

DETERMINANTS OF MARKET SHARES OF CONSUMER-INDUSTRIES IN GREEK FOOD MANUFACTURING: A FIRM LEVEL ANALYSIS

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The majority of the studies that examine the determinants of the structure use industry level data. The main reason is that industry level data are easily available, being publicly reported in the Census of Manufacturers (Martin, 1993), while firm level data in most countries are not easily available.

These data limitations do not exist in Greece since a proprietary company (ICAP) publish annual balance sheet data and some other additional information for all manufacturing firms. Given the high correlation between market shares of the leading firms and concentration in the markets (e.g. high market shares are associated with high level of concentration) it is reasonable to expect that both the level of market shares and industry concentration are determined by similar variables. It has

been argued that market share than industry concentration is the main determinant of market performance and competition and that the policy (e.g. antitrust policy) has to focus attention at the level of firm rather than on the industry. Market share is the most important single indicator of firm's degree of monopoly power in an ordinal sense. High market shares always provide higher monopoly power, while low shares involve little or none. The importance of market share has been recognised in the classical and neo-classical literature, mainly as a source of profits to the firm (Shepherd, 1990). This is the reason that almost all of the studies that have been carried out with firm level data associate market share with profit rates (Ravenscraft, 1983; Scott and Pascoe, 1986; Shepherd, 1972). Martin (1993) states that the advantage of using firm-level data is that one can examine the effect of changes in market share, rather than market concentration, on market performance. But since market share is an indicator of monopoly power is important to investigate the factors that affect it. There is an increasing evidence, that product differentiation and economies of scale play an especially predominant role in structural level. Strickland and Weiss (1976) suggested that concentration depends on economies of scale and advertising intensity. Martin (1979a) has criticised Strickland and Weiss's model on techni-

ABSTRACT

A large number of empirical studies of the literature examined the determinants of industrial structure, measured by concentration, using industry level data. This paper attempts to determine the factors that affect the market shares of Greek food manufacturing in consumer industries in 1992 by using firm level data. The results show that product differentiation, as it is measured by the advertising intensity and the number of brands per firm, along with the economies of scale and industry size are the main determinants of the market share. These results are similar to the evidence obtained from the relevant analysis that has used industry level data.

RÉSUMÉ

Un grand nombre d'études empiriques en littérature analysent les déterminants de la structure industrielle, mesurée en termes de concentration, en utilisant les données au niveau industriel. Ce travail essaie de déterminer les facteurs qui influent sur les quotes-parts de marché de l'industrie alimentaire grecque au niveau des industries des biens de consommation en 1992 en utilisant les données au niveau de l'entreprise. Les résultats montrent que la différenciation des produits - mesurée par la taux de publicité et le nombre de marques par entreprise - ainsi que les économies d'échelle et la taille des industries sont les déterminants principaux des quotes-parts du marché. Ces résultats sont proches de ceux qui ont été obtenus par l'analyse basée sur les données au niveau industriel.

cal grounds, and suggested a slightly enhanced model which has more attractive properties from an estimation viewpoint. Variables which describe technical entry conditions economies of scale and cost disadvantage ratio have significant coefficients although for his sample advertising intensity does not.

Pagoulatos and Sorensen (1983), found industry size, advertising intensity and initial capital requirements to be significant, but not industry growth. Uri (1988), concluded that the advertising variable has a positive effect on market structure. The absolute size of the industry exerts very weak downward pressure on concentration suggesting that large industries contain more opportunities for entry and expansion than relatively smaller industries. Finally the minimum efficient scale is a significant factor in explaining concentration.

Changes in market share and structure are especially revealing, however, because they serve as a proxy for changes in other elements of structure. For example, if entry barriers increase for some reason, industry concentration will probably rise as well. Thus, although market share is just one indicator of oligopoly or market power, changes in it are likely to reflect changes in other structural variables as well (Bain, 1956; Mueller and Hamm, 1974; Scherer and Ross, 1990). Most of the research typically explain inter temporal changes in concentration by the past levels of industry growth, advertising intensity and minimum efficient size. Mueller and Hamm (1974) found that between 1947 and 1970 concentration was increasing the most in industries characterised by a high degree of product differentiation. Whright (1978) substantiated the Mueller and Hamm conclusions. Mueller and Rogers (1980) found that television advertising has played an especially potent role in increasing concentration of consumer good industries. Jenny and Weber (1978) conclude for the French manufacturing sector, that there is a tendency towards deconcentration only in those industries in which barriers to entry are low.

DATA

In contrast to other countries where firm level data are considered as confidential, in Greece all firms are obliged to publish their annual balance sheets. The relevant data are available on an annual basis from a proprietary service company (ICAP) for all food manufacturing firms. That allows the classi-

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fication of the firms into the relevant 4-digit industries. Furthermore, in most studies that examine concentration, the sample is not homogeneous and includes a wide range of different industries. In this study the analysis is applied to a more homogeneous sample consisting of only consumer food and beverage manufacturing firms which are highly differentiated. This could provide better results (Connor et al, 1985). The food processing sector was chosen not only because of its importance as an area of current public concern but also because of its importance relative to the manufacturing sector. Food and beverage industries have recently been characterised by a rapid structural change and high profitability in both the European Union and Greece. The respective profitability indices for Greece are 13.6 and 26.9 percent against 11.3 per cent for the total manufacturing for 1992 (NSS). The same industries also achieved faster growth than the rest of the sector in terms of manufacturing output for the period 1987 and 1992. The respective indices (1980=100) are 98.3 and 102.6 for total manufacturing, as compared to 103.7 and 113.2 for the food industry and 126.1 and 132.1 for the beverage industry for 1987 and 1992, respectively (NSS).

The sample utilised in the estimation of the models consisted of 657 Greek food processing firms which were classified into the relevant 42 4-digit industries. From these firms, 267 consumer goods firms (which represent a 78.5 percent of the total size of the industries) had available information for all the variables that were used. Calculation of the relevant measures for firm growth (1987-92) and market shares for 1992 were made by the authors for each firm. The variable of minimum efficient size, industry growth and size were calculated also for each industry. Advertising expenses by firm were provided by another proprietary company (Nielsen). **Table 1** shows the mean values of the variables used.

Table 1 Mean values of the variables.

Variables	Mean value
ASF92	0.7%
GRF	5.6%
GRI	5.5%
MES	26.91%
BNF92	1.73

THE MODEL

Theory suggests that different underlying economic factors influence concentration in various industries. Following Martin (1979a, 1979b), the equation that explains inter industry differentials in market share (MS92) is based upon the proposition that the long run equilibrium level of market share is determined by scale economies, advertising, the rate of industry and firm growth and by other factors that establish the nature of entry conditions. Following the relevant IO literature we identify and quantify the factors that explain the level of market shares of the Greek food manufacturing firms by including the following variables in a cross sectional multiple regression analysis: level of advertising intensity per firm (ASF92), number of brand names per firm (BNF92), firm growth rate (GRF) and also size (LSI92), growth (GRI) and minimum efficient size (MES) of the industry that firm belongs. We shall first define these variables and explain their expected influence on firm market shares.

$$MS92 = a_1ASF92 + a_2BNF92 + a_3GRF + a_4MES92 + a_5LSI92 + a_6GRI$$

DEFINITION OF VARIABLES

Large market shares do not translate into stable high profits without entry barriers to prevent rapid entry. The leading barrier to entry in many food manufacturing firms is advertising. If there are substantial advantages (pecuniary or real) to large scale advertising, advertising would cause increased market shares in firms most susceptible to advertising. On the other hand, advertising may serve as a tool of entry, or as an information disseminating device, which might ease entry conditions. As the ratio of advertising over sales increases, we expect an increased market share. Most of the previous studies, used only advertising intensity as a proxy of product differentiation. Mueller and Hamm (1974), Wright (1978) and Mueller and Rogers (1980) included three binary (dummy) variables to measure the effect of product differentiation on changes in concentration. The three dummy variables measured low, moderate, and high product differentiation by taking into account only the level of advertising intensity (0-1%, 1-3%, 3-%). Pagoulatos and Sorenson (1981) used, as a product differentiation measure, the average number of brands offered by sellers in the industry and they took into account only the number of brands sold by the 200 largest food manufacturers. We introduce, as a measure of product differentiation, the number of brands per firm. As the number of brands per firm increases, we expect an increase in market share. It must be noted however that we do not claim that this is a variable that captures the differentiation completely. It is just a proxy that is simply associated with the differentiation strategy of the firm. Since the higher the growth of rate of the firm the higher the market share, we expect a positive sign for the coefficient of growth. Growth is measured as the ratio of the difference in sales between 1992 and 1987, over sales in 1987. Most of the economies of scale in production are associated with technological factors and appear to be attained at the plant level an estimate of plant minimum efficient scale will be used as a determinant of the level of market share. Estimating a MES at the industry level is a highly complex and technical methodological problem (Scherer and Ross, 1990). Census of manufactures data in the US measures MES as the plant at the midpoint of the distribution of value added by all plants in the industry. Following Comanor and Wilson (1967), we use as a measure of MES the average size of plants producing more than the Florence median. They argue that this measure is more closely related to Bain's engineering estimates of MES. We use the value of fixed assets as an indicator of the firm's technological capacity. We include MES in 1992 in order to prove that changes in market shares may in part be due to high or low economies of scale that, in turn, show the level of technological barriers to entry. The larger the size of the industry, the larger will be the deconcentration effect which occurs primarily via higher intra-industry mobility and to a lesser extent because fewer firms are exiting. As a measure of industry size we use the logarithm of industry total assets. Industry growth is expected to affect market shares in two general ways:

- 1) by affecting the conditions of entry into the industry and 2) through differences in growth rates between large and small firms in the industry.

Entry is easier in a rapidly growing industry and should provide deconcentrating pressure, at least initially, unless the entrant is larger than the industry leaders. So, to the extent that growth acts as a deconcentration force via either new entry or internal growth of smaller firms, it would be expected that industry growth and size would be inversely related to the level of market share.

Industry growth is measured as the ratio of the change in sales between 1987-92, over sales 1987.

EMPIRICAL RESULTS

The empirical findings from the multiple regression analysis are shown in **table 2**. In this table there are estimates for the basic model for the explanation of the level of market shares. In model 1 the coefficient of the firm's advertising intensity is positive and statistically significant. Higher degrees of advertising intensity have a significant influence upon market share. The coefficient of the advertising variable suggests that 1 percent increase in advertising intensity is associated with a 1.4 percent increase in market share. It is worth noting [4] that the coefficient of the number of brand names per firm in an industry is positive and statistically significant. The latter shows that an increase in the number of brands will increase market share. As it was expected the coefficient of the level of minimum efficient size is positive and statistically significant. The latter indicates that the higher the economies of scale - that al-

shares of the leading firms. As the number of brands per firm increases, the market shares increase across all consumer firms. This, along with the similar effect of advertising intensity, provides a more complete measurement of the effect of differentiation on market shares in highly differentiated industries such as the consumer food industries. Large firms are able to enjoy economies of scale and use this advantage to increase further their market shares. Finally, size and growth in sales of the industries were found to be negatively associated with structural change. This can be explained by that this sector grew rapidly over the study period and large firms were not able to exploit all chances in industries with fast growth, leaving market niches for the growth of small firms. For similar reason the large size of industries allows entries of small firms that decrease the market share of leading firms. ●

Table 2 Factors affecting the level of market shares in Greek consumer food industries, 1992.

Variables	MS92(1)	MS92(2)	MS92(3)
C	97.94 (7.56)*	92.68 (6.93)*	94.71 (7.20)*
ASF92	1.41 (3.25)*	2.25 (5.48)*	
BNF92	1.18 (4.54)*		1.54 (6.39)*
MES	0.27 (6.88)*	0.30 (7.29)*	0.29 (7.18)*
GRF	0.11 (1.33)	0.13 (1.58)	0.095 (1.16)
LSI92	-5.60 (-7.57)*	-5.24 (-6.88)*	-5.41 (-7.21)*
GRI	-1.45 (-1.72)**	-0.49 (-1.80)**	0.45 (-1.67)
no of observations	267	267	267
R2	0.42	0.37	0.40

* and ** denote statistical significance at 1 and 5% level of significance respectively.

so reflect the initial capital requirements and are associated, in general with technological factors of the firms - the higher the barriers to entry and the level of market share. Growth in firm's sales is positive but not statistically significant. The logarithm of industry size and growth effects are inversely related to changes in market shares as it was expected. In order to prove that the effect of both advertising and product differentiation variables on market shares is strong and the results are consistent, the second model of **table 2** includes advertising intensity variables while the variable of brand names per firm is omitted. Once again the coefficient of advertising is positive and significant. The coefficient of firm growth remains positive but insignificant. The coefficient of industry's growth and size variables remain also negative and statistically significant, while the effect of economies of scale is also positive and statistically significant.

Similarly, the third model of **table 2** includes the index of brand names per firm but not advertising. The effect of the number of brand names per firm on market shares is positive and statistically significant, while the sign of all the other variables does not change.

CONCLUSIONS

This work uses alternative regression models for 267 Greek food consumer manufacturing firms and finds interesting results for the role of advertising, number of brands per firm and scale economies for the determination of market shares. The results provide an empirical support for that advertising is among the main barriers to entry and increase the market

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