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**Internal Performance Evaluation:
the Case of Bank Branches**

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Abstract
This paper proposes a new approach for gauging the performance of branch managers of a financial institution by defining a Measure of Internal Performance (MIP). Our proposal is different from others existing in the literature in two main aspects. Firstly, it is consistent with the requirements of internal evaluation because it uses the managers' real preferences instead of assuming them. Secondly, it takes into account that each branch has a different target to achieve according to its specific characteristics. We show how MIP can be used as a management tool. This measure is grounded in extant theory, especially in the recent disappointment models proposed by Jia, Dyer and Butler (2001). This paper is one of the very first to apply the disappointment models to evaluate the internal performance of an organisation.

Keywords: banking, branch, performance measurement, disappointment models

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1. Introduction

The financial services industry has been undergoing a major revolution in recent years due to deregulation, desintermediation, globalisation, and technological change. Banks have been affected dramatically by these changes, which transform the way services are provided, the channels used to deliver the services, and the nature of financial institutions. While in the past banks were intermediaries and service providers that reacted to the constraints posed by regulation, nowadays their proactivity has led them to widen their scope to become universal financial agents. They decide independently who the target customers are, in which arenas they will compete and therefore who their competitors will be. The change to proactivity implies a cultural change for banks in order to become more oriented towards the customer, who they still reach mainly via their branch network.

In this hypercompetitive context, organisations demand the targeted results from each of their organisational divisions, departments or branches. In this last case, branches become decision making units which have autonomy to decide the best way of achieving the target goals within a set of banking services. They are profit centres, which are the main contributors to the bottom line of the whole firm. Therefore, the branch network managers are increasingly more interested in gaining insights into the performance of their network of branches, seeking new ways to add value to their services in such an increasingly competitive industry.

There is abundant literature on the performance of financial institutions. See for example, Berger and Humphrey (1997) for a comprehensive survey of studies of efficiency and productivity change in financial institutions in various countries. However, there are fewer studies at the branch level. A significant number of these studies are based on Data Envelopment Analysis (DEA), which was developed by Charnes, Cooper and Rhodes (1978) to be applied to public sector and not-for-profit settings in which prices are distorted or nonexistent. But lately their work has been extended to all sectors and for-profit behaviours, including bank branches. Sherman and Gold (1985) were one of the first to apply it to the bank branches context. Some improvements in the basic DEA model have been proposed in the literature. For example, Shaffnit, Rosen and Paradi (1997) and, more recently, Sowlati and Paradi (2004) use additional information to restrict the weights of the DEA model. Athanassopoulos (1998) as well as Hartman, Storbeck and Byrnes (2001) introduce

some environmental or non-discretionary inputs into the model, variables which are not controlled by managers but influence the branch performance. Other DEA models, such as the additive model, have been applied by Cook and Hababou (2001). Other contributions have been made by Zenios *et al*. (1999) and Cook, Seiford, Zhu (2004). A recent survey of DEA applications for bank branches can be found in Paradi, Vela and Yang (2004).

When the prices of the inputs are available one logical extension of the DEA efficiency approach is the cost approach. In this case, the operating inefficiency is evaluated in terms of excess cost, so that the managers can estimate the potential cost reduction if the inefficiency is removed from the network. This is also the case in Athanassopoulos (1998) and Hartman *et al.* (2001). Berger, Leusner, Mingo (1997) take the cost approach but use stochastic cost functions instead of linear programming models. However, this literature sometimes acknowledges that cost efficiency is not the sole driving force in managing commercial activity (e.g. Camanho and Dyson, 2005: 444). One way of solving this problem is to move to the profit side, the bottom line of the bank, which is possible if the output prices are known. Oral and Yolalan (1990) and Soteriou and Zenios (1999) are examples of representative applications for bank branches.

In our opinion, in order to evaluate internal units of the firm, such as the branches of a banking firm, the previous approach has two significant shortcomings. First, it fails to consider that each decision making unit may have a different target, which is a function of a wide set of environmental variables and organisational characteristics. For example, units of different ages, facing different levels of competition and stationality will most likely have different profit levels requested of them. Secondly, this approach does not explicitly consider the preferences of the network managers in the evaluation. The evaluation is made primarily for their use and therefore it should be made to conform to their needs and preferences.

As the previous reviewed research does not comply with these two requirements, we can consider these works as *external evaluation* approaches. In contrast, this paper proposes a new *internal evaluation* approach in which each branch can have a different target and the network managers' preferences are integrated into the evaluation framework. For this purpose, we have looked for the literature that explicitly considers targets and the preferences of the evaluators, which we introduce in Section 2. Building

mainly on the disappointment model proposed by Jia, Dyer and Butler (2001), in Section 3 the article proposes a methodology for evaluating the branch's performance in a network of a commercial bank. In Section 4, we carry out this evaluation in a privileged context as we had access to performance data at the business unit level. In particular, we evaluate 287 units comprising 145 household units and 147 Small and Medium Enterprise units, which correspond to 145 branches of a Spanish commercial bank. We used monthly data from almost four years, from 2001 to 2004. This study uses a sample of 13,202 observations which is, to the extent of our knowledge, the biggest sample employed in a performance analysis of internal units. Moreover, we had the opportunity to learn explicitly about the network managers' preferences, which were included in the evaluation, and to contrast them with some theoretical and experimental findings on performance evaluation. Finally, the discussion and conclusions follow in Section 5. Although the article makes a proposal for evaluating bank branches, it can be easily extended to other contexts of internal evaluation, such as other types of strategic units.

2. Theoretical background: A guided survey

2.1. Target and preference-oriented evaluation

Since the contribution of Markowitz (1959) to the field of finance, performance evaluation has been based mainly on the mean-risk approach. This approach considers that ex ante performance can be summarised in a measure of centrality (the mean) and a measure of dispersion (a measure of risk, such as the variance or the semivariance). This approach was born in the field of finance, but it has been adopted by other fields, such as management. The original ex ante focus for evaluating expected or predicted performance also extended to an ex post focus, that is, of realised performance. This extension can be attributed to several reasons, for example, to the availability of ex post data only, or to a greater interest in realised outcomes compared to predicted ones, which is the case of the management field in contrast to the financial field.

However, the discussion of which is the appropriate measure of risk to use in the mean-risk framework has generated a long-lasting debate which is still open. In this context, Stone (1973) uncovered some issues involved in selecting risk measures, the relation among these measures, and some guidelines for analysing when one risk

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measure is preferred over another. In particular, the article introduces two related three-parameter risk measures which generalise some very common measures of risk: variance, semi-variance, mean absolute deviation, probability of an outcome worse than a certain level, and the standard deviation. It also recognises that defining these measures involves decisions about three aspects: (1) the reference level of wealth about which the deviations are to be measured; (2) the power function chosen to operate these deviations, accounting for the relative importance of small versus large deviations; and (3) the range of deviations, or outcomes, that should be included in the risk measure.

The general measure proposed by Stone (1973:676) aggregates a performance variable called wealth, x, considering its probability distribution, $F(x)$, by using the following definition:

$$L(x^{ref}, k, A) = \int_{-\infty}^{A} \left| x - x^{ref} \right|^{k} dF(x), \; k \geq 0, \tag{1}$$

where there are three parameters to be defined: i) the reference level of wealth, x^{ref}, from which deviations are measured; ii) k, the power to which deviations in wealth are raised; and iii) A, the range parameter that specifies which deviations are to be included in the measure. These parameters introduce the discussion of the multiple possibilities in the aggregation and their consequences or, in other words, the assumptions on preferences underlying the decisions in x^{ref}, k, and A.

Stone (1973) recognises that, following a mean-risk approach the selected reference level, x^{ref}, is usually the mean. However, it is pointed out that for different evaluation contexts (e.g. gambling, bidding, capital budgeting) other possible – and valid – choices could be zero, the initial level of wealth, the distribution mode, the distribution median, or other wealth levels of concern to the decision maker. For choosing k the article establishes four main possibilities: $k = 0$, which assumes that the size of the deviations do not count at all; $0 < k < 1$, assuming that small deviations count more than large deviations; $k = 1$ which weights all deviations equally; and $1 < k < \infty$, which expresses that large deviations are more important than small ones. Parameter A has four relevant possible choices: $A = \infty$, when the evaluation wants to include all deviations from the reference level, which means all values of x; $A = x^{ref}$ when only deviations below the reference level are considered; $A < x^{ref}$ for considering only a part of the deviations

below the reference level; and $x^{ref} < A < \infty$, when all adverse deviations (below x^{ref}) are considered and only some of the favourable deviations (above x^{ref}).

In our opinion, Stone's work makes three important contributions: i) it makes it explicit that the evaluators' preferences condition which measure is chosen; ii) it introduces the importance of target levels in evaluating performance; and iii) it proposes the same evaluation for all types of results, be they good or bad, and leaves the decision of what results to include to the choice of A. The first two contributions are granted in the subsequent relevant literature, by assuming that performance evaluation is inseparable from preferences and by recognising the importance of reference levels. However, choosing A, which implies accepting or not the same (symmetric) treatment of gains and losses, generates different streams of measures and applications. This will be analysed in the following two sections.

2.2. The downside perspective

Part of the risk literature has adopted a downside perspective by choosing $A = x^{ref}$, to consider only deviations below the reference level. Thus, these measures, which are called downside-risk measures, only give value to and synthesise the results codified as losses. The argument behind this approach is that decision makers in investment contexts frequently associate risk with the failure to attain a target return (e.g. Markowitz, 1959, Mao, 1970). For example Fishburn (1977) proposes a class of mean-risk dominance models in which risk equals the expected value of a function that is zero at and above a target return and is non-decreasing in deviations below the target. This is clearly formulated as a partial measure (downside) because outcomes over the target are ignored in the evaluation. This approach, with $A = x^{ref}$, reduces the three-parameter model of Stone to a two parameter model, where only the reference level (x^{ref}) and the power function (k) need to be decided.

The downside risk perspective has based a large amount of research on the finance field (e.g. Bawa and Lindenberg, 1977; Harlow and Rao, 1989; or more recently Ang, Bekaert, Liu, 2005; Ballestero, 2005), and it has also been applied to different fields such as mining (e.g. Richmond, 2003) and agriculture (e.g. Atwood, 1985). However, the impact of this approach on management has been limited, except for some relevant applications such as Thomas (1982), Chang and Thomas (1989), Miller and Reuer (1996) and Miller and Leiblin (1996).

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2.3. Asymmetry between gains and losses

Another line of literature, which aims at defining measures that describe the evaluators' preferences better, recognises that results codified as gains or losses need asymmetric treatment, as found in empirical and experimental research. For example, Unser (2000), when experimentally exploring the risk perception in a financial context, found some disadvantages of symmetric and downside measures for gains and losses. He also found that positive deviations from an individual reference point tend to decrease perceived risk. In a management context, March and Shapira (1987) found that managers make a clear distinction between gains and losses, which is also reported in behavioural decision experiments (e.g. Kahneman and Tversky, 1979). Taking into account these more complex preferences makes a difference to the previous literature in two aspects. Firstly, it requires that $A = \infty$ to include all types of results (gains and losses), which is not compatible with the downside approach. Secondly, it needs a different evaluation of different types of results, such as gains and losses. For example, allowing a different k for gains and losses in (1) implies that the unique structure for evaluating results proposed in (1) has to be transformed into an evaluation function with different parts for the different types of results.

Behavioural decision theorists were the first to emphasise the importance of asymmetry in performance evaluation, normally in ex ante contexts. For example, Kahneman and Tversky (1979) strongly defend this asymmetry, and propose a two-part function for computing gains differently from losses. Based on this contribution, Bell (1985) offers an interesting theoretical development. He considers that a decision maker will form an expectation when considering a risky prospect, and use this expectation as a reference point when evaluating what is eventually received. He defines *disappointment* as a psychological reaction to an outcome that does not meet the decision maker's a priori expectation. When the decision maker does better than expected, he will experience *elation*, the opposite of disappointment.

Based on the ideas of Bell (1985), Loomes and Sugden (1986), and Jia and Dyer (1996), Jia, Dyer and Butler (2001) studied a specific class of risk-value models typically referred to as disappointment models. They developed a non-linear disappointment model that offers more flexibility in describing preferences. They proposed that disappointment and elation are proportional to the difference between outcome and expectation, and also assume that the preference relation is additive

between gains and losses. The article assumes a piece-wise power utility model, which indicates that the evaluators' preferences make a distinction between different types of outcomes, namely gains and losses, and that there may be a non-linear evaluation of the outcomes. Formally, they assumed that preferences have the following form:

$$u_0(x) = \begin{cases} e\, x^{\theta_1} & \text{when} & x \geq 0 \\ d\, |x|^{\theta_2} & \text{when} & x < 0 \end{cases},$$ (2)

where x are the possible outcomes, d and e are parameters that reflect the relative importance of good and bad results respectively, and θ_1 and θ_2 are parameters that represent the power function.

--- Insert Figure 1 about here ---

The graphical representation of this preference is shown in Figure 1, assuming asymmetry between gains and losses, loss aversion ($d > e$), and diminishing sensitivity ($\theta_1, \theta_2 < 1$).

Consistent with the piece-wise utility model in (2), the risk evaluation proposed by Jia, Dyer and Butler (2001:71) has the following structure:

$$R(x) = d \sum_{x < x^{ref}} p\, \left|x - x^{ref}\right|^{\theta_2} - e \sum_{x \geq x^{ref}} p\, \left|x - x^{ref}\right|^{\theta_1},$$ (3)

where x is the outcome distribution, x^{ref} is the reference level, and p is the probability distribution associated with x. This development uses the expected value as the reference level, and thus $\left|x - x^{ref}\right|$ is the difference between the outcome obtained and the reference level. However, it points out that there are other possibilities for x^{ref}, including the aspiration level of a decision maker.

The proposals of the disappointment models share some grounds with two other parallel literatures. Firstly, with some contributions in behavioural decision theory (e.g. Fishburn, 1982; Fishburn, 1984; Luce, 1996), including prospect theory (e.g. Kahneman and Tversky, 1979; Tversky and Kahneman, 1992), and secondly, with the literature on perceived risk (e.g. Weber and Bottom, 1990; Jia, Dyer and Butler, 1999). All these theories propose an asymmetric treatment of gains and losses, which leads to evaluating gains separately from losses. It is worth noting that the ultimate aggregation of the value

of gains or losses is additive in the proposals of prospect theory, perceived risk and disappointment models. We will also assume this in our Measure of Internal Performance.

The theoretical proposals of the disappointment models have been used in applications in the marketing field, such as in Szeinbach, Allen and Barnes (1998), Lemon, White and Winer (2002), Inman and Zeelenberg (2002), or Homburg, Koschate and Hoyer (2005). However, to the extent of our knowledge, it has not been applied to the management field and particularly not to the performance evaluation field.

3. A Measure of Internal Performance

To address our research question, we will define the Measure of Internal Performance, which aims at responding to how we evaluate the performance of the branches of a bank according to the preferences of the network managers. To define the measure, we will explicitly consider targets and the asymmetry between gains and losses.

We evaluate the performance of a Decision Making Unit (DMU), e.g. bank branches, indexed by i, during n time periods indexed by t. The performance outcome obtained by DMU i in time t is x_{it}. The frequency of a particular x_{it} is denoted by p_{it}, which is bounded between 0 and 1, and complies with $\sum_{t=1}^{n} p_{it} = 1$. For each DMU i at each period of time t, a reference level or target is defined, x_{it}^{ref}. When the outcome of a DMU exceeds its reference level, i.e. when $x_{it} > x_{it}^{ref}$, it is codified as a good outcome. Otherwise, when $x_{it} \leq x_{it}^{ref}$, it is considered a bad outcome. Following this notation, we define the Measure of Internal Performance, MIP_i as:

Definition: Measure of Internal Performance

The Measure of Internal Performance for a DMU i in a period comprised between 1 and n is defined as:

$$MIP_i(x_i, p_i) = \alpha_1 \sum_{\substack{t=1 \\ x_{it} > x_{it}^{ref}}}^{n} \tau(t) \alpha_2(x_{it} - x_{it}^{ref}) \, \alpha_3(p_{it}) - \beta_1 \sum_{\substack{t=1 \\ x_{it} \leq x_{it}^{ref}}}^{n} \tau(t) \beta_2(x_{it} - x_{it}^{ref}) \, \beta_3(p_{it}), \quad (4)$$

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where x_i and p_i denote the vectors $x_i = (x_{i0}, x_{i1}, ..., x_{in})$ and $p_i = (p_{i0}, p_{i1}, ..., p_{in})$ respectively, and $\tau(t)$ is a function of time.

This measure separately aggregates good outcomes ($x_{it} > x_{it}^{ref}$) and bad outcomes ($x_{it} \leq x_{it}^{ref}$), as considered in the theoretical developments of the disappointment models presented in Section 2.3. This separation enables good and bad results to be treated asymmetrically at three levels: (i) the functions α_2 and β_2 allow different treatment when evaluating good or bad values of x_{it} respectively; (ii) the functions α_3 and β_3 allow p_i to be evaluated differently, corresponding to a good or bad outcome; and (iii) the parameters α_1 and β_1, in turn, incorporate the possibility of weighting differently the overall evaluation of good and bad outcomes. The function $\tau(t)$ is defined equally for good and bad outcomes, and therefore only dependent on t, such as a discount factor.

MIP is more general than the disappointment model in (3), proposed by Jia, Dyer and Butler (2001), so that it adapts better to the context of internal management evaluation in the sense that it allows:

(i) a flexible modelling of the function for evaluating the performance discrepancies $(x_{it} - x_{it}^{ref})$, by means of defining the generic functions α_2 and β_2;

(ii) a more general treatment of p_i, which stands for frequencies in a ex post evaluation or for probabilities in an ex ante context, by means of defining the generic functions α_3 and β_3;

(iii) the inclusion of a function $\tau(t)$ to account for possible time preferences, such as a discount factor.

In the case that $\alpha_2(x_{it} - x_{it}^{ref}) = (x_{it} - x_{it}^{ref})^{\theta_1}$, $\beta_2(x_{it} - x_{it}^{ref}) = |x_{it} - x_{it}^{ref}|^{\theta_1}$, $\alpha_3(p_{it}) = p_{it}$, $\beta_3(p_{it}) = p_{it}$ and $\tau(t) = 1$, $MIP_i(x_i, p_i)$ is exactly the opposite of the standard measure of risk proposed by Jia, Dyer and Butler (2001: 71), and thus equivalent.

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4. Internal evaluation: Bank branches

The measure *MIP* defined in (4) will be used to evaluate the branches of a commercial bank in Spain, a medium-sized firm, challenging the large Spanish banks by positioning itself as a leader in adopting new technologies. Its total assets in 2004 were almost 30 billion euros, and it is in the top 10 of the Spanish ranking of commercial and savings banks. The before-tax earnings for the same period were over 150 million euros. With close to 3000 employees and more than 300 branches it offers a full range of retail banking services: personal and company accounts, foreign currency accounts, and credit applications. However, depending on the client base, each branch is organised to serve different lines of business better.

4.1. The managers' preferences

Putting the MIP measure in (4) into practice for evaluating a number of decision making units requires the following to be defined: i) the performance outcome, x_{it}; ii) the reference levels, x_{it}^{ref}; and iii) the parameters α_1 and β_1, and the functions α_2, α_3, β_2 and β_3. These definitions must be made by the network managers according to their preferences about performance.

In the case of our commercial bank, the reward and control systems are based on the Economic Value Added (EVA) measure. Following the management by objectives system, every branch negotiates a target of EVA defined on a monthly basis, and the reward system is based on the degree of attainment of this target. In particular, the contingent (variable) pay depends on the percentage attainment of the target EVA, which can account for 30% of the pay. Consistent with these preferences, we identify x_{it}^{ref} as the monthly target for EVA, which has to be positive, and x_{it} is the monthly EVA achieved.

According to the reward system of the bank, the bank network managers accepted that the allocation of attention (March and Simon, 1958) was almost exclusively on the ratio of EVA attainment for branch managers and for themselves. Thus, the relevant performance variable would be x_{it}':

$$x_{it}' = \frac{x_{it}}{x_{it}^{ref}}. \tag{5}$$

This ratio relation between the performance achieved and target performance is the alternative to the difference analysis $\left(x_{it} - x_{it}^{ref}\right)$. We have used this ratio formulation as it is the one used by the commercial bank, and the data was provided in this form. This particularity implies that we are replacing $\left(x_{it} - x_{it}^{ref}\right)$ in the MIP measure in (4) with $x_{it}^{'}$.

The relevant performance outcome, $x_{it}^{'}$, is unbounded, and it separates good and bad outcomes at 100% of percentage attainment. When the performance obtained equals the target, its value is 100%. Whenever the outcome is superior to the target, the value of $x_{it}^{'}$ is greater than 100%; and when the performance achieved is lower than the target, $x_{it}^{'}$ is lower than 100%, including negative values if the outcome is negative.

The branch network managers confirmed that the main reference level was 100% of attainment, but acknowledge a degree of tolerance around it. Furthermore, they revealed that their system had additional secondary reference levels, one for the bad outcomes and two more for the good outcomes. These levels are presented in Table 1, together with the judgement associated with them.

--- Insert Table 1 about here ---

--- Insert Figure 2 about here ---

Given the existence of several strata in the judgments on performance due to the secondary reference levels, we used a graphical scale to find the preferences of the evaluators and obtain a definition of parameters α_1 and β_1, and functions α_2 and β_2. The valuation established is represented in Figure 2, where a scale represents the functional forms decided for good and bad attainments, and for the different strata of good attainments. The parameters and functions α_1 and α_2, or β_1 and β_2 corresponding to each strata according to the visual scale in Figure 2, are provided in the Appendix.

The scale in Figure 2 maps the value of $x_{it}^{'}$ to a value ranging from 0 to 10, where 5 is traditionally considered the pass-level: the lowest evaluation for a good outcome. Although the value of $x_{it}^{'}$ is unbounded, any attainment up to 70% ($x_{it}^{'} \leq 70\%$) is so unsatisfactory that it is ignored in the evaluation by giving it value 0 in the scale. The following stratum, $70\% < x_{it}^{'} \leq 95\%$, receives a valuation for bad outcomes, with a

convex scale that ranges from 0 to almost 5. The good outcomes have three concave strata. The first is for the good attainments, $95\% < x_{it}^{'} \leq 105\%$, which obtains values over 5 and below 7. The next stratum is for very good attainments, $105\% < x_{it}^{'} \leq 120\%$, which receives values over 7 and below 9. The third one is for excellent attainments, $120\% < x_{it}^{'} \leq 130\%$, with a valuation ranging from 9 to 10. The last part of the valuation function is for the extremely good attainments, $x_{it}^{'} > 130\%$, which are uniformly given a value of 10.

For the functions for the frequencies of the attainments the evaluators acknowledged that $\alpha_3 = \beta_3 = \dfrac{1}{n}$, because it is the case of time series data. The evaluators considered $\tau(t)$ as a weighting function for giving a different importance to the outcomes obtained in different years, giving more value to the most recent outcomes. We will carry out two evaluations over time. In the evaluation of the period 2001-02, the evaluators chose a weight of 0.4 for the monthly attainments of the first year, 2001, and 0.6 for the attainments of the second year, 2002. In the evaluation of 2003-04, the same weights were applied, 0.4 for 2003 and 0.6 for 2004.

The decisions about the functional forms and parameters reflect the preferences of the evaluators, that is, the branch network managers. Their options comply with the theoretical findings originally explored by the prospect theory in several aspects: i) they acknowledge that the value carriers are gains and losses defined relative to a reference point, by defining their performance as the percentage attainment of the target EVA; ii) they clearly confirm the asymmetry in the evaluation of gains and losses; iii) they reflected loss aversion by accepting that the evaluation function is steeper for losses (attainments below 95%) than for gains (attainments over 95%); and iv) they showed diminishing sensitivity, that is, the marginal value of both gains and losses decreases with their size, which translate into concave functions for gains and convex ones for losses. These traits comply with the piece-wise utility models represented in Figure 1. Furthermore, they reveal some more sophisticated preferences, such as secondary reference levels, insensitivity to extreme values and tolerance around the achievement level.

With all the functions and parameters defined, *MIP* has been particularised to evaluate the branches of the commercial bank. The results of this evaluation are presented in the next section.

4.2 MIP as a tool for management

Most of the branches of the commercial bank under study are segmented into two units, according to their targeted customers. The first type of unit is oriented to household customers, and the second to businesses, mainly Small and Medium Enterprises (SME). The goal setting system of the bank firstly fixes yearly targets for each unit: households and SME. In addition, the goals are distributed along the months of the year according to the historical stationality patterns. As the branch units are considered profit centres, they will be the unit of analysis, and the base periods will be months.

---Insert Table 2 about here ---

The bank provided monthly data on the percentages of performance attainments for 287 units, comprising 145 household units and 142 SME units, which correspond to 145 branches. The data range from March 2001 to December 2004, providing 46 monthly observations. Table 2 provides basic descriptive statistics of the panel of data, by offering the median and standard deviation for the two segments.

The time period was split into two subperiods: 2001-02 and 2003-04. As there was an evaluation of the target setting system in the subperiod 2001-02, which affected the 2003-04 target setting, it is interesting to observe the possible learning effects in 2003-04 in comparison to the previous years. Therefore, we will analyse the performance of the second subperiod, 2003-04, in comparison with the performance of the first subperiod, 2001-02.

Applying MIP to each of the units of the sample permits us to synthesise the performance of each unit into a single figure for each subperiod, and to obtain a performance ranking. The mark obtained for each unit, which ranges from 0 to 10, shows whether each unit has achieved its targets over the period studied. If $MIP \geq 5$, the unit has achieved or exceeded its targets, on average. If $MIP < 5$, the unit has failed to achieve its targets on average. The results obtained will be analysed for all units altogether and for each of the two segments: household units and SME units.

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Furthermore, we will classify the units by asset volume into three groups (small, medium and large), which allows the results to be interpreted better. The small units belong to the first tercile with assets below 9 million euros at the end of 2004; the medium-sized comprise units in the second tercile, up to 16 million euros; and the large units are the third tercile with growing assets that reach 280 million euros, in the case of the main central branch.

The possible uses of the MIP will be explored for four main applications: i) using MIP to identify "problem children", that is, units with poor or worsening performance; ii) identifying and learning from best practices, by means of detecting good and improving performers; iii) using MIP to evaluate group performance, in this case, household and SME in different size groups; and iv) evaluating the target setting system.

Identifying "problem children"

The MIP measure can be used to identify units with poor performance, to find possible corrective actions and to evaluate their effect on performance. For example, the network managers define a unit to be performing poorly when its MIP<3, remembering that 5 is the pass-level. In the case of the bank we are analysing, the evaluation of the first subperiod 2001-02 shows 32 cases of units in this situation which can be classified as *problem children*. Most of these cases (27) are SME units, while only 5 cases are household units. To gather more information, network managers carried out strategic auditing of the units, and designed corrective actions to bring about changes in the strategy or tactics of the problematic units.

The evaluation of the second subperiod 2003-04 provides information about the mid-term success of the actions taken, and gives further information on future actions. Out of the 32 cases of initial poor performance, 25 cases overcame the situation and showed an improvement in performance. Two of them, which were SME units, reached an MIP greater than seven; 11 cases scored over 5, the minimum pass level; but 12 cases stayed below 5. However, on the negative side, there were seven units that continued to perform poorly (MIP<3). Six of them were SME units, small in size, with assets below 9 million euros. Only one was a household unit, of the medium size group. With this information, network managers should be rather worried about these seven

units with persisting poor performance. Strategic changes should probably be made in these units or even taking more definitive actions such as closing them.

Additionally, we can identify 12 units with significantly worsening performance because MIP decreases from 8 in 2001-02 to below 3 in 2003-04; that is, from a very good performance to a very poor performance. These units which significantly worsen in performance are also of interest for network managers. They were interested in identifying these cases, taking corrective actions and learning from the situation to prevent this happening in the future. MIP provides information on these undesired trajectories.

Identifying the best practices

Network managers must be interested in identifying the best performers to ensure that knowledge and capabilities are retained by means of learning good practices and giving the necessary recognition to successful managers and teams. In the case of this bank, network managers considered that good performers are the ones with MIP>7 (out of 10). The results show 68 units that exceed 7 in the first evaluation (2001-02), which went down to 18 units in the second evaluation (2003-04), with only 3 cases that keep such a good MIP score from the first to the second evaluation. These three cases are two household units and a SME unit.

To identify good practices, network managers can also monitor the improvements in performance. For this bank, in contrast to the case of worsening performance, dramatic improvements in performance are rare. Only two units have improvements over 5 points in MIP, and both were SME units of medium size. If it is possible to learn from these improvements, this information can be used in other units to try to replicate the good evolution.

MIP for evaluating group performance

The summary statistics of the evaluation of all units using MIP are reported in Table 3. The overall results for MIP show that the initial evaluation was 5.47 on average in 2001-02, indicating a higher degree of performance achievements than of failures. However the separate analysis for household and SME units reveals that the good MIP is due to the good performance of household units, who have an average of 6.30, whereas the average for SME units is only 4.62. The network managers analysed the

possible causes of this different group performance, and some corrective measures were taken in the goal setting process of the following years, 2003 and 2004.

--- Insert Table 3 about here ---

In the subsequent evaluation, 2003-04, there are significant changes in the joint performance and in the previous advantage of household over SME units. The overall performance decreases by almost 13% to reach 4.77, which indicates that the original dominance of success in performance becomes a dominance of failure, as the average MIP is below 5. This worsening of the MIP is due to household units because their MIP decreased more than 25%. The evaluation of SME units improved 4%, which is sufficient to overpass the evaluation of household units in 2003-04.

The MIP results for the group of household units and the group of SME units, as well as the changes over time can also be seen in Figures 3 to 6 which represent the spread of MIP results for each unit, separating the two types of units and the two periods of evaluation. The diagrams show the MIP results organised according to asset volume in 2004, where we have distinguished terciles that divide the units into small, medium and large. We must note that the asset volume of the two types of units is significantly different, as household units are mostly big or medium, while SME are mostly small or medium.

--- Insert Figure 3 about here ---
--- Insert Figure 4 about here ---
--- Insert Figure 5 about here ---
--- Insert Figure 6 about here ---

The comparison of Figure 3 and Figure 5 shows more evaluations over 5 for household units than for SME units in 2001-02, which represents visually the better achievement of the former compared to the latter. Comparing Figure 3 and Figure 4 shows the evolution over time. It depicts many MIP results for household units moving below 5 in the second period (2003-04), which indicates a worsening in performance that causes the mean to decrease. It also shows that the small household units have a similar performance in the second (2003-04) and first period (2001-02), but not the medium and large ones, for which it can be seen that many of their MIP values drop below 5 in the second period. The performance improvement over time for SME units is

less visible in Figures 5 and 6, except for the medium SME units that show a noticeable improvement, with many MIP values over 5.

MIP for evaluating the target setting system

The MIP measurements can be used to help evaluate the target setting system by synthesizing how the achievements eventually correspond to the targets and how the target setting system is learning to improve the precision of targets or other attributes that targets may have.

In the bank evaluated, we already noted that household units and SME units had different achievement levels in the first subperiod, 2001-02. We noted a different mean, which is significantly non-equal in statistical terms (t-test). This situation changes in the second period, 2003-04, when the mean MIP for household and SME units becomes closer to become 4.72 for the former and 4.82 for the latter, with a distribution that statistically has the same mean (t-test). These results can be interpreted as a certain bias in target fixing in the first period, favouring household units, which is corrected in the second period, proving that learning occurred in the target setting system.

In addition, we would expect that learning in a target setting would have an observable effect on the distribution, such as a reduction in the dispersion of performance, concentrating more around the 5 level, as attainments tend to approach the level of 100%. In the bank evaluated, this information can be obtained from the summary statistics of MIP in Table 3 and by observing Figures 3 to 6. Table 3 reports that for the joint consideration of household and SME units, the kurtosis coefficient was significant in 2001-02, but lost significance in 2003-04. This indicates a higher concentration of MIP values along the mean, which can be interpreted as learning in the target setting system. This effect is visible for the group of household units in the change of spread from Figure 3 to Figure 4. We can also observe that the concentration is higher for big household units. However, this learning is less observable in the case of SME units, in the transition from Figure 5 to Figure 6.

5. Conclusions

Existing approaches for evaluating branches of a firm or DMU follow an external evaluation approach because they do not consider the preferences of the internal

evaluators. This paper proposes a new approach which defines a Measure of Internal Performance (MIP) to gauge the performance of the branches of a commercial bank. Our approach is different to others existing in the literature in two main aspects. Firstly, it is consistent with the requirements of internal evaluation, because it is prepared to incorporate the judgments of the branch network managers who evaluate the branches. In this way, this paper uses the managers' real preferences, instead of assuming them. Secondly, it assumes that each branch is requested to achieve a different target according to its specific characteristics. These aspects aim to take into account how network managers understand the performance of branches, and that the values obtained in the evaluation have the meaning that managers want them to have. Furthermore, this paper uses a wide sample of internal performance data at the business unit level. We use this data to show how MIP can be used to advise the network managers of good and bad performance, to learn from successful practices and implement corrective actions when needed.

The measure proposed is based on extant literature on performance. The starting point is the work by Stone (1973), which raises the importance of reference levels or targets, and considers preferences by clarifying the objective of the aggregation. However, to include the opposite judgment that evaluators have of gains (achieving or exceeding targets), and losses (failing to achieve targets), we had to find models which considered asymmetry between gains and losses, such as disappointment models (Jia, Dyer and Butler, 2001). Based on these models we extended their proposal by maintaining the importance of target achievement and the asymmetry between gains and losses, but adding the possibility to include more general preferences and a time discount factor. This paper is one of the first to apply the disappointment model approach for internally evaluating an organisation.

Implementing this framework in the case of the branches of a Spanish commercial bank revealed that the managers' preferences were coherent with behavioural theories. In particular, they revealed that target or aspiration levels were very important (Cyert and March, 1992), and that they were relevant in the allocation of attention (March and Simon, 1958). Aspiration levels – targets – made a clear distinction between good and bad outcomes, which caused framing differences (Kahneman and Tversky, 1979). As in the prospect theory approaches, the non-linearity of the valuation function was also obtained, with loss aversion instead of risk aversion, increasing sensitivity when

reaching targets, and diminishing sensitivity when staying in the same stratum. This implies that the value function is concave for good outcomes and convex for bad outcomes.

Other confirmations are the existence of multiple reference levels (e.g. Miller and Chen, 2004), although one acted as the prevalent aspiration level, and the other as second-order reference levels. Some other interesting heuristics were found such as tolerance around the reference level, so that 95% attainment was considered to be achieving the target, and the insensitivity to extreme values (below 70% and over 130%). All these particularities of the internal evaluators' preferences where captured by the framework proposed, and we believe they cannot be attained by using standard statistical or efficiency analysis techniques.

The branch evaluation was based on detailed branch office information provided by bank network management. We had the privilege of gaining access to internal data on monthly performance from 2001 to 2004, showing how the 287 units evaluated covered their targets. MIP provides a synthesis of performance for each unit analysed and therefore a ranking of performance for each evaluation. We showed how the measure helps to identify good/bad performers with high/low achievements or high levels of improvement/worsening. From this information, the network managers learned good strategies applied in some branches which could be replicated in others. They could also identify wrong strategies, to be substituted by new corrective actions. We also showed that MIP could be used to analyse possible learning in the target-setting system.

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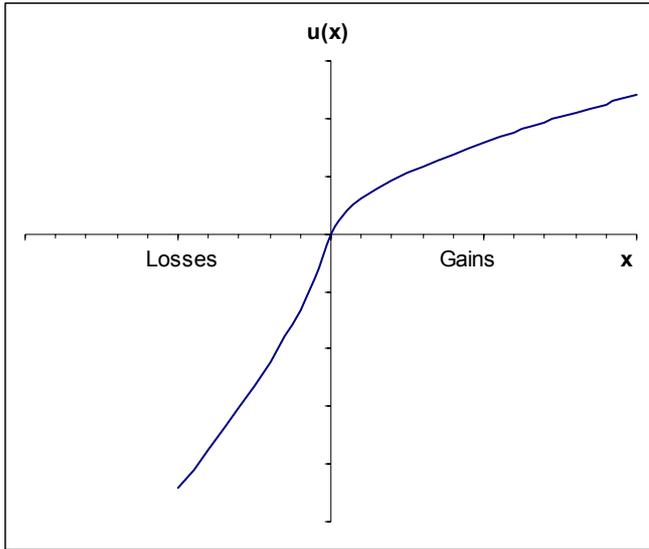
FIGURE 1
UTILITY CURVES BASED ON A PIECE-WISE POWER MODEL

TABLE 1
EXISTING REFERENCE LEVELS IN PERFORMANCE ATTAINMENT

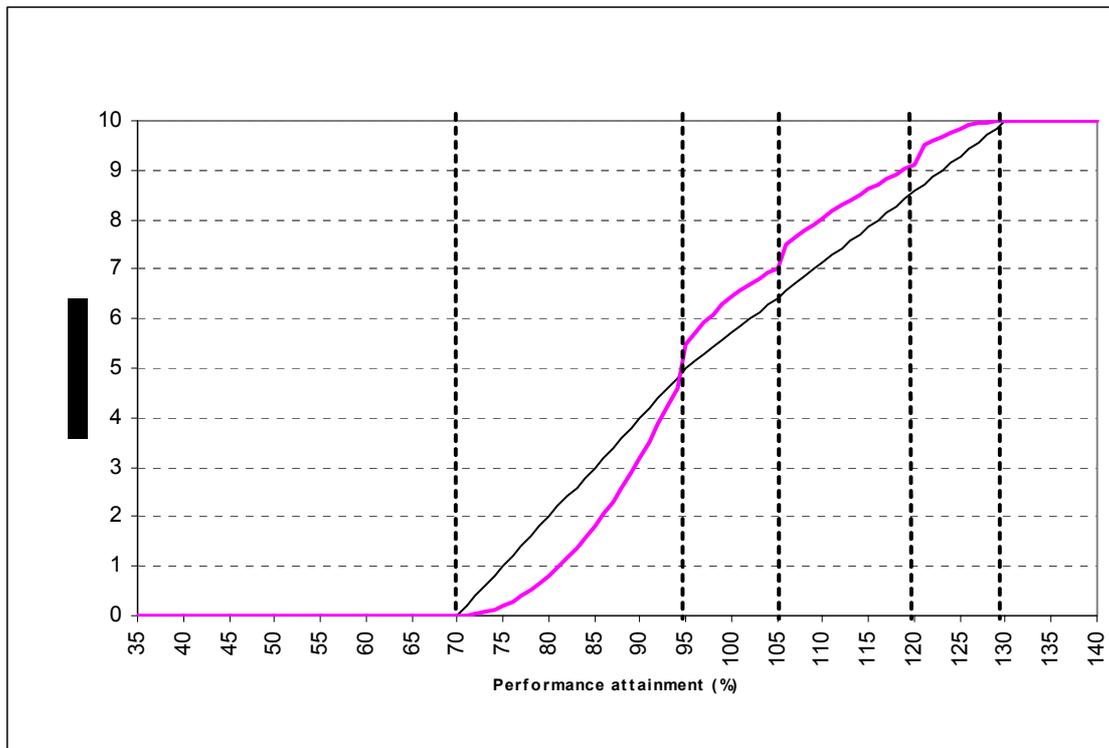| Attainment level strata	Judgement over attainment
$x_{it}^{'} \leq 70\%$	Very unsatisfactory attainment
$70\% < x_{it}^{'} \leq 95\%$	Unsatisfactory attainment
$95\% < x_{it}^{'} \leq 105\%$	Good attainment
$105\% < x_{it}^{'} \leq 120\%$	Very good attainment
$120\% < x_{it}^{'} \leq 130\%$	Excellent attainment
$x_{it}^{'} > 130\%$	Abnormally good attainment

FIGURE 2
SCALE TO EVALUATE THE PERFORMANCE ATTAINMENTS

TABLE 2
SUMMARY STATISTICS OF EVA PERCENTAGE ATTAINMENTS

	Household units	N = 145	SME units	N = 142
	Median	**Stand. Dev.**	**Median**	**Stand. Dev.**
March 2001	126	189	87	299
April 2001	121	187	96	375
May 2001	130	539	88	1212
June 2001	128	191	95	402
July 2001	118	188	104	1681
August 2001	129	176	118	625
September 2001	106	132	90	623
October 2001	114	160	100	904
November 2001	117	177	83	766
December 2001	190	424	76	801
January 2002	85	33204	91	51867
February 2002	102	187	85	787
March 2002	104	312	85	1203
April 2002	92	194	95	1338
May 2002	91	1013	84	7759
June 2002	114	551	98	1549
July 2002	104	123	104	1511
August 2002	103	220	93	452
September 2002	87	217	85	1217
October 2002	102	183	91	779
November 2002	114	177	84	395
December 2002	163	683	77	407
January 2003	96	171	102	154
February 2003	114	209	91	181
March 2003	117	774	91	972
April 2003	112	1242	97	338
May 2003	115	658	100	788
June 2003	127	1148	109	260
July 2003	123	292	108	193
August 2003	112	1428	98	197
September 2003	110	471	86	147
October 2003	105	374	89	424
November 2003	108	269	89	185
December 2003	128	1285	74	419
January 2004	67	1179	90	2347
February 2004	72	1272	95	2996
March 2004	84	2659	101	6162
April 2004	72	1110	81	2023
May 2004	72	226	90	16011
June 2004	78	688	98	2670
July 2004	88	542	96	3565
August 2004	62	319	80	1922
September 2004	93	348	98	2349
October 2004	89	669	107	1674
November 2004	85	1110	108	10285
December 2004	121	221	88	1845

Note: We show the median instead of the mean because the values of x'_{it}, defined in (5), are unbounded and there are extreme values, which can be seen through the standard deviation.

TABLE 3
SUMMARY STATISTICS OF THE MEASURE OF INTERNAL PERFORMANCE

	All units			Household units			SME units		
	2001-2002	2003-2004	Variation	2001-2002	2003-2004	Variation	2001-2002	2003-2004	Variation
Number of units				145	145		142	142	
Mean	5,47	4,77	-12,83%	6,30	4,72	-25,09%	4,62	4,82	4,25%
Median	5,44	4,77	-12,30%	6,48	4,70	-27,42%	4,40	4,80	9,12%
Std. Deviation	1,93	1,52	-21,47%	1,71	1,30	-23,85%	1,78	1,71	-3,46%
Asymmetry	0,00	0,08		-0,26	0,10		0,33	0,03	
Kurtosis	-0,74 **	0,04		-0,46	-0,09		-0,42	-0,16	
Minimum	1,11	0,93		2,00	1,16		1,11	0,93	
Maximum	9,63	9,55		9,63	8,21		8,99	9,55	

Superscript ** indicates that the kurtosis coefficient is statistically different from zero at the 1 percent level of significance.

FIGURE 3
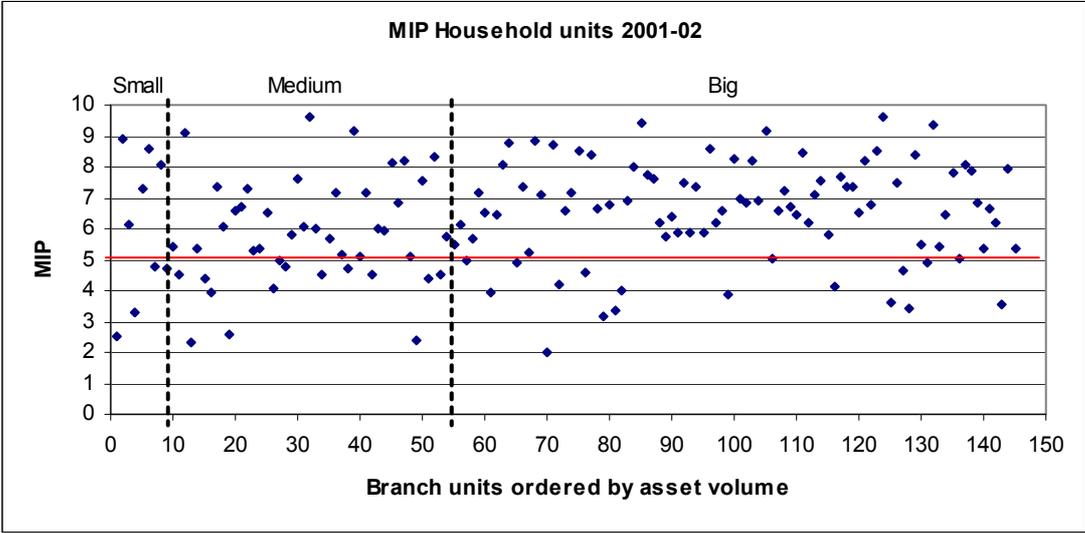MEASURE OF INTERNAL PERFORMANCE FOR HOUSEHOLD UNITS 2001-02

MIP Household units 2001-02

FIGURE 4
MEASURE OF INTERNAL PERFORMANCE FOR HOUSEHOLD UNITS 2003-04

MIP Household units 2003-04
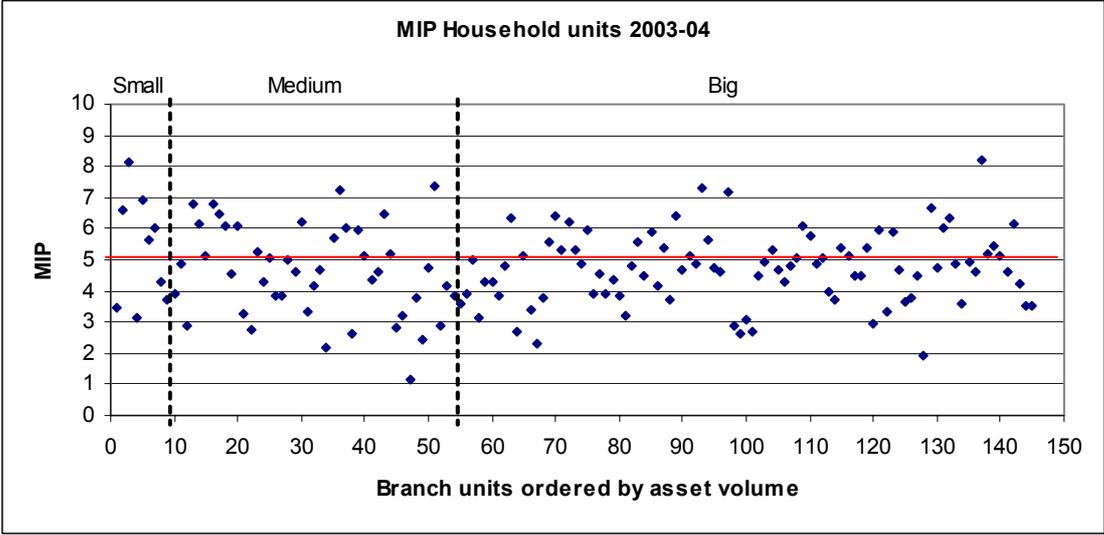
FIGURE 5
MEASURE OF INTERNAL PERFORMANCE FOR SME UNITS 2001-02
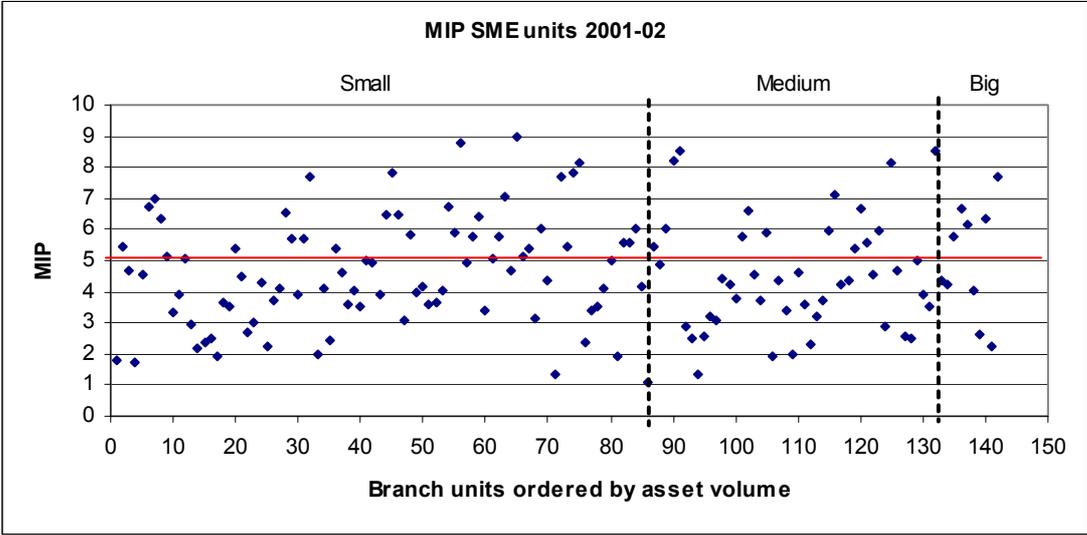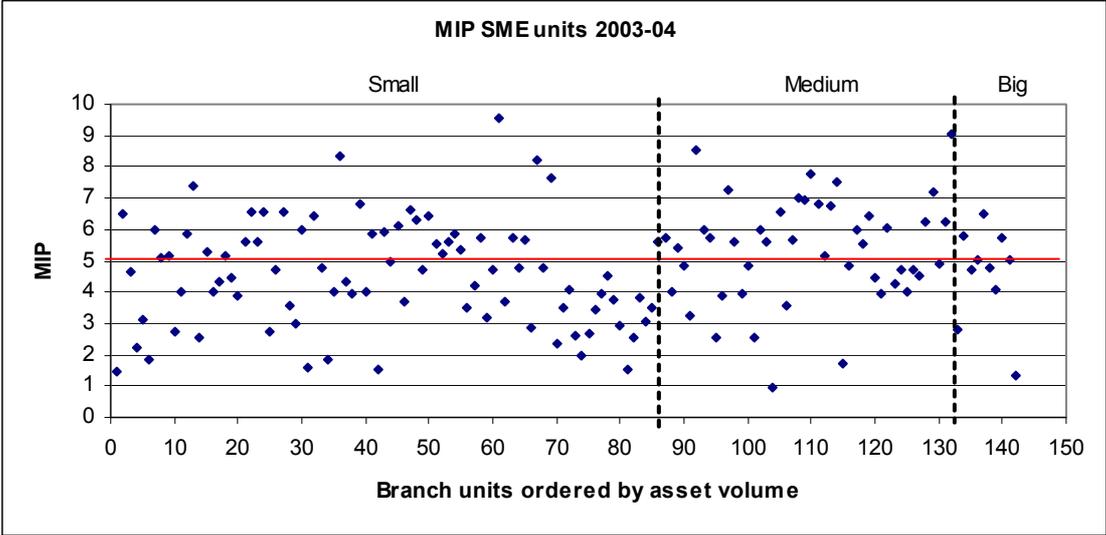

MIP SME units 2001-02

FIGURE 6
MEASURE OF INTERNAL PERFORMANCE FOR SME UNITS 2003-04

MIP SME units 2003-04

APPENDIX

In order to define the following functional forms, which have been represented in Figure 2, we followed a step-wise procedure with the network managers. The starting point was to gain information on the importance of target attainment versus failing to achieve the targets. Secondly, by graphically mapping the performance attainments with a scale ranging from 0 to 10, we confirmed their preferences of good and bad performance. In a third step, we discussed the multiple strata in their performance judgments (Table 1) and we used graphical mapping to include these multiple reference levels. This procedure generated the graphical scale represented in Figure 2. Finally, from this graphical scale the authors of this paper estimated the piece-wise functions which are presented in this appendix and which have been used to evaluate the branches of the commercial bank (Section 4).

FUNCTIONAL FORMS FOR MIP CORRESPONDING TO THE SCALE IN FIGURE 2

Attainment strata	α_1	β_1	α_2	β_2
$x_{it}^{'} \leq 70\%$		0		$\left(x_{it}^{'}\right)^0$
$70\% < x_{it}^{'} \leq 95\%$		-1/5		$\left(1/5\ x_{it}^{'} - 14\right)^2$
$95\% < x_{it}^{'} \leq 105\%$	1/7		$-0.0525\left(x_{it}^{'}\right)^2 + 11.55 x_{it}^{'} - 584.9375$	
$105\% < x_{it}^{'} \leq 120\%$	1/7		$-0.0148\left(x_{it}^{'}\right)^2 + 4.1481\ x_{it}^{'} - 220.7\widehat{4}$	
$120\% < x_{it}^{'} \leq 130\%$	1/7		$-0.0432\left(x_{it}^{'}\right)^2 + 11.2346\ x_{it}^{'} - 660.2469$	
$x_{it}^{'} > 130\%$	10		$\left(x_{it}^{'}\right)^0$	