Determining factors of Spanish retailers’ efficiency

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1. Introduction.

Growing competitiveness among companies and the globalisation of markets have given rise to an economic environment where it is becoming increasingly difficult for companies to survive. Thus, the analysis of productivity and efficiency has become an important issue in retailing (Lusch et al., 1995), as it favours intermediary management (Sinigaglia et al., 1995). Past research examining productivity in retailing can be broadly classified either as estimating productivity (e.g. Waldorf, 1966; Nooteboom, 1982; Ratchford and Stoops, 1988; Goldman, 1992; Ratchford and Brown, 1985) or as measuring the impact of market factors in productivity (e.g. George and Ward, 1973; Ingene, 1982; Nooteboom, 1983; Good, 1984; Lusch and Moon, 1984, Van Dalen et al. 1990).

In these papers, productivity has been estimated in units that vary from physical activity to monetary value, and this has caused confusion and controversy (Parsons, 1997). Furthermore, previous studies have estimated absolute measures of productivity. These indexes are calculated by inserting numbers into the predetermined formulas or ratios and do not consider the performance of other retailers. However, the productivity measurement of an individual retailer should be “relative” and incorporate the performance of other retailers.

In this sense, relative efficiency is a new approach to retail productivity measurement that focuses on one retailer relative to the best performers rather than the average performers as done in the traditional absolute measures. Among this latter point of view are studies by Thomas et al., (1998), Donthu and Yoo (1998), Ratchford (2003), Keh and Chu (2003) and
Barros and Alves (2003, 2004). DEA and SF are two main approaches. The advantage of both methods is that they allow the use of multiple inputs in the measurement of performance, making them more suitable in the retail context. Although the DEA method is a nonparametric, deterministic approach that defines a relationship between multiple spending inputs and outputs by building an efficient frontier it has been critiqued for not providing fit statistics such as r-square or p-value that can be used for statistical inference.

Regarding the determining factors, a considerable amount of research has been done on the correlates of retail labour productivity (Lusch and Moon 1984). These correlates can be classified as: (i) Marketing variables (store location, price levels, inventory investment, advertising expenditures); (ii) Characteristics of a retail firm (type of store, legal form of ownership); and (iii) Traditional economic correlates (wages, capital to labour ratio, scale or size of firm) (George and Ward 1973; Good 1984; Hall, Knapp, and Winsten 1961; Ingene 1982; Lusch and Moon 1984; Nooteboom 1983; Van Dalen et al., 1990). However, empirical papers analyzing the correlates of retailing efficiency are scarce (e.g. Sellers, R. and Mas, F., 2009a). In this paper, some potential determinants of retailers’ efficiency are revised.

2. Potential factors determining retailer’ efficiency.

2.1. Size and efficiency.

Firm size is one of the most important determinants of firm performance (Dobrev and Carroll, 2003). In the particular case of retailing, size can be considered from two points of view: the size of the own retailer and the size of its outlets.

With regard to the first, economic theory is somewhat ambiguous regarding the relationship between size and efficiency. Nevertheless, it is generally accepted that, at least up to some point, larger firms are able to perform more efficiently than smaller firms (Good, 1984).

In particular, the benefits resulting from a larger sized company cover a number of activities, such as the following: (i) better purchasing and the establishment of more advantageous contracts with suppliers, (ii) increase in financial power to make essential investments, especially in technology, (ii) a better brand image, (iv) the improvement and modernisation of economic and administrative management. Consequently, the following research hypothesis is proposed:
H_{1a}: The size of a retailer has a positive effect on its efficiency.

As for the size of the establishments, most papers conclude that a large assortment of products benefits productivity (Good, 1984; Lusch and Moon, 1984; Keh and Chu, 2003). The underlying logic to this argument is that as the average sales area increases, it becomes possible to reach scope economies, since the costs and resources associated with the installation of an establishment are distributed among a greater selection of products. Consequently, for example, a linear increase in non-perishable goods would increase the amount of products offered to the consumer, enabling a greater sales volume in each purchase. It must not be forgotten that the main purpose of having great depth in the selection on offer is to satisfy the consumer’s needs (Lusch and Moon, 1984).

A proper way to measure a product assortment is to measure the width (narrow or wide) and depth (shallow or deep) of all products lines at a retail store. Since these data is quite difficult to obtain, we adopted a surrogate measure, the sales area. The rationale for this surrogate measure is that a store which has more sales area will be able to provide more selection to its customers than other with less sales area. In this sense, Lusch and Moon (1984) show a positive relationship between the sales area and productivity. As far as technical efficiency includes the capacity of companies to generate outputs based on certain production resources, it could be expected that an increase in productivity as a consequence of a greater sales surface area would have a positive effect on technical efficiency, which leads to the following research hypothesis in terms of technical efficiency:

H_{1b}: The average sales area of the outlets of a retailer has a positive effect on its efficiency.

2.2. Experience (age) and efficiency.

The effect of experience on a firm’s productivity is a question seldom addressed in the literature. In principle, a positive relationship between the seniority of a company and its sales and profits might be expected. Thomas et al. (1998) has described the age of firm as one of the key components of a firm’s experience and learning curve. In fact, as a store becomes established within the business community, awareness and reputation are expected to become more widespread along with positive word-of-mouth (Thomas et al., 1998).

In the particular case of efficiency, and generally speaking, greater seniority affords the company greater know-how, which can lead to a greater capacity for developing its activities
in a more efficient way (Thomas et al., 1998). In the case of firm experience -typically measured by firm age- Berger and Mester (1997) consider that a firm’s age might be related to cost efficiency since firm production might involve “learning by doing”. Consequently, the following hypothesis is put forward:

\[ H_2: \text{The experience of a retailer has a positive effect on its efficiency.} \]

2.3. Salary level and efficiency.

One of the main agreements in the literature which examines the use of the work factor as an input for the estimation of productivity is the need for approaching the different level of professional qualifications of employees. This responds to the fact that traditional economic theory upholds a positive relationship between the salary level and productivity, since the salary level acts as a proxy to the level of professional qualification. In other words, a greater salary level makes it possible for the company to attract a more highly skilled labour force (Lusch and Moon, 1984), thus reducing the corresponding rotation ratio and improving productivity (Carey and Otto, 1977).

At empirical level, there is evidence of the positive influence of the salary level on the productivity of the work factor (George and Ward, 1973; Ingene, 1982; Lusch and Moon, 1984; Van Dalen et al., 1990). By virtue of the above and seeing that technical efficiency includes the capacity of companies to generate outputs based on certain production resources, it could be expected that an increase in productivity as a consequence of a greater salary level would also have a positive effect on technical efficiency, which leads to the following hypothesis:

\[ H_3: \text{The salary level of a retailer has a positive effect on its efficiency.} \]

2.4. Vertical integration and efficiency.

Vertical integration has been a topic of interest to economists over several decades (Joskow, 2005). Since the seminal work of Coase [60], the literature has developed several theories that explain what determines the vertical boundaries of a firm. The efficiency rationale, as studied under the transaction cost economics and property rights theories, suggests that vertical integration reduces transaction costs by mitigating contractual in efficiencies between non-
integrated suppliers and customers and provides incentives to make relationship specific investments. However, in addition to this efficiency argument, the foreclosure argument suggests that a vertical integration with a supplier (customer) enhances the market power of the integrated, and this could lead to lower efficiency rates.

Vertical integration provides common ownership over successive levels of the supply chain and facilitates internal exchange instead of market or contractual exchange (Shenoy, 2008). Vertical integration of the production stages in retailing emerges whenever there are economic efficiency advantages over specialized non-vertically linked production, reducing transaction costs by mitigating contractual inefficiencies between non-integrated suppliers and customers. In a simple situation where there are a manufacturer, a wholesaler and a retailer, the wholesaler has a marginal cost (the price set by the manufacturer), and to make profits has to sell above its marginal cost. The retailer has a marginal cost as well, which is usually the price that the wholesaler sets. The retailer will then set a price to the consumer above this price. When there is vertical integration, the new retailer (the result of the integration between the wholesaler and the retailer) now provides the product directly to the consumer and the only mark-up is to the consumer. The profit maximizing price to the consumer is lower than before, increasing the efficiency of the whole system.

From the point of view of the supply chain management, some authors analyse the effect of vertical integration on the efficiency of the firms involved. For example, Golany et al., (2006) develop an efficiency measurement framework for systems composed of two subsystems arranged in series that simultaneously computes the efficiency of the aggregate system (vertical integration) and each subsystem. Their findings suggest that managers of each subsystem will not agree to “vertical integration” initiatives unless each subsystem will be more efficient than what each can achieve by separately applying conventional efficiency analysis.

In this sense, Axelsson et al. (2005) argue that insourcing decisions -i.e. assuming processes presently performed by outside suppliers- are results of a continuous process where the firm evaluates factors that affect vertical integration to make the most efficient operations. McLaren (2000) points that the efficiency gains associated with vertical integration take the form of lower fixed costs for downstream firms. Following this argument, Avenel (2008) shows how the profitability of vertical integration is related to the ability of integrated firms to coordinate on the adoption of specific technologies associated with a lower marginal cost. Consequently, the following hypothesis is proposed:
**H4:** *Vertical integration has a positive effect on retailers’ efficiency.*

### 2.5. Price strategy and efficiency.

In the field of industrial organization two alternative theories have been put forward to explain the relationship between market structure (market concentration and market share) and performance (Sellers, R. and Mas, F., 2009b). On the one hand, the traditional hypothesis of market power (Bain, 1951) proposes that high market concentration and/or market share is associated with less favorable prices for consumers, which will in turn generate higher profits for producers. Companies operating in concentrated markets can adopt collusive behavior, charging higher prices for their products. In fact, in a concentrated market, firms have incentives to cooperate as opposed to competing because if they are able to coordinate their actions and there are no potential entrants into the market, they can behave monopolistically and maximize the joint profits of the industry.

On the other hand, the efficient structure hypothesis (Demsetz, 1973; Peltzman, 1977) proposes that concentration and/or market share are positively correlated with firm efficiency, so that the most efficient companies grow more and obtain dominant market shares. Under this hypothesis, high concentration and market share are associated with more favorable prices for consumers if some of the savings made through efficiency are passed on to consumers (possibly as part of the process of reaching dominant market shares), and the greater efficiency of companies in more concentrated markets and with higher market shares would also produce higher profits. In summary, this hypothesis holds that efficiency explains both profitability and concentration and market share, meaning that the positive association between profitability and concentration is due to the greater efficiency of large companies and not to the exercise of monopolistic power in the industry.

One of the characteristics of the Spanish supermarket industry is the presence of a small group of large companies with high market shares, along with an atomized market structure with a large number of agents, which creates a situation in between the conditions established in the models of perfect competition and monopoly. Sellers and Mas (2009b) show that is that the competitive situation characterizing the supermarket sub sector in Spain is that of a modified efficient structure. Under this hypothesis it is supported that more efficient firms can charge lower prices than competitors, enabling them to capture larger market shares and economic rents.
Maintaining this strategy requires a continuous search for cost reductions emphasizing efficiency gains. In fact under the cost leadership competitive strategy proposed by Porter (1985, 1986), a firm’s relative position within its industry determines whether its profitability is above or below the industry average. Under this strategy, a firm sets out to become the low cost producer in its industry. The sources of cost advantage are varied and depend on the structure of the industry (Porter, 1985). They may include the pursuit of economies of scale, proprietary technology, preferential access to raw materials, and other factors. A low cost producer must find and exploit as many sources of cost advantage as possible (reducing unit manufacturing costs through higher unit volume, efficient scale facilities, and experience curve, exercising strict cost control over engineered costs, and minimizing discretionary costs such as R&D, service, sales force, advertising or quality control) (Porter, 1985). If a firm can achieve and sustain overall cost leadership, then it will be an above average performer in its industry, provided it can command prices at or near the industry average. At the end, cost efficiency enables the retailer to sell its products to many customers at the lowest competitive price and such low prices will provide competitive advantage and lead to an increase in market share (Allen and Helms, 2006; Beheshti, 2004).

Consequently, the following hypothesis is put forward:

**H5:** Retailers with a low price strategy are more efficient than retailers with a non low price strategy.

### 2.6. Geographic expansion and efficiency

After the Spanish Retail Trade Act in 1996 some supermarket chains, and not only the largest, proceeded to increase the number of outlets outside what until then had been their traditional geographic scope of operation. Two competing theories arise to explain this relationship between geographic expansion and efficiency, although the results are not clear (Illueca et al., 2009).

On the one hand, previous studies support the hypothesis that positive link exists between efficiency and distance (derived from geographic expansion). Geographic expansion may allow efficiently managed institutions to “export” their superior managerial skills, policies and procedures to their affiliates, take advantage of network economies, allowing scale or scope economies that reduce costs (Berger and DeYoung, 2001). In this line, Petersen and Rajan (2002) found a positive relationship between distance and labour productivity, mainly due to the increasing role of technology. When an industry is relatively information intensive,
it could take meaningful advantage of the benefits of information processing and telecommunications, enabling firms to screen and monitor their business at greater distances (Berger and DeYoung, 2006).

On the other hand, if “agency costs of distance” exist, then additional expenses or lost revenues arise as managers have more difficulty monitoring and controlling local business from a greater distance (Illueca et al., 2009). If expansion takes place over geographically distant markets (i.e. other provinces) it could lead to a decrease in the performance of firms seeking presence in other markets (which are farther away than the natural market), because of the existence of agency costs related to distance and lack of control (Illueca et al., 2009). Should these effects exist, they would be evidence in favour of a negative link between distance and productivity growth. However, technology can offset these negative effects, mitigating the negative effect of distance (expansion in other markets) on productivity growth (Illueca et al., 2009; Berger and DeYoung 2006). Actually, Sellers and Mas (2007a) suggest that technological progress in the Spanish retail industry may have led to productivity improvements, and these findings would be consistent with the hypothesis of improved control over distant outlets and reduced agency costs of distance.

Further, expansion in the natural market (a “defensive strategy” consisting in growing only in one province) which by definition is physically closer to headquarters than “other markets” could also be beneficial in terms of efficiency gains for the firm as firms in their natural market enjoy lower transportation and monitoring costs (Illueca et al., 2009). However, the positive link between expansion in natural markets and efficiency gains could effectively emerge if firms were able to reduce some inherent costs associated with the industry as well as establishing long-term relationships with clients.

Thus, derived from these arguments we propose the following hypothesis:

**H₆:** Retailers operating in various provinces are more efficient than retailers operating only in their natural market.

### 3. Conclusion.

In the last decade, the Spanish supermarket industry has been characterized by a series of changes that have affected its structure and performance (Sellers and Mas, 2009a). In this situation, efficiency has become an important challenge for retailers. Thus, the goal of this paper has been to consider some potential determining factors of retailers’ efficiency and to develop
some hypotheses, to be further studied, devoted to analyse how these variables affect retailers’ efficiency.

References


