

Measuring marketing productivity in services: an application to life insurance

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Abstract: The literature on marketing productivity shows the absence of a measurement of the commonly accepted term, especially in the case of quantitative measures and in the measurement of the influence of marketing assets on company issues. This paper proposes a Theoretical Model of Marketing Productivity (TMMP), useful as a base to measure marketing productivity in services. The model is validated in the case of a Chilean life insurance company. The results show increasing technical efficiency levels in the analyzed period, in each of the three business units of the company. They demonstrate the influence of certain variables on the productivity of marketing assets. Expenses of external agents of sales and administrative staff are the assets with a positive influence on marketing productivity; in the case of Collective Insurance, the general expenses, expenses of external agents and expenses of sales have a negative effect on the Life Revenues Insurance case.

Keywords: Marketing Productivity, Technical Efficiency, Stochastic Frontier, Services, Life Insurance

1. Introduction

From the perspective of economic theory, high levels of productivity in the processes of production should have a favorable impact on company profits and on the creation of value for the consumer (Grönroos and Ojasalo, 2004). Companies have to decide between reducing costs and increasing productivity.

The term productivity appeared in the first half of the 16th century, linked generally with the agricultural sector (Diéguez and González, 1994). Since then, there are numerous definitions of productivity in the specialized literature, the majority of which establish a relationship between the use of resources (input) and the product obtained (output). The most frequent definitions centre on the primary sector of the economy and are practically non-existent as definitions in the context of the services sector, since these were considered to be economically unproductive activities until the beginning of the 20th century. Though this erroneous conviction declined as scientific knowledge of the economy developed, the influence of these first theories persists today (Diéguez and González, 1994), above all in the analysis of productivity development in the services sector. Rather than holding back or weakening general economic growth, this sector, from the 1980s on, has acted as a stimulus (Griliches, 1992; Musolesi and Huiban, 2010).

On the other hand, the concept of efficiency means to "do things well". Companies are interested in doing things well in terms of economic results (Sheth and Sisodia, 2002). In this way, the term productivity, related to the effective use of resources used in the production of a good, can be defined as the relationship established between the production and consumption of productive factors (Diéguez and González, 1994).

In order to attract and retain customers, companies need to engage in marketing with significant costs (Keh et al., 2005). Successful marketing allows acquisition and retention of clients, which translates as an improvement in the net profit of the company (Lovelock, 2001). But, effective marketing must consider the expenses incurred, which are crucial in considering the productivity of marketing in the service sector (Keh et al., 2005).

The review of the literature carried out by Schiff and Schiff (1994), focusing on the analysis of investments in marketing, observes that the majority of accounting texts dedicate a complete chapter to the cost distribution of the companies. Among them, investments in marketing were seen as an expense, not an investment, during the second half of the 20th century (Buzzel, 1957). The study of the productivity of marketing has many problems to solve, due to the intangibility of the effects that this activity produces (Buzzel et al., 1975). The functions of marketing have been considered intrinsically inefficient, given the nature of its aims, domain and tools. Moreover, it does not exist solely as a way to measure marketing productivity, but it is necessary to quantify its measurement until now, it has been difficult to establish a systematic and quantitative process of measurement of marketing productivity (Sheth and

Sisodia, 2002).

The aim of this research is to partially solve this problem by proposing a theoretical model to measure marketing productivity in services. This model is validated through its application to insurance services, although it can be applied to other service sectors. Moreover, the model includes productivity and efficiency variables, measuring and quantifying their effects and their relationship.

2. Marketing Productivity

From Neoclassical Theory, productivity represents, in economic terms, the conversion of income to a process (work, capital) in desirable units in terms of the aim (sales, earnings) (Solow, 1956). This relationship takes different forms: as a measure of the efficiency combining productive resources, including capital and work, (Fabricant, 1969); the ratio between issues and resources to obtain the output (Bucklin and Takeuchi, 1977); and, any relationship between production (output) and consumption (input), both measured in physical units (Diéguez and González, 1994).

Marketing productivity is the added value of the function of marketing in relation to the realized investments (Sheth and Sisodia, 2002). Therefore, a high level of productivity will correspond with returns adapted as much in terms of benefits as in the value created for the customers (Grönroos and Ojasalo, 2004). There are conceptual and operational definitions of marketing productivity, but there is no agreement on a universal definition (Sheth and Sisodia, 2002). For example, for Sevin (1965) it is the ratio: produced effect to used energy (ratio of sales or net profits) and marketing costs (used energy); Beckman et al. (1973) define marketing productivity as output and production issues, over economic resources; Hawkins et al. (1987) see it as the price derived from participation in the market over the marketing expenses of the company..

The intangibility of the variables involved in the measurement of marketing productivity (Keh et al., 2005), makes it difficult to justify investments destined for productive increases and even to support suitable levels of productivity. In order to justify the viability and utility of marketing activities, an effective and quantitative measurement of is needed (Meyer, 1994; Sheth and Sisodia, 2002; Rust et al., 2004; Hooleya et al., 2005; Keh et al., 2005; Betancourt et al., 2007; Fenn et al., 2007; MSI, 2006; 2008).

2.1 Determinants of Marketing Productivity

The increase of the level of productivity of marketing has to consider all activities that have an impact on the acquisition and retention of customers. Then, price is considered among the determinant factors of the marketing productivity (Sheth and Sisodia, 2002). Marketing productivity may increase sales, advertising, product development, and the definition of adequate levels of price (Moe and Fader, 2009). Determining the level of price allows companies to increase their levels of customer retention thus enabling them to rely on budgets that allow the implementation of marketing activities to achieve stated objectives (Dawes, 2009). Therefore, a positive relationship can be proposed between price and the marketing productivity of companies (Sheth and Sisodia, 2002), keeping in mind that the price must allow a maintenance of levels of satisfaction and customer retention, as well as fulfilment of the profit objectives of the organization. This allows us to establish the first hypothesis of research:

Hypothesis 1: Price levels defined by the organization will have a positive effect on marketing productivity.

Marketing resources that affect marketing productivity can be classified via diverse criteria as, for example, the degree of tangibility of their attributes, their physical or human performance, intellectual or capital assets. That is, these resources can all be used to gain a competitive advantage in the markets. Given this complexity, Hooleya et al. (2005) define the concepts as base marketing resources and marketing support resources. The first are those that can be delivered directly in the market and the second are those that permit the development of activities that contribute indirectly to generating a competitive advantage. Base marketing resources consider four elements: i) The ability to identify what the customer wants, creating appropriate relationships; ii) the reputation and credibility of the organization among its clients, suppliers and distributors; iii) the ability to innovate in the market; and iv) the human resources of the organization who generate staff development, and increase the loyalty and motivation of the workers. The resources of support for marketing activities incorporate two elements, the culture of marketing of the organization and the abilities of managers to conduct, coordinate and motivate these activities.

Hooleya et al. (2005) demonstrate a negative correlation between the orientation to the market and the active reputation. This correlation is due to the fact that well-established companies in the market, with high reputation and an offer of well-known brands can become myopic and complacent. Therefore, the previous success of these companies leads them to a certain degree of arrogance, thus neglecting the market. The other negative relationship that exists is

produced between the assets of human resources and the financial performance that are related indirectly through the performance of the customer, underlining the importance of motivation and training of staff so that the effectiveness of the company is not negatively affected. Thus, those investments that companies undertake in base market resources will have a negative effect on financial performance and on marketing productivity. In this way we establish:

Hypothesis 2: Investments in the base market resources will negatively affect financial performance

Hypothesis 3: Investments in base market resources will negatively affect marketing productivity.

Resources or marketing assets can also affect marketing productivity (Rust et al., 2004). Marketing resources are found to be focused on the value of customers to the company in the long term, directly and positively affecting its cost-effectiveness. Generally, resources or marketing assets tend to be grouped in the value of the brand and the value of the customer (Rust et al., 2004). The value of the brand corresponds to the knowledge that the customer has of the brand which would produce an intermittent increase in cash flow, as a response to brand awareness by the customer (Keller, 1998). The value of the customer is defined as the sum of the net present value of his life cycle (Blattberg and Deighton, 1996). Notable within the studies that analyze the positive effect that brand value has on the market value of the company, are those done by Simon and Sullivan (1993), who calculate the fraction of cash flow of the organization that is attributed to the brand value, and by Aaker and Jacobson (1994), who relate the brand value to the ROI, finding a positive relationship between the variations presented in the brand value and the value of the marketing activities of certain companies. With regard to customer value, Blattberg and Deighton (1996) emphasize that it should be one of the main focal points of marketing activities, which should be developed so as to identify customers of greater value, to decrease the costs of acquisition and to devise marketing projects. Berger et al. (2006) propose a structure that allows the understanding of the way in which customer value affects shareholder value, using the value of the customer as an intermediary (Rust et al., 2004). Thus we establish:

Hypothesis 4: Marketing resources will positively affect financial impact or performance.

Hypothesis 5: Marketing resources will positively affect marketing productivity.

The fourth determinant of marketing productivity corresponds to the investments in marketing done by the company. When thinking about reducing

costs, the main objective tends to refer to marketing activities. It must be kept in mind that, if a company opts for an increase in productivity, complications arise from its measurement, especially in the service sector, due to the intangibility of its product (Keh et al., 2005). Therefore, to avoid decreases in marketing investments, adequate levels of productivity should be maintained. If it were possible to measure this productivity quantitatively, the viability of marketing activities could be demonstrated, considering these as more an investment than an expense. In this regard, it is necessary to point out that one must take care that the functions of marketing become routine, since they can be absorbed by other business functions, thus creating the perception that greater expenditures on this activity decrease marketing productivity. (Sheth y Sisodia, 2002). Therefore:

Hypothesis 6: The investments in marketing that are undertaken by the company that are directly associated with the marketing activities of the organization will negatively affect financial impact or performance.

Hypothesis 7: Marketing investments undertaken by the company, directly associated with marketing activities of the organization, will negatively affect marketing productivity.

A measurable result of the previously analyzed factors, investments in marketing, marketing resources and base marketing resources, is financial impact or performance (Rust et al., 2004; Hooleya et al., 2005). Thus, there will be a positive relationship between financial performance of the company and its marketing productivity (Rust et al., 2004; Bou and Satorra, 2006). Financial performance can be measured by the ratio ROI (Jorge and Laborda, 2002; Bou and Satorra, 2006), since, in spite of the fact that this indicator only provides results in the short term, it allows us to consider marketing expenses as an investment. For that, it measures the financial returns through marginal profit, measured through percentage increment. This measurement allows the inclusion not only of the increases in income of the organization but also the expenditures necessary to reach them (Rust et al., 2004; Bou and Satorra, 2006). In the literature of marketing productivity the rationale most employed for its measurement are the marketing expenses measured through the factor of work. On the other hand, the output predominantly employed as numerator considers the added value of companies in economic terms (Yuengert, 1993; Cummins et al., 1999; Cummins and Weiss, 2004). Thus, an increase in the financial impact or performance of the company will provoke an increase in marketing productivity, that is, if the company obtains greater financial profitability, it is

due to the fact that it has invested correctly in marketing activities (Jacobson and Aaker, 1985; Bou and Satorra, 2006). This relationship gives rise:

Hypothesis 8: The increase in the financial performance of the company will increase marketing productivity.

The necessity to analyze the efficiency and effectiveness of marketing productivity emerges when the expenditures of marketing in the total cost of the company increase, which could cause a loss of competitiveness. There are diverse ways to achieve appropriate levels of productivity, for example through the efficient use of company resources or the maximizing over time of the ROI. Another way of achieving suitable levels of productivity consists of including concepts of efficiency and effectiveness in the company's marketing productivity, with the goal of developing a productive marketing structure (Sheth and Sisodia, 2002).

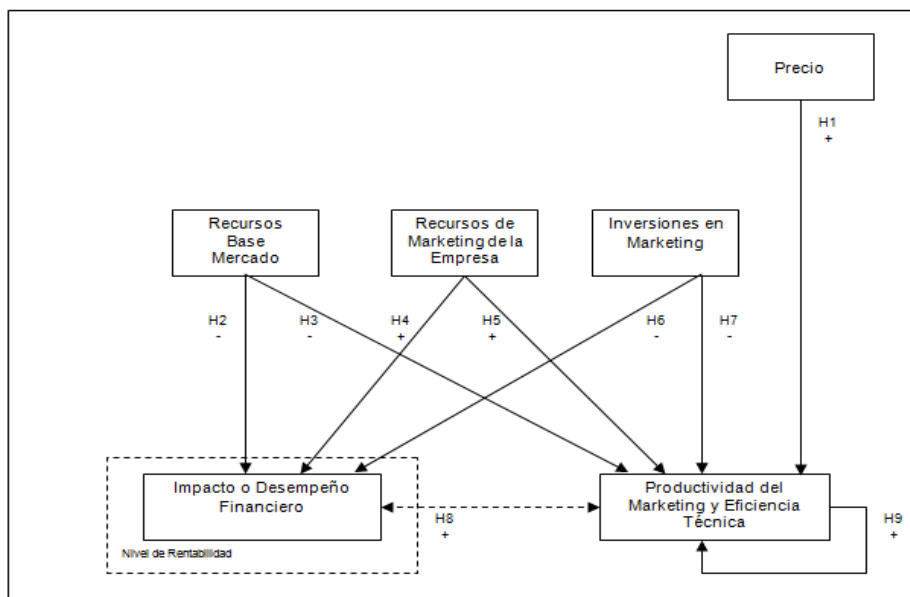
It is crucial to consider the effectiveness and productivity of marketing, especially in companies in the services sector (Keh et al., 2005). Effectiveness is positively related to marketing productivity (Keh et al., 2005). Nevertheless, within the services sector, measurement of the efficiency of productivity might not be adequate, since a loss of quality could be perceived and, with that, a reduction in customer satisfaction. In this sector, the most suitable measurement is presumably the observation of productivity of the service in terms of its profitability (Grönroos and Ojasalo, 2004).

As an example of the measurement of marketing productivity of a hotel chain, Keh et al. (2005) measure the technical efficiency in the budget allocation of marketing and the effectiveness of the consumption of marketing investments on the income obtained, following Grönroos and Ojasalo (2004), as the ratio between the initial inputs (costs) and the final output (income).

Keh et al. (2005) propose as inputs in their productivity model, total expenditures, the number of rooms and the marketing expenditures. With regard to the definition and measurement of the outputs, the authors propose income per room and income from food and drink. The importance of this work lies mainly in two aspects i) it separates the operations related to the allocation of the marketing budget, and the effectiveness of marketing in a hotel establishment, ii) it separates marketing expenditures from total company expenses, considering them as an investment. The study represents a considerable effort dedicated to obtaining technical effectiveness and the resulting effectiveness in productivity in one single model. Therefore:

Hypothesis 9: Marketing productivity is positively related to technical efficiency.

In this way, the Theoretical Model of Marketing Productivity (MTPM) that is proposed is reflected in Figure 1.



Fuente. Elaboración propia

Figure1. Theoretical Model of Marketing Productivity MTPM

3. Method

In order to validate the proposed MTPM in the services sector, an application is done to the sub-sector of insurance. The database used was provided by a Chilean life insurance company for the period between January, 2002 and August, 2008, containing financial results of each of the company products, which are associated with a strategic unit of business: Individual and Group Insurance Annuities. Thus, the sample includes a panel of data for each unit of business, where each transversal section corresponds to a specific product for the 80 time periods included in the sample.

In order to determine the levels of technical efficiency of the units of the sub-sector insurance, the Stochastic Frontier models of Aigner et al., 1977; Meeusem and Van Den Broeck, 1977; and Coelli et al., 1998, 2005 will be used, given that they allow useful measurements of technical efficiency for the performance evaluation of the business units of the company. In order to achieve adequate levels of productivity, it will be necessary to determine the factors that influence levels of performance, as well as to quantify that influence. This will be done through the use of econometric methodologies of Panel Data.

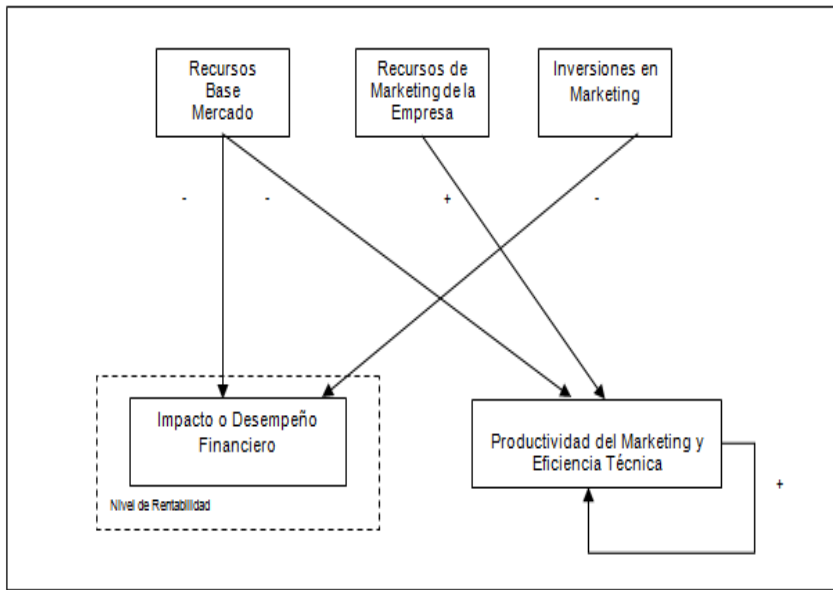
Keeping in mind the available information in the company, hypotheses formulated in the MTPM are used. The models are considered for each one of the strategic units of the company's business (Figures 2, 3 and 4).

In the three strategic units of business, the net profit (the financial impact or performance) and marketing productivity are considered as endogenous variables. The variables of market base resources will be exogenous variables. In order to validate the existing relationship between efficiency and productivity of each of the units, the relationship proposed in MTPM will be analyzed.

The endogenous variables net profits (BN) and marketing productivity (PMKT), are measurements by the company through operational results, discounting the costs of marketing, and through the net profits for each monetary unit spent in marketing activities, respectively (Yuengert, 1993; Berger and Humphrey, 1997; Cummins and Zi, 1998; Cummins et al., 1999; Cummins and Weiss, 2004; Karim and Jhantasana, 2005; Cummins and Xie, 2007). With regard to the relationship to the exogenous variables, the base market resources are measured through administrative work, work by the agents, and the costs of external intermediation (Cummins et al., 1999; Karim and Jhantasana, 2005; Cummins and Xie, 2007; Fenn et al., 2007; Kasman and Turgutlu, 2007). Administrative work or personnel expenses (TAD), correspond to those incurred in administrative personnel (remunerations, commissions and others); the work of the agents or costs of internal intermediation (TAG) correspond to expenditures on sales agents belonging to the company; and the cost of external intermediation (CIEX) corresponds to the expenses related to the payment to agents external to the company (insurance agents). Marketing resources of the company are measured through variable business services (BSER) that correspond to general expenditures (expenses in real property, real estate, etc.) (Berger and Humphrey, 1997; Cummins and Zi, 1998; Cummins et al., 1999; Karim and Jhantasana, 2005; Cummins and Xie, 2007; Kasman and Turgutlu, 2007). Finally, the variable investments in marketing are measured.

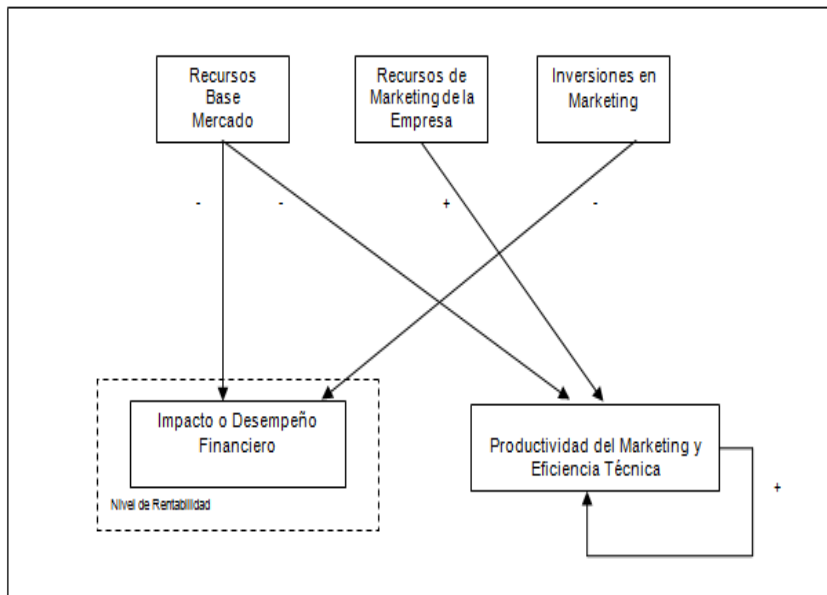
Thus the models that are formulated to respond to the problem of the measurement of efficiency and marketing productivity in the case object of analysis are: the Model of Financial Performance (MDF) that considers as output the Net Profit and the Model of Marketing Productivity (MPM) that considers as output the Marketing Productivity measured by the company.

Through marketing expenses and sales expenses (Karim and Jhantasana, 2005), marketing expenditures (GMKT) are the expenditures in pesos incurred by marketing activities of the company and sales expenses (GVTA) that correspond to the expense linked to the sale of a service.



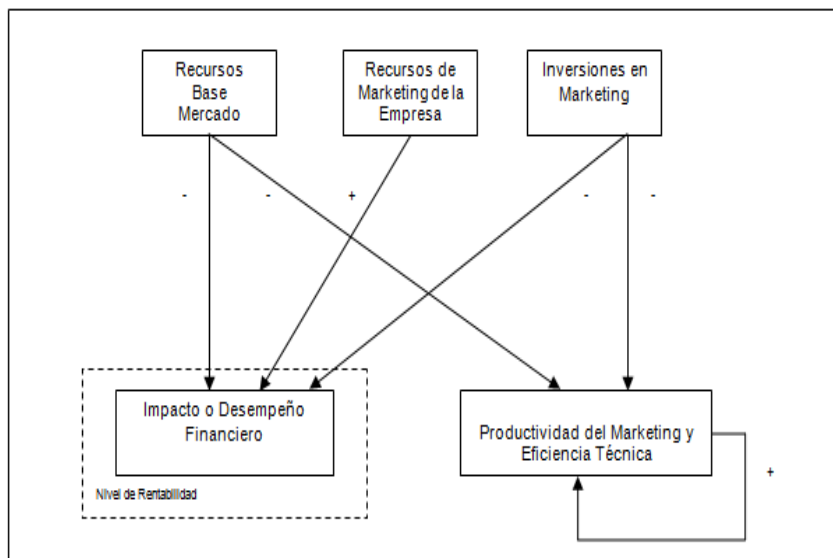
Fuente. Elaboración propia

Figure2. Adaptation of the MTPM for the strategic individual unit of the insurance company



Fuente. Elaboración propia

Figura3. Adaptation of the MTPM for the strategic group unit of the insurance company



Fuente. Elaboración propia

Figure4. Adaptation of the MTPM for the strategic annuities unit of the insurance company

3.1 Results of the Analysis of Efficiency

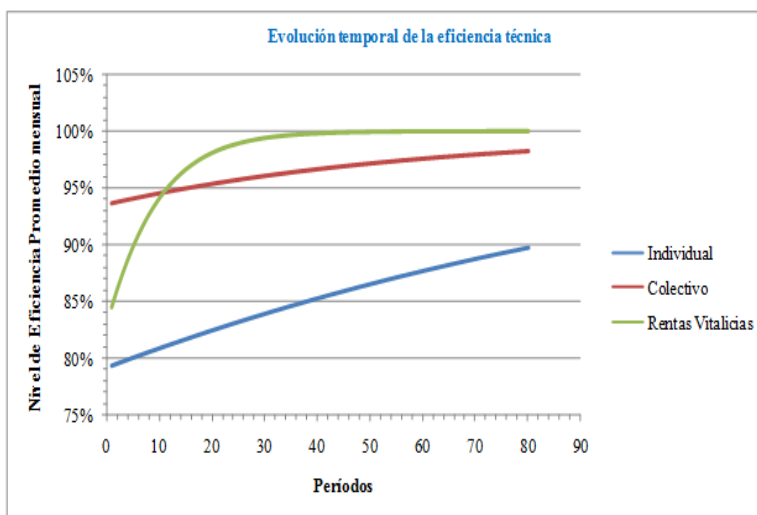
The analysis of efficiency is carried out through the methodology of stochastic frontiers, which allows the calculation of a quantitative measurement of the level of efficiency in the use of resources to obtain the net profit of the company for each product. The functional form to use for the estimation of the stochastic frontier of MDF is Cobb-Douglas (Aigner and Chu, 1968) and translogarithmic (Karim and Jhantasana, 2005; Kasman and Turgutlu, 2007; Cummins et al& 2009). In order to check which functional form better adjusts to the data, the generalized unilateral test is used (LR Test).

The results of the application of the LR test indicate that the functional translogarithmic form prevails as a better representation of data for the Group Insurance Annuities, while the functional form Cobb-Douglas fits better to the data pertaining to the Individual unit. In addition, the supposition of absence of effects of technical inefficiency is accepted, so that the eventual difference between optimum and real output would only be due to variables beyond the control of the company. On the other hand, as much for Individual units as for Group Insurance Annuities, the results show the existence of technical inefficiency in both units.

The critical value was extracted from the table with degrees of liberty equal to the number of parameters of the second order of the trans-logarithmic form, in this case 10.

Degrees of liberty equal to the number of restrictions involved (Kodde & Palm, 1986), in this case 3.

In agreement with the estimated stochastic frontier models, the levels of technical efficiency are obtained for the three strategic units of business of the life insurance company, for each product and month of the sample period. In Figure 5, the evolution over time of the average technical efficiency per unit, for the period January 2002 to August 2008 is presented graphically.



Fuente. Elaboración propia

Figure5. Evolution over time of technical efficiency

In Figure 5 we observe that the average monthly levels of technical efficiency per unit of business show growth for the period under study. Nevertheless, growth in the technical efficiency of the unit Group Insurance Annuities stands out as almost 100% of efficiency from April 2005. The Individual unit began with levels of technical efficiency averaging 80%, to reach 90% at the end of the period. The Group unit began with levels around 94% of technical efficiency to end the period with approximately 98% efficiency.

The results referring to the levels of technical efficiency per product indicate that, for the Individual unit, the most efficient is the Gold Policy (99.49%), while the least efficient product is the Individual Life Policy, at 77.41%. For the Group unit, the most efficient product is the Group Life (96.64%) and the least efficient is the Group Health (96.41%). Finally, for the unit Annuities, the most

efficient product is that of the New Senior Annuity (99.41%), with the Senior Stock Annuity being the least efficient, at 96.82% average efficiency.

3.2 Results of the Analysis of Productivity

Considering that the differences between the products are related to the observed inputs for the insurance company, since the inputs are accounts relative to the expenses incurred in each product, it is possible to state that we are in the presence of fixed effects of panel data, where the formulation of the model of fixed effects assumes that the differences among products can be captured in constant terms (Greene, 2002).

Thus, the fixed time effect is selected for the MDF and for the MPM in all the units in base, to the individual and group significance of the estimated models, the results of which are better than those of the fixed effects models of the product. It must be pointed out that the results of the effects selected are the expected ones, since in all the models mentioned, the component over time was the dominant one (Greene, 2002).

With regard to the hypothesis of the lineal model, the Marketing Productivity model presents a problem of self-correlation of the first order, which is solved through the inclusion of a self-regressive term of order 1. This solution is validated by the Durbin Watson test. The existence of self-correlation of the higher order was rejected through the Breusch-Godfrey test.

Regarding the obtained results for the Individual unit, the greatest influence on net profits is the internal cost of intermediation, with a decrease of 0.0041%, while the marketing expenditures have the least influence with a decrease of 0.0021%. As for marketing productivity, the greatest rise in its levels is due to personnel expenses, with an increase of 0.0020%, while the greatest decrease in the levels of marketing productivity is due to general expenditures, with a drop of 0.0020%. Thus all the hypotheses presented by MTPM are validated to 99% of significance, with the exception of those relating to the base market resources (measured through personnel expenses and the cost of external intermediation) to marketing productivity, and the assets of the company (measured through business services) to marketing productivity, which are rejected.

For the Group unit, the costs of internal intermediation exert a positive influence on the net profits of 0.013%. On the other hand, the expenditures of marketing present a negative influence on net profits of 0.013%.

For the estimation of the models, we proceeded to eliminate atypical data and non-significant variables in the estimation.

Durbin-Watson = 1.56, dl = 1.28, du = 1.45,

F statistic = 0.867183, P-value = 0.844249.

As to marketing productivity, the general expenditures are the most influential with 1.33% increase in productivity. On the contrary, personnel expenditures present a negative influence of 0.93% over marketing productivity. Regarding the hypotheses of MTPM stated for this unit, all are validated to 99% of significance, except the relationship between the base market resources (measured through the cost of internal intermediation) to the financial impact or performance of the company.

Finally, for the unit Annuities, general expenditures have the greatest influence on net profits, which produce an increase of 0.011%. Marketing expenditures have the least influence, causing a drop in net profits of 0.0017%. Regarding marketing productivity, the greatest influence are the costs of external intermediation, with a 0.0050% drop in the levels of production leaving the sales expenses in second place with a decrease of 0.0029% in the levels of marketing productivity; the hypotheses of MTPM for this unit are validated in their totality with a level of significance of 99%.

Regarding the positive relationship set forth for the three units of business between marketing productivity and technical efficiency, it is established that, for the case of the Individual unit, the variables in which levels of efficiency should be increased are business services and cost of internal intermediation, since they currently exert a negative influence on marketing productivity. The same thing occurs in the Group unit with personnel expenditures, so that efforts to improve efficiency should tackle the use of administrative work resources. Finally, for the Annuities unit, the variables that negatively affect marketing productivity, and those which should increase their levels of efficiency, are the costs of external intermediation and sales.

4. Conclusion

Since the non-productive use of company resources has direct negative consequences on profits, the research that has been done in this work is especially relevant. We have proposed a theoretical model of measurement of marketing productivity (MTPM), and it has been validated using mathematical models to measure the impact of marketing resources on the financial position of companies, and to explain the existing relationships among the distinct components of marketing productivity as well as their effects on the technical efficiency of the organization.

The company for which the study was done only possesses a profitability function in its group, lacking the means of productivity, efficiency and

profitability for each of its units. This work has allowed the validation of econometric models and stochastic frontiers for each of its three lines of business. The obtained results suggest a fund of important information for the company, providing it with solid bases to improve the development of its strategies.

Among the limits of the investigation was the size of the sample for each of the empirical analyses developed. In addition, the lack of information about the financial capital of the Chilean company, as well as the prices for each of its products, did not permit its inclusion in the relative analysis; a question that can be related to the lack of observation of effects of technical inefficiency in the Group unit of the company. Another limitation corresponds to the lack of qualitative information available in the data base. In the study as developed, this type of measurement is explained through random components of the proposed models, in which it is not possible to separate the effect of the unobservable quantitative variables, nor of the qualitative variables. These limitations open the way to a broadening of the study, with additional data bases and in other geographic, sectarian, and entrepreneurial contexts, which would allow us to include the whole realm of financial-accounting indicators.

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