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# Measuring Sustained Superior Performance at the Firm Level

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## ***Abstract***

This paper proposes a two-dimensional Strategic Performance Measure (SPM) to evaluate the achievement of sustained superior performance. This proposal builds primarily on the fact that, under the strategic management perspective, a firm's prevalent objective is the pursuit of sustained superior performance. Three basic conceptual dimensions stem from this objective: relativity, sign dependence, and dynamism. These are the foundations of the SPM, which carries out a separate evaluation of the attained superior performance and of its sustainability over time. In contrast to existing measures of performance, the SPM provides: (i) a dynamic approach by considering the progress or regress in performance over time, and (ii) a cardinal measurement of performance differences and its changes over time. The paper also proposes an axiomatic framework that a measure of strategic performance should comply with to be theoretically and managerially sound. Finally, an empirical illustration of the Spanish banking sector during 1987-1999 is herein provided by discussing some relevant cases.

## **Key words**

Sustained superior performance, persistent performance, profit differences, sustainable competitive advantage.

## **1. Introduction**

Strategic management research focuses on explaining the heterogeneity of performance among firms. Performance evaluation uncovers such differences, addresses their measurement, and analysis. It provides a valuation of the outcome results attained by economic agents, in our case firms, which discriminates between success and failure in performance, and establishes the degree to which the former or the latter has been achieved. The importance of performance evaluation arises from the many consequences that successful or unsuccessful results can have in economic agents, not the least of which is the survival prospects of the organization, or the possibility to sustain a certain welfare situation. Furthermore, performance evaluation assesses the degree of success of the actions or strategies implemented, which will allow improvement in future decisions.

Evaluating the performance of a firm implies the synthesis of the performance data available for a firm, which necessitates the use of measures or methods in charge of carrying out this synthesis. This aggregation aims to convey the relevant information about performance, therefore it has to consider how the judgements over performance results are made, thus reflecting the preferences of evaluators on results, in order to be theoretically and managerially sound. Therefore, information about the preferences of evaluators is required. Although preferences can vary across individuals, evaluators taking a strategic management point of view have reached a consensus on a firm's prevalent preference or objective: this is attaining superior economic performance to that of competitors (Rumelt, Schendel and Teece, 1994), assuming that it is the reward for having competitive advantages (e.g. Barney, 1997, Grant, 1998), which firms must achieve and sustain.

The concept of competitive advantage dates back to Ansoff (1965) and was widely popularized by Porter (1979, 1980). A competitive advantage was to be the source of superior performance for firms, as it provided a strong competitive position (Ansoff, 1965: 110). Later, literature became more demanding requiring the sustainability of superior performance (Porter, 1985; Ghemawat, 1986; Barney, 1991; Conner, 1991; Amit and Shoemaker, 1993; Porter, 1996). This expansion of the concept includes a dynamic and strategic point of view, accepting that only some competitive advantages are difficult to imitate by competitors in the long run and, therefore, can lead to a sustained superior performance over time. Assuming this upgraded objective for firms, this paper proposes a

two-dimensional Strategic Performance Measure (SPM) to gauge sustained superior performance by carrying out a double evaluation: (i) the degree to which superior performance is obtained, as a result of achieving competitive advantages, and (ii) the sustainability of this superior performance. In this way, the SPM will report on the degree of achievement of Sustained Superior Performance (State 1). Otherwise, if this state has not been reached, the SPM will classify the performance of the firm into three other possible states: Eroding Superior Performance (State 2), Worsening Inferior Performance (State 3), and Reducing Inferior Performance (State 4). The definition of the four states is relevant as they all do take place. For example, the classic works of Mueller (1986, 1990) especially highlight the finding of firms whose performance would be classified in State 1, State 2, and State 4.

Apart from presenting a new measure of strategic performance, this paper proposes a set of axiomatic properties which we believe should be held for other measures of strategic performance. These properties are based on three basic conceptual dimensions called: relativity, sign dependence and dynamism. These dimensions, in turn, stem from the objective of pursuing sustained superior performance.

This paper proceeds as follows: the following section presents the background literature on the persistence of superior performance. The third section begins with the derivation of the three basic conceptual dimensions: relativity, sign dependence, and dynamism. It continues with the definition of the Strategic Performance Measure and its two components, and the analysis of the states of sustained superior performance and the three other possible states. It also sets out a graphic analysis of this definition, which enables the temporal analysis of superior performance and its sustainability. The theoretical evaluation of the two measures is presented in section four. An illustration of the proposed measures is given in section five, and a final section of conclusions ends the paper.

## **2. Background on Strategic Performance Evaluation**

The rationale for sustained superior performance is the possession of sustained competitive advantages. Therefore, the main task for managers is to find strategies that create, renew, and struggle to maintain competitive advantages, even in hypercompetitive contexts (D'Aveni, 1994). For this reason, literature has mainly focused on competitive advantage as the

dependent variable, i.e., in explaining the sources of sustained competitive advantage. As Wiggins and Ruefli (2002) point out, only a few studies have concentrated on the distribution of performance, or what they call the *topography* of performance.

Studies of the distribution of performance are found in two literature sources: the first one is the literature on the persistence of profits, which has generally used time series methodologies, and is mainly found close to the domain of industrial organization; the second source of literature that we believe to be related to strategic performance is the one in *ex post* risk measurement. This branch of literature is relevant because it is concerned with what economic agents (e.g., firms, managers, investors) are averse to, which is necessarily related to some type of failure in performance, and failure is part of the strategic performance concern. Secondly, it must be noted that an important part of the literature on risk has an *ex post* focus, which means that it is actually carrying out an evaluation of realized outcomes. For example, the recent works of Miller and Reuer (1996), Miller and Leiblin (1996), Miller and Bromiley (1996), Ruefli, Collins and LaCugna (1999), and Reuer and Leiblin (2000) run mainly along the lines of *ex post* risk measurement. Another interesting feature of this body of research is that it is measure-oriented, which involves the development and evaluation of measures that synthesize *ex ante* or *ex post* performance.

### ***Time series approaches***

The main body of research on superior performance has been based on autoregressive time series methodologies. These methods were selected because the aim of this part of the literature was to study the dynamism of performance, namely the persistence or decay in performance. Mueller (1986, 1990) used this methodology with the purpose of examining the long-term persistence of superior ROA for large US industrial firms, mainly finding the convergence of performance towards the mean, although at a slower speed for the highest-performing firms, and some high-performing firms whose ROA increased over time. The same type of autoregressive methods were used in studies for other US and European firms or strategic business units, with similar findings (e.g. Geroski and Jacquemin, 1988; Jacobsen, 1988; Schohl, 1990; Droucopoulus and Lianos, 1993; Goddard and Wilson, 1996; Waring, 1996). More recently, Mueller and Raunig (1999) used the same autoregressive model developed in Mueller (1986) and Geroski (1990) to test whether the results from Structure-Conduct-Performance models estimated at the industry level are sensitive to the degree of heterogeneity of the firms in industries. Consistent with Mueller (1986) for the US over the



period 1950-1972, and Mueller (1990) for six other countries, his findings indicate that competitive forces require more than one year to eliminate short-term rents; that persistent differences in performance across firms exist within many industries; that it cannot be assumed that profits observed in an industry at a given point in time are near their long-term equilibrium which, in turn, is not the same for all industries; and that inter-, and within-industry variations in profit rates are important in many cases. Therefore, the existence and persistence of profit differences is still an issue because the empirical findings encounter room for delays or violations of the expected decay in abnormal profits that the economic theory predicts.

In the field of strategic management, Wiggins and Ruefli (2002) have recently made a contribution to the measurement of persistent superior performance. They use a new methodology introduced in Ruefli and Wiggins (2000) to stratify firms in groups of performance, and they investigate the stability over time of pertaining to the higher performance group by means of ordinal time series methods.

### ***Measure-oriented approach***

Many of the models and measures used to evaluate ex post risk have been borrowed from financial economics and statistical decision theory. The most traditional approach is the mean-variance model, which presents the mean as a measure of the central tendency of outcomes and the variance as a measure of its variability. The mean is widely accepted as a valuable description of a series of outcomes, but there is more discussion on the use of the variance, which is often presented as a measure of risk. Alternative approaches have abandoned variance to complement the mean with other measures aimed at considering what decision-makers perceive as risk, such as semi-variance, deviations below a target level or some derivative of a covariance, like the beta of the Capital Asset Pricing Model (Malkiel, 1989). However, strategy research has recently identified that reliance on these existing measures of risk may not be adequate for both the concept and the use in management research (e.g., Bettis and Thomas, 1990; Baird and Thomas, 1990; Miller and Leiblin, 1996; Ruefli, Collins and LaCugna, 1999).

It can be considered that, the mean being a measure of the central tendency of a series of performance outcomes of a firm, a measure to complement it, namely ex post risk measure, should convey the information of outcomes which is relevant and not related to centrality. In

our opinion, this should be the temporal dynamics of performance. The dynamic dimension has not been dealt with in literature on ex post risk which has largely had a static approach. Only some exceptions on ex post risk literature have developed measures which consider dynamism in a measure-oriented approach (Collins and Ruefli, 1992; Fiegenbaum and Thomas, 1990).<sup>1</sup>

This paper proposes to integrate the synthesis provided by the measure-oriented approaches and the concerns for dynamism underlying the time series approach by putting forward a two-dimensional Strategic Performance Measure (SPM). The first component of SPM, which we have named Static Performance, will provide a cardinal evaluation of the superior (or inferior) performance attained by a firm. The second component of SPM, named Dynamic Performance, will provide a measurement of the sustainability (or erosion) of performance over time. In this way, the SPM will give information on the dynamism of performance, similar to a time series approach, but it further provides an explicit cardinal measurement of superior performance and its dynamic evolution.

### **3. The Strategic Performance Measure**

#### ***3.1 Three basic dimensions in strategic performance evaluation***

The aim of performance evaluation consists of judgement on the outcome results obtained by firms, in order to discriminate between success and failure in performance, and establishing the degree to which the former or the latter has been achieved. Success will be achieved when the preferences or objectives of evaluators are fulfilled. Thus, under a strategic management perspective, success is defined by achieving persistent superior economic performance to that of competitors, assuming that it arises from sustainable competitive advantages.

Superior performance can be understood in different ways. Economic theory views it as abnormal profits or rents, with respect to those predicted by equilibrium models. But when an equilibrium state does not apply, they allow firm-specific rents, which are those in excess of the competitive return and an industry return, as is done in relevant research under the industrial organization perspective (e.g. Waring, 1996). Nevertheless, a more strategic concept, coherent with the strategic management postulates, understands superior performance of a firm as outperforming its industry (Besanko, Dranove and Shanley, 1996).<sup>2</sup> Empirical works in the field of industrial organization operationalize this superiority as the

return in excess of the average of the sector, industry or system investigated (e.g., Mueller, 1986; Mueller, 1990; Geroski and Jacquemin, 1988; Mueller and Raunig, 1999; Goddard and Wilson, 1996). In the field of strategic management, the recent work of Wiggins and Ruefli (2002) defines superior performance as statistically significant, above-average performance with respect to the industry.

The definition of sustained superior performance is subject to more ambiguity. From the definition for sustained competitive advantage due to Barney (1991), sustained superior performance would be that which continues to exist after competitors have made efforts to reproduce the underlying competitive advantage that leads to the superior performance. Porter (1985) provides a more feasible definition by associating sustained competitive advantage with long-term profitability or above-average performance in the long run.

Assuming that the prevalent objective is pursuing sustainable superior performance, the paper infers three basic conceptual dimensions that should be an integral part in the assessment of strategic performance: relativity, sign dependence, and dynamism. These are analyzed herein and contrasted with literature.

### *Relativity*

Relativity arises from judging success as the attaining of targets, thus necessitating the comparison of realized outcomes with targeted ones in order to discriminate between good and bad outcomes. If the objective for firms is to achieve a superior performance, relativity comes from the very definition. Superior means greater than the performance of comparable firms, such as competitors. If the target is to sustain superior performance, success is considered as sustaining or improving the privileged position in performance, and failure will be to suffer an erosion in the relative performance.

The relativity of performance evaluation has been widely considered in literature on the persistence and dynamics of superior performance. Mueller (1986, 1990), Mueller and Raunig (1999) and Goddard and Wilson (1996, 1999) analyze performance at the firm level by using the firm's standardized profit, which is the difference between the rate of profit of a firm and a certain average rate of profit. Geroski and Jacquemin (1988) operationalize success as exceeding the average profitability, calculated across all firms of the country

sample. Waring (1996) refers to firm-specific rents, as the excess return from the competitive return and an industry rent.

This property has been especially considered in literature concerning the concept and measurement of risk by introducing the importance of targets, which discriminate successful outcomes from unsuccessful ones (e.g., March and Shapira, 1987; MacCrimmon and Wehrung, 1986). For example, in the field of finance, Mao (1970) finds that managers perceive risk as the failure to achieve their target returns, in accordance with maximizing the value of the firm, and consider the growth of returns and their stability as important. Stone (1973) calculates risk as deviations from target measures, and downside CAPM measures also consider targets to discriminate success from failure (e.g., Bawa and Lindenberg, 1977; Harlow and Rao, 1989). In the field of behavioral decision theory, Fishburn (1984) considers risk as a judgement of outcomes according to targets desired and preferences, which means that risk involves the discrimination between more and less desirable outcomes. In the field of strategic management, Aaker and Jacobson (1990) state that risk can be considered as the probability of loss or the shortfall in achieving a certain return level fixed as the target. Targets are also relevant in the downside measures proposed for strategic management (Miller and Leiblin, 1996; Miller and Reuer, 1996; Reuer and Leiblin, 1999).

In conclusion, these pieces of literature on different economic and management fields consider that success, what evaluators (managers or investors) want, is attaining or exceeding targets. Falling short of targets, or failure, is what they do not want. In consequence, a conceptually valid measure has to gauge to what degree targets are achieved.

### *Sign dependence*

This dimension points out that perception makes a distinction between outcomes according to their position relative to targets, and that valuation should take that into account. It is precisely the positive or negative sign of the deviation from the target which marks the distinction between success or failure. According to sign dependence, achieving and exceeding targets is positively evaluated and should increase the value of performance assessment, whereas failing to achieve targets is negatively evaluated and decreases the performance assessment of the firm.

Existing literature on the persistence of performance is mainly focused on finding evidence of superior performance and investigating whether it decays or persists over time.<sup>3</sup> As the focus of study is a truncated part of performance, sign dependence is not covered by this literature. Also, as it is not oriented to produce measures of performance, the methods do not imply a valuation of the results. On the contrary, sign dependence is explicitly defended in literature on ex ante performance assessment, such as in the behavioral decision theory (e.g., Fishburn, 1982, 1984; Luce and Fishburn, 1991), in the prospect theory (Kahneman and Tversky, 1979; Tversky and Kahneman, 1992), and in the classic expected utility frameworks used in economic decision theory (e.g., Kreps, 1990). As for ex post performance measures, the mean complies with sign dependence, but other widespread measures of performance violate this property. For example, measures based on variance make no distinction in the contribution of outcomes above or below targets, thus failing to comply with sign dependence. Downside risk measures, such as semi-variance or deviations below target, propose that outcomes above the target neither add to nor reduce the value of risk.

#### *Dynamic evaluation*

The objective of pursuing persistent or sustained superior performance has a long-term perspective at least. But we contend that it implies a dynamic perspective in the sense that success is related to avoiding the erosion of superior performance, that is, to maintaining the advantage over time or even improving it. This dimension, therefore, requires considering the time-ordering of outcomes.

The importance of dynamics has already been recognized in literature. Actually, existing literature on the persistence of performance uses a time series methodology, which embodies the consideration of the time-ordering of the outcomes. This is not the case for literature on the measurement of ex post risk (performance) in the field of strategic management, as they propose aggregations of static performance. However, there are some worthwhile exceptions to be mentioned. Bettis and Mahajan (1990) explicitly consider it in performance evaluation and propose a time series methodology. Fiengenbaum and Thomas (1990) implicitly consider this dimension by designing a measure that calculates deviations of returns with respect to an average of returns for the previous four years. Collins and Ruefli (1992) propose an ordinal, dynamic, but not sign-dependent, approach where performance is evaluated by the changes of a firm's position, over time, within the industry's returns ranking system.

The three dimensions defended also hold some similarities with the Strategic Reference Point Theory (Fiegenbaum, Hart and Schendel, 1996). This theory states that the formulation of reference points or targets used to evaluate performance have to draw upon three sources of information: internal capability, external conditions, and time. Also, the conceptual dimensions are consistent with two of the analytical steps proposed by Del Sol and Ghemawat (1999) for the strategic valuation of investments, namely, positioning and sustainability.

If targets can be assumed to be achieving superior performance, a valid measure must convey this; if the targets are sustaining a superior performance, a valid measure must determine to what extent this is achieved. We contend that these can be attained by defining a measure which complies with the three aforementioned properties, as defined in the next section.

### ***3.2 Definition of the Strategic Performance Measure (SPM)***

The achievement of superior performance implies a double incremental objective for performance which has to be considered in strategic evaluation. Firstly, superior performance is understood as outperforming competitors, as already discussed in the relativity dimension. A measure of performance should explain the degree, or lack, of achievement of this superior performance, in function of the magnitude of the achievement and its frequency. This can be measured periodically by comparing the outcomes of an organization to those of competitors. This can be considered as a static evaluation because it measures the achievement of the period-by-period goal. Secondly, sustainability implicitly entails the desire of continuous improvement in outcomes, which in turn requires the dimension of dynamism. Therefore, a strategic evaluation of performance should consider both steps, which can be called static and dynamic, respectively. For this reason a two-dimensional measure is herein proposed, which we call Strategic Performance Measure, which considers both evaluations separately. The two components of the Strategic Performance Measure are: Static Performance, which assesses to what degree superior performance for a firm is obtained, and Dynamic Performance, assessing the temporal dynamics of performance. The first two basic conceptual dimensions, relativity and sign dependence, will be implemented in both measures. The third dimension, dynamism, will only be enforced in the dynamic performance measure.

Let  $x_{it} = \{x_{i0}, x_{i1}, \dots, x_{in}\}$  be the outcomes of a firm  $i$  obtained in period  $t$ ,  $x_{i0}$  being the initial performance. The dimension of relativity can be put into practice by comparing the outcomes of a firm  $i$  at time  $t$ ,  $x_{it}$ , with a reference or target level for the same period,  $x_t^{ref}$ ,<sup>4</sup> generating what in literature has been called performance deviation or discrepancy (e.g., Miller and Leiblin, 1996),  $\delta_{it}$ , as:

$$\delta_{it} = x_{it} - x_t^{ref} . \quad [1]$$

The performance discrepancy is the degree to which the outcomes of firm  $i$  have outperformed the reference level. The reference level should be a proxy of the level of performance to outrun, such as the average of the industry or group, the outcome of a competitor used as a benchmark, or a certain best practice. If  $\delta_{it} > 0$ , the firm's performance is above the target, and if  $\delta_{it} < 0$ , it is below the target. The additive aggregation of  $\delta_{it}$  over  $n$  periods produces the measure of static performance ( $SP_i$ ), which for discrete historical outcomes data is defined as follows:<sup>5</sup>

**Definition 1: Static Performance (SP)**

*The measure of static performance for a firm  $i$  in a period comprised between 1 and  $n$  is the mean value of  $\delta_{it}$  from  $t=1$  to  $n$ :*

$$SP_i(1, n) = \frac{1}{n} \sum_{t=1}^n \delta_{it} , \quad [2]$$

being  $\delta_{it} = (x_{it} - x_t^{ref})$ .<sup>6</sup>

If  $SP_i > 0$ , the firm has achieved a superior performance because its outcomes have been, on average, above the reference level. If  $SP_i < 0$ , the firm has not shown superior performance because outcomes have been, on average, below reference levels, and if  $SP_i = 0$ , the firm has had, on average, the same outcomes as the reference, showing neither an advantage nor a disadvantage. This measure can have a centrality interpretation as the average static position of the outcomes of a firm relative to the reference levels, thus evaluating the average superior or inferior performance achieved. A similar type of measure is proposed by Miller and Leiblin (1996), who define a downside risk measure to evaluate ex ante or ex post performance with a parallel interpretation, but only considering outcomes below the reference level.

The property of dynamism is meant to reflect the sustainability of superior performance, i.e., the maintenance or the erosion of the advantage in performance. Therefore, the measure should increase if outcomes positively deviate from the reference levels, i.e., when  $\delta_{it}$  increases over time, and should decrease if outcomes negatively deviate from the reference levels, i.e., when  $\delta_{it}$  decreases. The measure of dynamic performance will be defined to incorporate this property.

Let  $z_{it}$  be the comparative performance change from period  $t-1$  to period  $t$  as:

$$z_{it} = \delta_{it} - \delta_{it-1}. \quad [3]$$

If  $z_{it} < 0$ , the firm has suffered an erosion in its outcomes relative to the reference levels in this transition from  $t-1$  to  $t$ , failing to achieve any objective of sustainability. If  $z_{it} = 0$ , the firm has maintained its position relative to reference levels, whatever it is. If  $z_{it} > 0$ , the firm has improved its position, meeting its dynamic objective to improve performance over time. The aggregation of that behavior over time is carried out in the measure of Dynamic Performance ( $DP_i$ ) which for discrete historical outcomes is defined as follows:<sup>7</sup>

**Definition 2: Dynamic Performance (DP)**

*The measure of dynamic performance for a firm  $i$  in a period comprised between 1 and  $n$  is the mean value of  $z_{it}$  from  $t=1$  to  $n$ :* [4]

$$DP_i(1, n) = \frac{1}{n} \sum_{t=1}^n z_{it},$$

being  $z_{it} = \delta_{it} - \delta_{it-1}$ .<sup>8</sup>

If  $DP_i < 0$ , the firm has, on average, suffered an erosion in its outcomes relative to the reference levels over this time-period, failing to achieve the objective of sustainability. If  $DP_i = 0$ , the firm has maintained its position relative to reference levels in the period under analysis. If  $DP_i > 0$ , the firm has, on average, improved its position, meeting its dynamic objective to increase performance. Apart from dynamism,  $DP_i$  involves the other two dimensions because it ultimately aggregates on  $\delta_{it}$ , which complies with relativity and sign dependence, as can be seen in the expression of  $z_{it}$  as a function of the original performance outcomes:



$$z_{it} = \delta_{it} - \delta_{it-1} = (x_{it} - x^{ref}) - (x_{it-1} - x^{ref}_{t-1}) = (x_{it} - x_{it-1}) - (x^{ref}_t - x^{ref}_{t-1}).^9 \quad [5]$$

The definition of dynamic performance lets the final relative position of outcomes of a firm  $i$ ,  $\delta_{in}$ , to be expressed as a function of the initial position,  $\delta_{i0}$ , and the dynamic performance, as follows: [6]

$$\delta_{in} = \delta_{i0} + n DP_i.$$

In turn, the final outcome value of the firm can be expressed as:

$$x_{in} = x_{i0} + (x_n^{ref} - x_0^{ref}) + n DP_i. \quad [7]$$

As can be seen in expression [7],  $DP_i$  offers a simple interpretation and connection with the actual outcomes. This is due to its linearity. It is formulated as an average and can be interpreted as the average periodical rate of change of the relative position, which can be an increase in the distance to the reference level, when  $DP_i > 0$ , a decrease when  $DP_i < 0$ , or the maintenance of the relative position when  $DP_i = 0$ .

The two component measures have been defined; however, the strategic evaluation of performance implies the integration of both evaluations to measure the degree of achievement of the objective of attaining a sustained superior performance. For this reason we formulate the Strategic Performance Measure as follows:

**Definition 3: Strategic Performance Measure (SPM)**

*The Strategic Performance Measure (SPM) is a two-dimensional measure which evaluates the degree to which a firm has achieved sustained superior performance, assessing its relative position by means of the measure of Static Performance ( $SP_i$ ) and the temporal dynamics of the relative performance by means of the measure of Dynamic Performance ( $DP_i$ ).*

This two-dimensional approach allows the graphic representation and analysis of the performance of a firm, as is explored in the next section. Additionally, the performance over a long period of time can be divided into subperiods to introduce the analysis of the transitions in performance over time.

### ***3.3. The graphical display of the Strategic Performance Measure***

The signs of the two component measures of the SPM define four relevant performance states. In the most favorable one  $SP_i > 0$  and  $DP_i \geq 0$ , meaning that the firm has achieved, on average, a superior performance which has been sustained over time, or improved in the case that  $DP_i > 0$ .<sup>10</sup> In this case strategic performance has undoubtedly been successful. The extent of such achievement is measured statically by the value of  $SP_i$ , and the average dynamic improvement rate is measured by the value of  $DP_i$ . The strategic performance of a firm in that situation would be depicted in State 1 in Figure 1, and it is referred to as Sustained Superior Performance. The second best status would take place when  $SP_i > 0$  but  $DP_i < 0$ . In that case, the firm has, on average, achieved a superior performance measured by the value of  $SP_i$ , but it has been eroding over time at the rate indicated by the value of  $DP_i$ . This situation is depicted in State 2, and is named Eroding Superior Performance.

-- Insert Figure 1 around here --

Should the firm be in a disadvantageous performance situation, its state will be in the lower quadrants, because  $SP_i \leq 0$ . When the firm reduces the distance to targets, it reduces its inferior performance, that is,  $DP_i \geq 0$ . It will be represented in State 4, in the right quadrant, and it is called Reducing Inferior Performance. The worst possible situation in strategic performance is found when a firm has an inferior performance,  $SP_i < 0$ , which is becoming worse over time, causing a negative dynamic performance,  $DP_i < 0$ . This has been named Worsening Inferior Performance, and it is represented in State 3 of Figure 1.

The most desirable situation is being in State 1, but there are two other states which can be considered positively. In a short-term evaluation, firms would be required to have a superior performance,  $SP_i \geq 0$ , thus being represented in the first row of Figure 1 (States 1 or 2). But in a long-term perspective, dynamic performance is what measures whether the progress is made or not with the aim of building superior performance, therefore increasing the importance of being preferably in the second column (States 1 or 4). However, there is one state which can not be considered good from any point of view: Worsening Inferior Performance is an undesirable state, in both a short- and a long-term perspective.

This two-dimensional approach to the measurement of strategic performance has several interesting features. In the first place, it defines objective criteria which classify the strategic performance of a firm into four possible states, considering not only superior performers but also inferior performers. Secondly, it distinguishes between the static position (superior or inferior performance) and the dynamic performance over time (improving or worsening), which could be assimilated to a short- and a long-run evaluation of performance, respectively. Thirdly, apart from the four states analysis, it offers a cardinal analysis, which is the synthesis of performance into a measure (two-dimensional) which allows the ordering of strategic performance according to the two dimensions. This could not be offered by the other dynamic approaches such as time series analysis and stratification techniques. Furthermore, the proposed Strategic Performance Measure will be tested to have some properties that make it conceptually and technically recommendable.

### ***3.4 The transitions within the four states***

If the evaluation of strategic performance is carried out over a long time-period, it may well be worth considering making periodical measurements of the strategic performance achieved. Next we shall briefly exemplify how this analysis could be useful for strategic management.

-- Insert Figure 2 around here --

According to literature, the performance of a firm can exhibit certain transitions along the four states of strategic performance. Figure 2 represents a hypothetical case. When a firm has achieved a differentiation advantage (Porter, 1985), it is expected to achieve a superior performance which will be maintained for a certain time-period, therefore being represented in SPM 1. If the advantage attained by the firm is only sustainable over a limited period, it is expected that the superior performance erodes over time, as imitators reproduce the advantages or innovators find minor advantages that allow them to catch up in performance. This occurrence would leave the performance evaluation of the firm in SPM 2. If the firm evaluated is not able to come to the market with more innovations in products, processes, or resources use, but some competitors do, the firm will lose the competitive advantage and therefore its superior performance. In this case, it will move away from SPM 2 because its static performance will be negative. If innovating competitors succeed in their advantages and increase performance along a time-period, the strategic performance of the firm under

analysis will move to SPM 3, where it does not have superior performance and its relative position even becomes worse over time. If the firm manages to react to that situation and place advantageous products into its markets, its performance can gain positions over time, that is, having a positive dynamic performance, which will bring the firm to SPM 4. Should this not happen, the evaluation of the firm would remain in State 3, which is the most dangerous state.

To sum up, any trajectory that leads to State 3 (Worsening Inferior Performance) should be considered as extremely dangerous for the survival of the firm. On the contrary, trajectories leading to State 1 (Sustained Superior Performance) are the healthiest ones for a firm. The multiple observation of performance, in consecutive periods, provides a view of the stability of strategic performance, answering the questions of the changes of relative position in performance over time, and of the gain or loss in competitiveness, in performance terms. It allows the possibility to confirm several aspects of strategic performance: whether it is stable over time, whether its relative position is randomly moving from one state to another or not, whether relative gains and losses are produced over time; or whether a certain trajectory backed by theory stands or not. Also, it can be used to analyze the effects of the strategic interaction among firms, because the performance of relevant competitors can be analyzed in parallel, to evaluate the effects of their competition over time on strategic performance. In section 5 an application of the SPM to the Spanish banking sector is provided to illustrate the meaning of the measure and to study some relevant cases where different trajectories along the four states can be observed.

#### **4. Theoretical Evaluation of a Measure of Strategic Performance**

In the previous section the two-dimensional measure of Strategic Performance has been defined, in terms of its two components: Static Performance and Dynamic Performance. The component measures were defined to comply with the three basic dimensions relevant to performance evaluation: relativity, sign dependence, and dynamism. In this section the three basic conceptual dimensions are transformed into an axiomatic framework that we defend should apply to any measure of strategic performance. The framework ensures that the measures make managerial sense and desirable mathematical properties.

The three basic dimensions, relativity, sign dependence, and dynamism, give rise to six mathematical properties. Two other conceptual properties are added to the evaluation system because they are supported by literature, and are compatible with and complementary to the previous six ones. The properties will be listed in turn and applied to the measures of Static Performance and Dynamic Performance as the components of the SPM. In the formulation of the properties, the expression *good outcomes* refers to those outcomes judged as successful because they achieve or exceed targets, i.e., the static outcomes which comply with  $\delta_{it} > 0$  or dynamic outcomes which comply with  $z_{it} \geq 0$ . *Bad outcomes* will be the ones judged as failures in achieving targets, i.e., the static ones with  $\delta_{it} \leq 0$  or the dynamic ones with  $z_{it} < 0$ .

**Property 1:** Relativity in value.

The contribution of an outcome to the value of performance assessment depends on the reference levels, as well as the value of the outcome itself.

**Property 2:** Sign dependence.

The marginal contribution of a good (bad) outcome is positive (negative), i.e., it increases (decreases) the value of the performance measure.

Static evaluation: If  $\delta'$  is a good (bad) static outcome, then  $SP(\delta + \delta') >(<) SP(\delta)$ .

Dynamic evaluation: If  $z'$  is a good (bad) dynamic outcome, then  $DP(z + z') >(<) DP(z)$ .

**Property 3:** Monotonicity in value.

The performance measure is continuous and increases (decreases) with the value of good (bad) outcomes.

Static evaluation: If  $\delta$  is a good (bad) static outcome, then  $\partial SP / \partial \delta > 0$  ( $\partial SP / \partial \delta < 0$ ).

Dynamic evaluation: If  $z$  is a good (bad) dynamic outcome, then  $\partial DP / \partial z > 0$  ( $\partial DP / \partial z < 0$ ).

**Property 4:** Monotonicity in frequency.

The performance measure is continuous and increases (decreases) with the frequency of good (bad) outcomes.

Static evaluation: If  $p$  is the frequency of a good (bad) static outcome, then  $\partial SP / \partial p > 0$  ( $\partial SP / \partial p < 0$ ).

Dynamic evaluation: If  $q$  is the frequency of a good (bad) dynamic outcome, then

$$\partial DP / \partial q > 0 \quad (\partial DP / \partial q < 0).$$

The following two properties only apply to the dynamic performance measure as they are derived from the dynamic dimension.

**Property 5:** Dynamic sign dependence.

If the outcomes of the firm,  $x_{it}$ , increase (decrease) over time, the performance measure increases (decreases), *ceteris paribus*: being  $\Delta x_{it} = x_{it} - x_{it-1}$ , then  $\partial DP / \partial \Delta x_{it} > 0$ .

**Property 6:** Dynamic relativity.

If reference level outcomes,  $x_t^{ref}$ , increase (decrease) over time, the performance measure decreases (increases), *ceteris paribus*: being  $\Delta x_t^{ref} = x_t^{ref} - x_{t-1}^{ref}$ , then  $\partial DP / \partial \Delta x_t^{ref} < 0$ .

There are two other conceptual properties which are not derived from the three basic dimensions but which are found in literature and have also been considered relevant. The first one is diminishing sensitivity, which considers that the marginal contribution of outcomes decreases with its magnitude. The rationale behind this property is that the psychological response to change is a concave function of the magnitude of this change. This property is proposed by the behavioral decision theory, and especially by the prospect theory (Kahneman and Tversky, 1979; Tversky and Kahneman, 1992). This property would require that the measure of performance should be concave for bad outcomes and convex for good outcomes. However, this property is not generally accepted. Widespread measures of ex post performance, such as the mean and the variance, do not comply with diminishing sensitivity, and even the variance presents increasing sensitivity. Because of the advantages of linearity and some criticisms on diminishing sensitivity, we propose non-increasing sensitivity.

**Property 7:** Non-increasing sensitivity in the value of outcomes.

Static evaluation: If  $\delta$  is a good (bad) static outcome, then  $\partial^2 SP / \partial \delta^2 \leq 0$  ( $\partial^2 SP / \partial \delta^2 \geq 0$ ).

Dynamic evaluation: If  $z$  is a good (bad) dynamic outcome, then  $\partial^2 DP / \partial z^2 \leq 0$  ( $\partial^2 DP / \partial z^2 \geq 0$ ).

Another conceptual property affects the reference or target levels, which are the values used to discriminate between good and bad outcomes. As already mentioned, valid reference levels must be relevant for the competitive arena of the firm or group under analysis. In strategic management literature, applications tend to use reference levels which are recalculated over time, often built with data from the industry. Aspiration levels from the behavioral theories of the firm (Cyert and March, 1963) also give support to changing reference levels over time. In the field of strategic management, the Strategic Reference Point theory (Fiegenbaum, Hart and Schendel, 1996) highlights the importance of time in defining reference levels. Therefore, the following conceptual, but not mathematical, property is proposed:

**Property 8:** Reference levels change over time.

The former eight properties describe the axiomatic properties for which we contend that any measure of performance should comply. The properties are intended to make the measure managerially and theoretically sound. Although some of the properties can be similarly found in literature, their joint consideration is not found, as far as we know. The set of properties applied to the SPM proposed in Definition 3 leads to the formulation of the following proposition:

**Proposition:** *The Strategic Performance Measure (SPM) complies with properties P1 to P8, as its constituent measures comply with their corresponding properties:*

- 1. The measure of Static Performance,  $SP_i$ , complies with all properties that apply to it (P1, P2, P3, P4, P7, P8).*
- 2. The measure of Dynamic Performance,  $DP_i$ , complies with all properties that apply to it (P1, P2, P3, P4, P5, P6, P7, P8).*

*See Appendix 1 for proof of the Proposition.*

Compliance with the axiomatic properties proves that the SPM conveys the type of strategic performance evaluation defended in this paper, allowing SPM to be considered conceptually valid. The importance of this compliance depends, in turn, on the validity of the objective posed for firms: the search for sustainable superior performance. The prevalence of this objective maybe subject to discussion, but it is necessarily important either descriptively, normatively, or under both points of view.

## 5. Measuring Sustained Superior Performance in the Spanish Banking Sector

To illustrate the measures proposed and their properties, this paper presents an application to the Spanish banking sector, which analyzes the performance of firms competing in the industry from 1987 to 1999. The Spanish banking sector is adequate for the application of the strategic performance evaluation because it is a sector with increasing competition, where strategic competition undoubtedly applies, especially for the biggest banks and savings banks, and for the innovative or differentiated medium banks. With this application, we shall show that static performance describes the degree of achievement of superior performance for a banking firm during a time-period, and dynamic performance captures the time trend of superior performance, which is its observed sustainability over time.

The period under analysis is characterized by containing the final part of a long deregulation phase that had the objective to progressively comply with the Second Banking Directive of the European Union, which aimed at preparing the unified banking market in 1993.<sup>11</sup> This liberalization implied an increase in the competitive possibilities for the banks, and a bigger one for the savings banks as they were previously affected by more restrictions. One of the main reactions to the new environment was the mergers wave, which significantly reduced the number of banking firms in the sector and, therefore, increased its dimension. Its peak period was in 1990, and it ended in 1995. After the consolidation wave, the leading role for strategic moves was mainly given to the slight post-merger rationalizations, stronger price competition, and branch expansion. Because of the structural and competitive changes, it is interesting to analyze the period under study in three parts: 1988-1991, 1992-1995, and 1996-1999.<sup>12</sup> The first subperiod corresponds to the last steps in deregulation. The second would contain the first reactions to the new deregulated competitive framework, including the consolidation wave. The last period corresponds to a more stable post-regulatory phase. These subperiods contain 4 years each, therefore, the Static Performance will be based on these 4 years, and the Dynamic Performance on the corresponding 4 transitions in performance.

According to the competitive situation, we would expect to find that Sustained Superior Performance (State 1) is an exceptional situation, as the increased competition erodes the previous privileged positions, situating the performance of the firm in Eroding Superior Performance (State 2) or even in the inferior performance states, in the case of more



hypercompetition. Theory would also predict that enlarged competitive possibilities would promote competitive moves, innovation, and more dynamism in the sector increasing the probabilities of transitions between performance states: from superior performance (States 1 and 2) to inferior performance (States 3 and 4), and conversely when some banks are able to build competitive advantages.

The application uses the operating returns on assets as the relevant performance variable because it reflects the effect of strategies in the financial intermediation business, which is the traditional activity of banks. The SPM is computed using the operating returns' sample mean as the reference level. The firm-level data is obtained from annual bank account records published by the Spanish Banking Association (AEB) and the Spanish Savings Banks Confederation (CECA). As a panel of results was preferable for the purpose of this application, we have reconstructed the returns of the merged firms in the years previous to the merger. The sample includes the banks which had a complete panel of data for the period and which did not present abnormal data in their annual accounts.<sup>13</sup> This has led to a final sample of 50 savings banks and 37 banks.

The results of computing the SPM for the sample show that Sustained Superior Performance (State 1) exists for some firms in every subperiod, but it is difficult to maintain. Actually, there is only one firm which keeps its SPM in State 1 for the three subperiods. This firm is labelled SB1 and it is a savings bank with a regional focus. The value of its sustained superior performance can be observed in table 1, which also presents the results of eight more banking firms that will be used as examples. The SPM of the firm is depicted in figure 3. It has achieved a superior performance because SP is positive in every subperiod, being around 0.5. This figure indicates that its performance has been approximately 0.5 points over the industry average. As regards to DP, it shows that its performance presented an increasing trend because DP is positive. Particularly, it increased at a rate of 0.142 in the first subperiod, but only at rate of 0.015 in the third one. In the same Figure there are two more examples of firms which keep their state during the three subperiods. B1 is a large bank with a national focus.<sup>14</sup> Its SPM indicates that it has an Eroding Superior Performance (State 2). The temporal dynamics of SPM for B1 indicates that its superior performance (SP) has decreased over the three subperiods. The third bank represented in Figure 3 is B2, which is a small national bank specialized in commercial banking. Its SPM is Worsening Inferior Performance for the three subperiods. The inferior performance (SP) ranges from 0.591 in

the first subperiod to 1.628 in the last subperiod. The yearly rate of performance deterioration is 0.361 in the first subperiod, but reduces in the following ones, approaching zero. We must note that B2 is the only firm in the sector staying permanently in State 3. As for State 2, apart from B1, there is only one other case.

-- Insert Table 1 around here --

-- Insert Figure 3 around here --

In Figure 4 three more cases are depicted where the transitions from one state to another can be observed. B3 is a large national bank which enjoys superior performance during the three subperiods, but which suffers an erosion of its initial sustained superior advantage. Therefore it moves from State 1 to State 2, and it stays in State 2 for the third subperiod. Its superior performance (SP) is remarkable – it is one of the best performing firms in the sector – and it ranges from 2.061 in the first subperiod to 1.57 in the last one. The yearly rate of erosion of its superior performance (DP) is 0.077 and 0.145 in the second and third subperiods, respectively, indicating a persistent erosion of performance. In the same Figure B4 is depicted, which is a small bank with a regional focus. Its SPM indicates that this firm has been unsuccessful in its performance during the last two subperiods. In particular it starts with a Sustained Superior Performance (State 1) during the first subperiod, but then continues with an Eroding Superior Performance (State 2), and ends with Worsening Inferior Performance (State 3). In contrast, an improving trajectory is observed for SB2, which is a large savings bank with a national focus. Its SPM starts in Worsening Inferior Performance (State 3) and moves to Sustained Superior Performance (State 1) in the second subperiod, to stay there in the third one. It would be interesting to know what strategies have allowed this firm to move from the worst state to the best one.

-- Insert Figure 4 around here --

Three more cases are presented in Figure 5. All three firms are large savings banks that had a regional focus before the deregulation and which have made a great branching expansion to become players at the national level. SB3 is an example of step-by-step improvement, and its SPM has moved from State 3 to 4 and, finally, to State 1. SB4 is an example of a *yo-yo* behavior, as its performance started in State 3, improved to State 4, and ended back in State

3. The last one, SB5, had a worsening performance which improved dynamically in the last subperiod. Particularly, its SPM moved from State 2 to State 3, but initiated a recovery in the last subperiod because the inferior performance was reduced (State 4).

-- Insert Figure 5 around here --

## **6. Conclusions**

This paper has addressed the measurement of strategic performance by building on three pillars: (i) the generic objective for firms of pursuing sustainable superior performance, (ii) received strategic management literature, and (iii) existing empirical literature on the persistence of profits and literature on ex post performance. Three basic conceptual properties are derived from the generic objective of pursuing sustainable competitive advantage: relativity, sign dependence, and dynamism. According to these properties, the two-dimensional Strategic Performance Measure (SPM) is defined, composed of a measure of Static Performance and a measure of Dynamic Performance. The SPM provides the measurement of the sustained superior performance attained. Otherwise, it identifies three more possible states of performance: eroding superior performance, improving inferior performance, and worsening inferior performance. The SPM provides a cardinal measurement of performance at the firm level, which enlarges the vision offered by the literature on the persistence of profits found in industrial organization literature and in the field of strategic management. Literature on ex post risk (performance) does provide cardinal measurements at the firm level, but its valuations do not correspond to the objective of pursuing sustainable superior performance, and it has rarely focused on capturing the temporal dynamics of performance.

The paper has explored the graphic analysis of SPM, which permits the analysis of changes in performance states over time. This analysis provides a visual aid to understanding the performance effects of the strategic interaction among firms, because the performance of relevant competitors can be analyzed in parallel. It has been illustrated in an application to some cases of strategic competition in the Spanish banking sector.

Two broad possibilities for extension are worth mentioning. Firstly, SPM could be used to test hypotheses brought by literature, as it is applicable to different empirical contexts by

defining the adequate performance variable. For example, to test the degree to which superior performance is persistent for firms pursuing different strategies, or whether a certain performance trajectory backed by theory stands or not. The deterministic approach and linear definition of the functions that consider the variables influencing performance (value of outcomes, frequency) grant the separability of SPM into additive parts. The exploration of this possibility may contribute an interesting methodology to explain the nature of superior performance and of its sustainability.

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## Appendix 1 Proof of the proposition

### Property 1 Relativity in value.

1a.  $SP_i = \frac{1}{n} \sum_{i=1}^n (x_{it} - x_t^{ref})$ , therefore it is a function of  $x_i$  and  $x^{ref}$ .

1b.  $DP_i = \frac{1}{n-1} \sum_{i=2}^n (\delta_{it} - \delta_{it-1})$ , thus, it is a function of  $\delta_{it}$ , which, in turn, is a function of  $x_i$  and  $x^{ref}$ .

### Property 2 Sign dependence.

2a. A good static outcome complies with  $\delta' > 0$  and has a frequency of  $\frac{1}{n}$ . If it is added to the existing  $\delta$  series, *ceteris paribus*, which has a certain static evaluation measured by

$SP(\delta)$ , then,  $SP(\delta + \delta') = \frac{1}{n} \sum_{i=1}^n \delta_{it} + \frac{1}{n} \delta' = SP(\delta) + \frac{1}{n} \delta'$ . As  $\delta' > 0$ , then  $SP(\delta + \delta') > SP(\delta)$ .

2b. Similarly to 2a, for  $SP$ , if  $\delta'$  is a bad static outcome, then  $\delta' < 0$ , thus,  $SP(\delta + \delta') < SP(\delta)$ .

2c. For  $DP$ , if  $z'$  is a good dynamic outcome,  $z' > 0$ , and if it is added to the existing  $z$  series,

*ceteris paribus*,  $DP_i = \frac{1}{n} \sum_{i=1}^n z_{it} + \frac{1}{n} z'$ , that is,  $DP(z + z') = DP(z) + z' \cdot q(z)$ . As  $z' > 0$ , then

$DP(z + z') > DP(z)$ .

2d. Similarly to 2c, for  $DP$ , if  $z'$  is a bad static outcome, then  $z' < 0$ , therefore

$DP(z + z') < DP(z)$ .

For the monotonicity properties we can express  $SP$  and  $DP$  in a more general expression, separating good from bad outcomes and considering the frequency of each of the outcomes, as follows:

$$SP(\delta) = \sum_{\delta_i > 0} \delta \cdot p(\delta) - \sum_{\delta_i \leq 0} |\delta| \cdot p(\delta),$$

$$DP_i = \sum_{z_{it} \geq 0} z \cdot q(z) - \sum_{z_{it} < 0} |z| \cdot q(z).$$

### Property 3 Monotonicity in value.

3a. For  $SP$ , if  $\delta > 0$ ,  $\partial SP / \partial \delta = p(\delta) > 0$ .

3b. For  $SP$ , if  $\delta \leq 0$ ,  $\partial SP / \partial \delta = -p(\delta) < 0$ .

3c. For  $DP$ , if  $z \geq 0$ ,  $\partial DP / \partial z = q(z) > 0$ .

3d. For  $DP$ , if  $z < 0$ ,  $\partial DP / \partial z = -q(z) < 0$ .



**Property 4 Monotonicity in frequency.**

- 4a. For  $SP$ , if  $p$  is the frequency of a certain good static outcome, then  $\partial SP / \partial p = \delta > 0$ .
- 4b. For  $SP$ , if  $p$  is the frequency of a certain bad static outcome, then  $\partial SP / \partial p = -|\delta| < 0$ .
- 4c. For  $DP$ , if  $q$  is the frequency of a certain good dynamic outcome, then  $\partial DP / \partial q = z > 0$ .
- 4d. For  $DP$ , if  $q$  is the frequency of a certain bad dynamic outcome, then  $\partial DP / \partial q = -|z| < 0$ .

The expression of the measure of Dynamic Performance can be rewritten in terms of the increments of outcomes for the firm under evaluation,  $\Delta x_i^t = x_i^t - x_i^{t-1}$ , and for the reference levels  $\Delta x_i^{ref} = x_i^{ref} - x_{i-1}^{ref}$ , leaving the expression of  $DP_i$  as follows:

$$DP_i = \sum_{\Delta x_{it} - \Delta x_i^{ref} \geq 0} (\Delta x_{it} - \Delta x_i^{ref}) \cdot q(z) - \sum_{\Delta x_{it} - \Delta x_i^{ref} < 0} |\Delta x_{it} - \Delta x_i^{ref}| \cdot q(z).$$

Otherwise, it can be written as:

$$DP_i = \sum_{\Delta x_{it} - \Delta x_i^{ref} \geq 0} (\Delta x_{it} - \Delta x_i^{ref}) \cdot q(z) - \sum_{\Delta x_{it} - \Delta x_i^{ref} < 0} (\Delta x_i^{ref} - \Delta x_{it}) \cdot q(z)$$

**Property 5 Dynamic sign dependence.**

- 5a. For a good dynamic outcome, that is, when  $z_{it} = \Delta x_{it} - \Delta x_i^{ref} \geq 0$ , then  $\partial DP / \partial \Delta x_{it} = q(z) > 0$ .
- 5b. For a bad dynamic outcome, that is, when  $z_{it} = \Delta x_{it} - \Delta x_i^{ref} < 0$ , then  $\partial DP / \partial \Delta x_{it} = q(z) > 0$ .

**Property 6 Dynamic relativity.**

- 6a. For a good dynamic outcome, that is, when  $z_{it} = \Delta x_{it} - \Delta x_i^{ref} \geq 0$ , then  $\partial DP / \partial \Delta x_i^{ref} = -q(z) < 0$ .
- 6b. For a bad dynamic outcome, that is, when  $z_{it} = \Delta x_{it} - \Delta x_i^{ref} < 0$ , then  $\partial DP / \partial \Delta x_i^{ref} = -q(z) < 0$ .

**Property 7 Non-increasing sensitivity in the value of outcomes.**

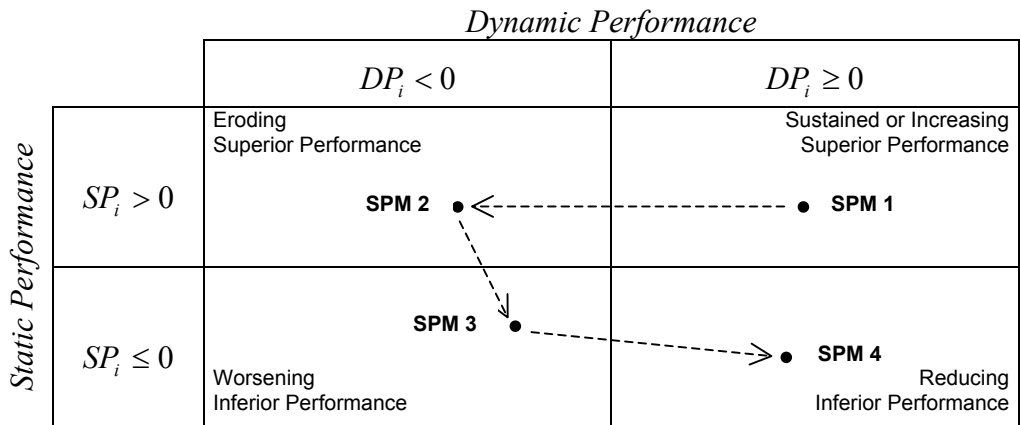
- 7a. For  $SP$ ,  $\partial^2 SP / \partial \delta^2 = 0$  because  $SP$  is linear on  $\delta$ .
- 7b. For  $DP$ ,  $\partial^2 DP / \partial z^2 = 0$  because  $DP$  is linear on  $z$ .

**Property 8 Reference levels change over time.**

- 8a. For  $SP$ , as  $\delta_{it} = (x_{it} - x_i^{ref})$ , reference levels are introduced by  $x_i^{ref}$  which are defined to vary over time.
- 8b. For  $DP$ , as  $z_{it} = (\delta_{it} - \delta_{it-1})$ , dynamic reference levels are variable over time as they are set as the previous period deviation. In turn, static reference levels are introduced by  $x_i^{ref}$  which are defined to vary over time.

		<i>Dynamic Performance</i>	
		$DP_i < 0$	$DP_i \geq 0$
<i>Static Performance</i>	$SP_i > 0$	<i>State 2</i> <b>Eroding Superior Performance</b>	<i>State 1</i> <b>Sustained Superior Performance</b>
	$SP_i \leq 0$	<i>State 3</i> <b>Worsening Inferior Performance</b>	<i>State 4</i> <b>Reducing Inferior Performance</b>

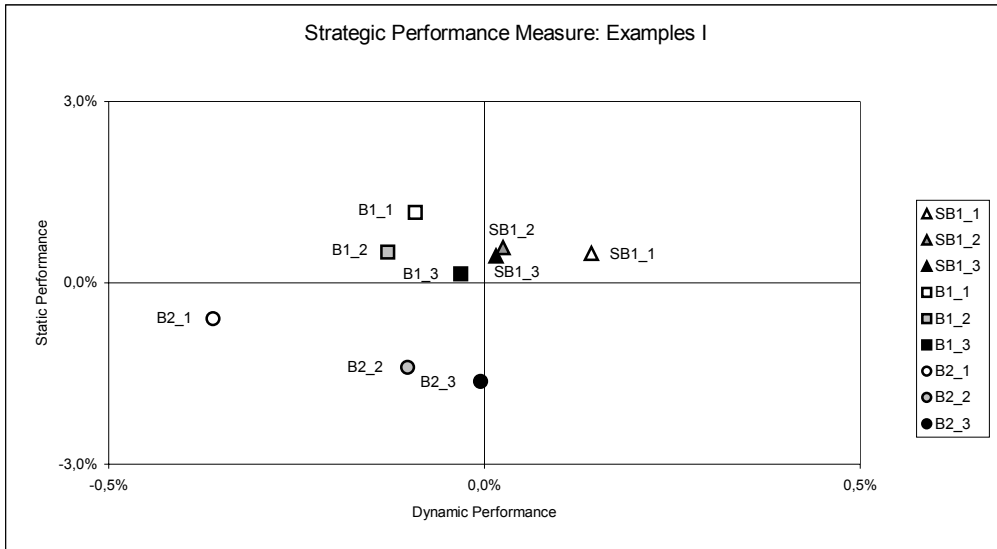
**Figure. 1** Four states in strategic performance evaluation



**Figure. 2** Transition example of performance

	SPM 1988-1991		SPM 1992-1995		SPM 1996-1999	
	SP	DP	SP	DP	SP	DP
<b>SB1</b>	0.483%	0.142%	0.588%	0.024%	0.443%	0.015%
<b>B1</b>	1.171%	-0.092%	0.505%	-0.129%	0.148%	-0.031%
<b>B2</b>	-0.591%	-0.361%	-1.401%	-0.102%	-1.628%	-0.005%
<b>B3</b>	2.061%	0.194%	2.013%	-0.077%	1.570%	-0.145%
<b>B4</b>	2.099%	0.711%	1.011%	-0.601%	-0.252%	-0.261%
<b>SB2</b>	-0.670%	-0.220%	0.150%	0.273%	0.351%	0.039%
<b>SB3</b>	-0.646%	-0.262%	-0.251%	0.331%	0.489%	0.080%
<b>SB4</b>	-0.702%	-0.074%	-0.478%	0.094%	-0.496%	-0.041%
<b>SB5</b>	0.899%	-0.153%	-0.069%	-0.231%	-0.291%	0.079%

*Table. 1 Strategic Performance Measure results for the example firms*



**Figure 3.** Strategic Performance Measure: Examples I

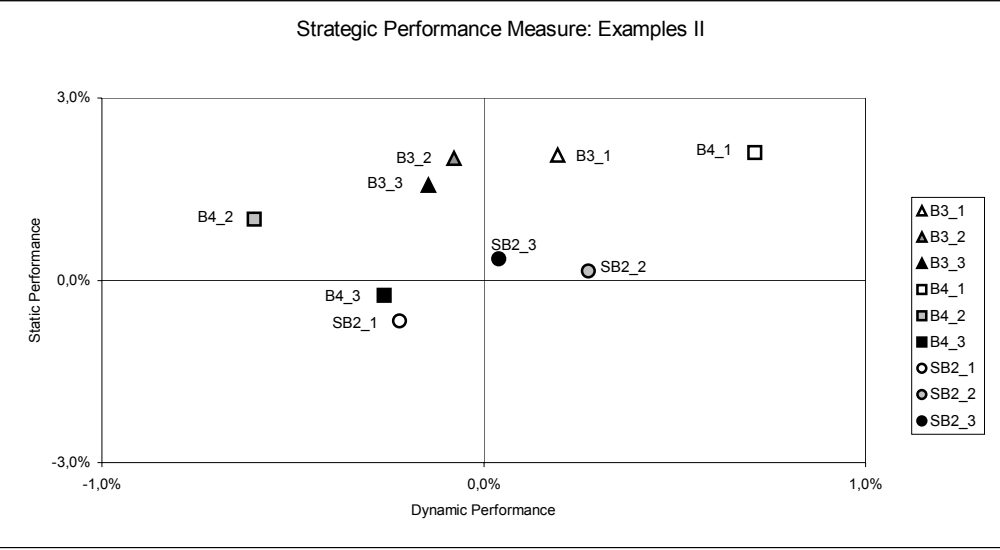
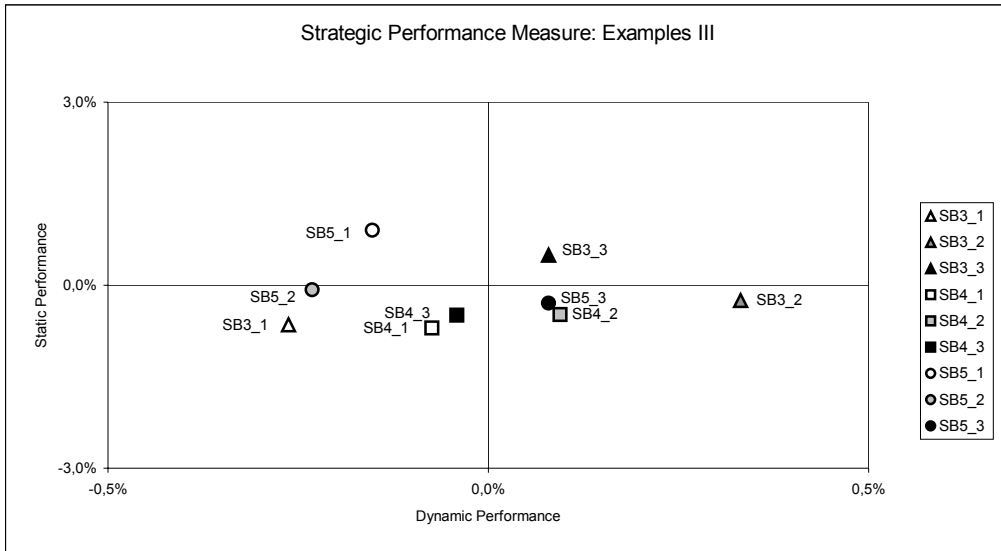


Figure 4. Strategic Performance Measure: Examples II



**Figure 5.** Strategic Performance Measure: Examples III

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## Footnotes

<sup>1</sup> In ex post risk literature there have also been some time-series approaches (e.g., Bettis and Mahajan, 1990), but the majority of the works have been measure-oriented.

<sup>2</sup> The definition of Besanko, Dranove and Shanley (1996) actually refers to competitive advantage, which they assimilate to superior performance as it is the expected cause-effect relationship.

<sup>3</sup> See references in section 2.

<sup>4</sup> The reference, or target level, is considered to be only dependent on time, in the sense that it is common for all firms belonging to the system under analysis, as the evaluation takes place in a context of strategic competition.

<sup>5</sup> Should the outcomes be continuous, the expression for the static performance measure would be  $SP_i = \int \delta_{it} dp$ , where  $p$  is the density function of outcomes.

<sup>6</sup> The aggregation of the static performance,  $\delta_{it}$ , is carried out linearly to comply with sign dependence. Nevertheless, the aggregation could include the consideration of weights, which would leave its expression as:

$SP_i(1, n) = \sum_{t=1}^n w_{it} \delta_{it}$ . This would allow the definition of weights variable over time or over values of  $\delta_{it}$ ,

reflecting varying preferences over time or values, respectively. For the purpose of this article, the unweighted aggregation is preferred as it assures a convenient information content of the measures proposed, and we find no theoretical need to make a weighted aggregation. Further, the unweighted proposal does not cause the analysis any relevant loss of generality, because the inclusion of standard weights (positive) would not change the axiomatic and theoretical analysis provided.

<sup>7</sup> Should the outcomes be continuous,  $DP_i = \int z_{it} dq$ , where  $q$  is the density function of outcomes' transitions.

<sup>8</sup> The aggregation of the dynamic performance,  $z_{it}$ , is carried out linearly to comply with sign dependence. Nevertheless, the aggregation could include the consideration of weights, which would leave its expression as:

$DP_i(1, n) = \sum_{t=1}^n w_{it} z_{it}$ . See footnote 6 for further comments.

<sup>9</sup> This expression also shows the equivalence between first considering relativity and then dynamism, or the reverse.

<sup>10</sup> The signs of the inequalities have been defined to comply with the objective of sustained superior performance, superior performance being identified with  $SP_i > 0$ , and sustained or increasing performance over time with  $DP_i \geq 0$ .

<sup>11</sup> The main policies included were the complete deregulation of interest rates (1987); the end of the branch expansion control (1985 for banks, 1989 for savings banks); the abolition of restrictions to the entrance of foreign banks (1988, 1993); and the removal of the liquidity requirements which implied compulsory investment in government bonds (1992).

<sup>12</sup> Note that the initial period (1987) is not included in the evaluation as there is one initial period needed to compute the dynamic performance,  $z$ , of 1988.

<sup>13</sup> The banks involved in mergers and acquisitions are not included in the sample because they do not have a complete panel, but they are considered in the reconstructed return series for the bank resulting from the consolidation. Abnormal observations were the ones that stated null assets or workers during the period under analysis, indicating that the bank was operating in special situations, such as whether it was temporarily inoperative, being restructured or operating in other activities but not in the traditional banking intermediation.

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<sup>14</sup> Large banks and savings banks are those belonging to the top ten in average assets during the period under analysis.