1513)	24	12.0	7.5
Water and spirits (1598)	65	15.7	7.5
Poultry (1512)	76	22.8	7.5
Bakery products (1581)	232	8.7	7.5
Oils& fats (154)	148	-6.1	7.5
Wine (1593)	92	10.6	7.5
Mill products (156)	68	22.3	7.5
Dairy products (155)	141	22.2	7.5
Beverages (1591)	48	5.7	7.5
Miscellaneous (1599)	598	7.0	7.5

In order to evaluate Greek Food sector competitiveness we compare the mean values of growth and profitability in each of the ten sectors with the mean values of growth and profitability for the whole Greek economy sectors. The sectors that combine higher profitability and higher growth than the economy average are characterised as competitive, while sectors that have only higher profitability or only higher growth are characterised as potentially competitive, while food sectors with level of profitability and growth lower than the mean value of the average, are characterised non-competitive. The average growth and profitability value of all economic sectors and for each of the selected food and beverage sectors for 2007 have been taken from Hellastat Bank. Table 2 shows the growth of the ten selected food sectors with their NACE classification code. According to Table 2, sausages (with industry growth 12%), water &spirits products (with industry growth 15.7%), poultry (22.8%), bakery products (8.7%), wine industry (10.6), mill products (22.3%) and dairy sector (22.2%) grow faster than the average (7.5%).

Table 3 presents gross profitability values for each of the ten Greek food and beverage sectors and the mean value of all economics sectors for 2007. According to Table 2, water and spirits (30.4%), bakery products (32.1%), wine (29.7%) and beverages (28.9%) are more

Table 3. Gross Profit margin of Greek food industry

	Gross profit margin		Economy	
	2007	2006	2007	2006
Sausages	22.5	22.0	26.9	26.4
Water and spirits	**30.4**	**28.0**	26.9	26.4
Poultry	11.6	12.6	26.9	26.4
Bakery products	**32.1**	**31.1**	26.9	26.4
Oils& fats	12.4	10.7	26.9	26.4
Wine	**29.7**	**31.4**	26.9	26.4
Mill products	16.5	15.7	26.9	26.4
Dairy products	14.9	13.3	26.9	26.4
Beverages	**28.9**	**28.0**	26.9	26.4
Miscellaneous	22.5	21.8	26.9	26.4

profitable than the average for 2007 (26.9%). So we can conclude that competitive industries are water and spirits, bakery products, wine products who combine higher than the average growth and profitability. Potentially competitive industries are sausages, poultry, mills, beverages, dairy products, sectors which have either higher than the average growth or higher
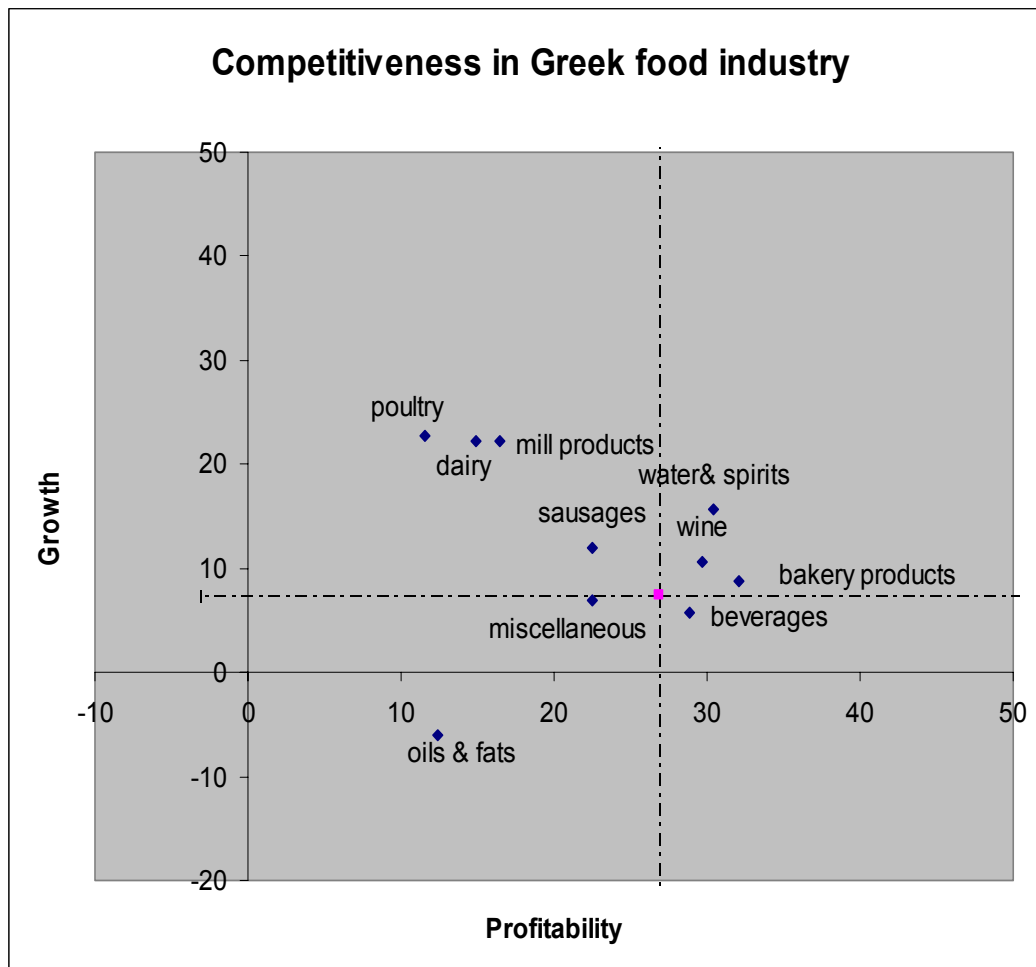
profitability and Non-competitive industries are oils and fats and miscellaneous. These results are presented also in the graph.

3. Research Methodology

3.1 Data of empirical model

The data source used in this paper was obtained from the balance sheets and income statements published by two proprietary companies ICAP HELLAS and HELLASTAT. The empirical work is based on financial data of 303 food manufacturing firms for the period 2003-2007. Although the financial data were collected for the period 2003-2007, the results cover the period 2003-2007 in order to take account of the growth variable. We use panel data for food manufacturing firms over the period 2003-2007 of 6 food industries: wine industry, ice-cream, dairy products, sausages, poultry, and mill products.

In this study we will try to evaluate competitiveness as a function of profitability and growth, separately. Profitability is measured as gross profits over turnover (gross profit margin) while Growth is measured as the annual change of turnover value. With regard to the variables used, Profitability (PR) is measured as the ratio of gross profits over turnover while Growth (GR), is measured by the sales growth rate, as the ratio of firm's sales of year t minus the sales of year t-1, over sales of year t-1,$(S_{i(t)}-S_{i(t-1)})/S_{i(t-1)}$. Following much of the recent literature we adopt as a measure of firm size (SIZE) sales and as a measure of firm age (AGE) the number of years a firm is operating in an industry. Market share (MS) is the annual ratio of the firm's sales over the industry sales. Advertising intensity (AS) is measured as the ratio of advertising expenses over sales. As financial variables we include also leverage (LEV) which is the ratio of short liabilities over total assets and LIQ which is the ratio of current assets over total assets.. Industry Growth (GRI), is measured by the sales growth rate, as the ratio of industry's sales of year t minus the sales of year t-1, over sales of year t-1,.All variables have been subjected to logarithmic transformation (natural log).

3.2. Empirical model specification

Profitability Model specification

According to the Industrial Organisation literature (IO) the performance of the firm is a result of either efficiency of the firm or market power effect. Demsetz presented evidence that supported the efficiency hypothesis (Demsetz, 1973). Empirical studies of traditional (Structure-Conduct–Performance) SCP provided support for the market power hypothesis. A number of recent studies suggested that both market power and efficiency affect profitability (Oustapassidis et al. 2000).

Also according to managerial school of thought, management practice is the key to profitability. Cowling (2004) add a forth school of thought which is closely aligned with the managerial school, the so called "entrepreneurial school", where inter-firm variation in profitability substantially reflects differences in the quality of entrepreneurs who own and coordinate firms.

The relationship between a firm's profitability and the explanatory variables is modeled (Spanos et all, 2004; Barbosa and Louri, 2005; Cowling, 2004) as follows:

Profitability = f (firm quality variables, financial variables, industry variables)
$$PR=a_0 +a_1MS +a_2MS^2 +a_3AS+a_4AGE +a_5LEV+ a_6GR+ A_7GRI$$
where

•**PR** is the profitability variable at time t
•**MS** is market share
•**MS²** is the square value of Market share
•**AS** is firm advertising intensity
•**AGE** is firm's age
•**LEV** leverage index
•**GR** is the firm growth variable
•**GRI** is industry growth variable

Given that large firms have lower information assymetries and are less risky they have access to lower cost of capital. Also given that larger firms may have strategic and competitive advantages they may realize superior profits. (Majundar, 1997;Sign et al. 2007). On the other hand, small firms may be able to compensate their cost differentials by adopting more flexible managerial organizations and methods of production responding more rapidly to changes in the competitive environment and obtaining larger than average profits.

A positive relationship between firm age and profitability may be expected if older firms benefit from dynamic economies of scale by learning from experience. They may also benefit from reputation effects, which allow them to earn higher profits. At the same time, an older firm may have a more rigid organizational structure not in line with changes in market conditions that can negatively affect firm performance (Glancey, 1998).

An increase in firm growth is expected to affect profitability positively. This can be explained because rapidly growing firms can enjoy advantages related to both the economies of scale and dominance of the market. The higher the leverage ratio, the greater the risks associated with the probability of default by the firm, while lower leverage generally indicates greater financial security. However, there are cases where the firm needs financial support to invest in modern technology. Value-maximization theory suggests the existence of optimal leverage for a firm (Copeland and Weston, 1983), which is determined by the trade-offs between the benefits of borrowing and the associated risks.

Firm Growth Model Specification
Firm growth has been studied at both the theoretical and empirical level. The most famous theory about a firm's growth is Gibrat's law. This law essentially states that firm growth is independent of firm size. Empirical literature has for the most past rejected the model, while some have not been able to reject for large firms. However, it is widely accepted that not only the size and age but a number of strategies affect the rate of growth. More detailed empirical analysis on the determinants of growth going beyond the traditional size-age-growth relationship should be of great importance both for economists and policy makers.

The following model has been formulated to identify and quantify the factors that explain growth in Greek manufacturing firms.

$$GR = a_0 + a_1 SIZE + a_2 SIZE^2 + a_3 PR + a_4 AGE + a_5 AS + a_6 LIQ$$
where **GR** is the growth variable,
•**SIZE** is the size of the firm,
•**SIZE²** is the square value of size
•**PR** is the profitability variable,
•**AGE** is the age of the firm,
•**LIQ** is liquidity,

•and **AS** is the advertising intensity.
•

A non-significant relationship between size, age and the growth of firms is an indication that Gibrat's proportional growth law holds, while a negative relationship is a rejection of Gibrat's law and at the same time a validation of Jovanovic's managerial efficiency theory. The latter asserts that efficient firms grow while inefficient firms decline. The results of empirical studies on the relationship between firm growth and firm size are not equally unanimous. In most studies especially for small firms (Caves, 1998; Harhoff et al.1998; Almus and Nerlinger, 2000) Gibrat's Law is rejected. Some other findings lend support to this law (Klette and Griliches, 2000), while Hall (1987) cannot reject the law for larger firms.

We expect young firms to grow faster than older. A number of studies (Glancey, 1998; Davidsson et al. 2002) proved that the relationship between firm age and growth is negative suggesting that older firms grow less rapidly than younger firms. By sorting firms into intervals related to their age, Evans (1987a and 1987b) showed that firm age is an important factor in explaining firm growth. Firm growth is expected to slow with age (Oliviera and Fortunato, 2006) Also Robson and Benneti (2000) support that older firms have reached a reasonably secure position in the markets in which they compete, having long ago surpassed the minimum efficient scales of production.

3.3 Method of Analysis and Empirical Results

It is worth noting, that this study uses firm level data in order to take into account the persistence of profits and the sustainability of the competitiveness. Although the interpretation of cross sectional regression estimates, as measures of long-run slopes and elasticities, is rather standard in the literature, the permanency of the profits observed in any cross section is open to question (Mueller, 1986; Oustapassidis *et al.,* 2000). A panel data analysis can provide estimates satisfying the relevant requirements. A number of researchers (Hsiao,1986; Klevmarken, 1989; Solon, 1989) claim that only panel data can control for individual heterogeneity, can give more informative data, more variability, less co linearity, more degrees of freedom and more efficiency. Also they argue that panel data are better able to identify and measure effects that are simply not detectable in pure cross sections or pure time series data and allow us to construct and test more complicated behavioral models than purely cross-section or time-series.

The Fixed Effects method is used to estimate the coefficients of the specified empirical model using time series cross-section panel data. In profitability equation model (table 4) the results of Hausman-test for orthogonality suggested that individual effects were correlated with other repressors; thus we used fixed effects regression to produce unbiased regression coefficient (H=34.04, d.f. =7, p=0.00). Fixed effects regression (also referred as the least squares dummy variable model) controls for both the unobserved firm (group) effects and the year effects. Fixed effects regression assumes that the unit specific (firm-specific) residuals do not have a distribution and treats them as fixed and estimable. Fixed effects also help minimize the problems of heteroscedasticity and autocorrelation (Finkel, 1995; Kor and Leblebici, 2005).

The main significant determinants of profitability are: market share, age of the firm, leverage and firm growth. Market share is found to affect profitability positively since larger firms usually have strategic and competitive advantages which lead to superior profits. Even the square value of market share has a positive sign which shows that in case of Greek food industries an increase in size will always lead to superior profits. Age affect profitability

positively as it was expected, since older firms benefit from dynamic economies of scale by learning from experience and from reputation effects, which allow them to earn higher profits. The impact of leverage is negative as it was expected also, since the higher the leverage ratio, the greater the risks associated with the probability of default by the firm, while lower leverage generally indicates greater financial security. Finally the impact of firm growth on profitability is found to be negative which can be explained because rapidly growing firms can enjoy advantages related to both the economies of scale and dominance of the market. Advertising intensity and industry growth have no significant effect on profitability.

Table 4. Profitability model parameter estimates

Variables	Fixed effects PR
MS	0.32 (1.89)**
MS2	0.05 (3.13)*
AS	0.002 (0.14)
AGE	0.31 (2.10)*
LEV	-0.14 (-2.34)*
GRF	-0.12 (-1.90)**
GRI	0.01 (1.58)
Hausman-test	34.04 (7df, 0.00)
R2 Adj. R2	0.77 0.67
Observations	883

* & ** denotes statistical significant results at 1% & 5% level of significance, respectively

Table 5. Growth model parameter estimates

Variables	Fixed effects GR
SIZE	-0.41 (-1.94)**
SIZE2	0.032 (4.28)*
PROF	-0.06 (-2.23)*
AGE	-0.31 (-3.92)*
LIQ	-0.08 (-1.50)
AS	0.012 (1.50)
Hausman-test	148.52 (6df, 0.00)
R2 Adj. R2	0.51 0.30
Observations	892

* & ** denotes statistical significant results at 1% & 5% level of significance, respectively

The application of Hausman-test for fixed effects (OLS-dummy variable) or random effects (error component) in the case of growth equation model (table 5) shows that the fixed effect model is the appropriate estimation method for the model (H=148.52, d.f. =6, p=0.00). The main significant determinants of growth are size, profitability and age. It is found that there is an U shaped relationship between size and growth which implies that size affect growth positively only when firm reaches a certain level of sales. Profitability is found to affect growth negatively which shows that in order to achieve high growth firm sacrifices profits. The relationship between firm age and growth is found to be negative suggesting that older firms grow less rapidly than younger firms. Advertising intensity variable and liquidity variable have no significant effect on growth.

4. Conclusions

In this paper we try to present an extensive definition framework and literature review relative to the question, how competitiveness is defined and what measures can be used. Our research concludes that among other measures, profit margins and growth can be preferable, at least in our case- which is the Greek food manufacturing.

More specifically we used the two measures in order to evaluate the competitiveness in Greek Food and Beverage industry by comparing the mean values of growth and profitability in each of the ten sectors with the mean values of growth and profitability for the whole Greek economy sectors. The results show that from the ten sectors used in this analysis, only three can be characterised as competitive since they have higher level of both profitability and growth than the average of the Greek sectors. Competitive industries are water and spirits, bakery products, wine products. Potentially competitive industries are sausages, poultry, mills, beverages, dairy products and Non-competitive industries are oils and fats and miscellaneous.

Further in our empirical model we use as main competitive indicators firm profitability and growth in order to investigate the relative importance of both firm specific characteristics (e.g. size, past profitability, growth, financial ratios) and industry characteristics (e.g. industry growth) on competitiveness of Greek food and beverage manufacturing firms. Our results prove that market share and age affect profitability positively, while the impact of leverage and firm growth on profitability is found to be negative. The main significant determinants of growth are size, profitability and age. It is found that there is an U shaped relationship between size and growth which implies that size affect growth positively only when firm reaches a certain level of sales. Profitability is found to affect growth negatively which shows that in order to achieve high growth firm sacrifices profits. Future research should improve the development of a competitive index as a composite measure of different dimensions of the competitive concept.

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