Multiple Goals and Ownership Structure: Effects on the Performance of Spanish Savings Banks

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Abstract

Spanish savings banks (*SBs*) are financial institutions with a wide mission that includes different stakeholders' goals. Profit maximization is only one among several goals, and the widespread use of cost or profit efficiency as the only comparative performance measure may prove to be insufficient in this context. To overcome this problem, we build an aggregate performance index for organizations with multiple goals. Furthermore, we show how the ownership structure of *SBs* influences their economic behavior in two basic ways: (1) the performance level and (2) their goal priorities. In particular, we distinguish two types of ownership structures in our application, namely, organizations controlled by Public Administrations and those controlled by insiders (i.e. managers and workers). Our results indicate that each type has different priorities and differ in their performance indexes. More specifically, the empirical analysis shows that insider-controlled *SBs* favor goals related to profit maximization and the universal access to financial services and, furthermore, they perform better. In contrast, contributing to regional development becomes the most favored goal when the Public Administrations have a majority in the bank.

Keywords: Banking; Data Envelopment Analysis (DEA); DEA weights; Ownership structure; Performance evaluation; Weight restrictions

1. Introduction

Over the past several years, substantial research effort has gone into answering the question of whether the ownership structure of firms influences their economic behavior. In particular, a broad list of ownership types has been extensively explored in the literature in search of the differences in their ability to transform inputs into outputs. In the banking industry, for example, some studies have examined the differential effect on efficiency of (1) mutual versus stock-owned banks, (2) banks with stocks traded in capital markets versus private banks, (3) government ownership versus private banks, (4) foreign versus domestic ownership, (5) minority versus nonminority owned banks, and so on (Berger and Humphrey 1997). In addition, other studies dealing with the relationship between ownership and efficiency have also been conducted in contexts such as hospitals, education, insurance, public utilities, transportation or manufacturing industries.

There are at least four reasons for expecting different efficiency levels across different ownership structures. First, the *pressure that capital markets exert on managers* explains that a lack of capital market discipline, in the case of mutual firms, will facilitate that managers can pursue their own agenda, becoming less efficient. Second, the *concentration of ownership and control in fewer hands* makes it possible for majority owners to punish inefficient managers. Third, the *presence of both fuzzy corporate objectives and conflicts of interest in the political process* will leave managers with no single criteria to take a decision (in practice, it leaves the manager with no clear objective), makes the process of decision-taking more difficult, politicizes the corporation, and allows the managers to exercise their own preferences at the time of spending the firm's resources. Finally, the *firm's goal order* will encourage (or discourage) efficient production processes (for example, the search of profits may motivate managers to become more efficiency oriented, whereas the use of nonprofits goals – e.g. service quality – may eliminate the incentives to reduce waste in the production process).

Our study examines the effect of ownership structure on the economic behavior of organizations in two ways: the ability to transform inputs into corporate goals, and the relative importance attached to each different goal, the weights. The organizations we are interested in (Spanish savings banks, henceforth *SBs*) present in their legal form and governance structure several

of the previously mentioned undesirable features. This should imply lower levels of efficiency than their main counterparts in the banking industry, namely the commercial banks. More specifically, these features are: (1) by law, *SBs* must pursue a wide set of goals, not just profit maximization or cost minimization. Furthermore, some of these goals are in contradiction with value maximization; (2) *SBs* are unlisted and lack formal owners; (3) also by law, the control of *SBs* has been allocated to several types of stakeholders, each one with different goals; and, finally, (4) Spanish regional governmental authorities have something to say in terms of the composition of governing bodies, so voting distribution among stakeholders will vary across regions.

In spite of all these features, a majority of empirical papers indicates that *SBs* are more efficient than commercial banks (Grifell-Tatjé and Lovell 1997, Lozano-Vivas 1998, Tortosa-Ausina 2003). However, a common feature of most works that evaluate the efficiency of savings banks' management is the use of the very same indicators analyzed in commercial banks. That is, by means of productivity (Grifell-Tatjé and Lovell 1997, Pastor 1995), costs (Lozano-Vivas 1998, Maudos et al. 2002, Maudos and Pastor 2003, Tortosa-Ausina 2003) or profits (Kumbhakar et al. 2001, Lozano-Vivas 1997). Previous studies have omitted the multiple-goal nature of *SBs*, which makes inadequate the use of only costs or profits as a way to measure managers' efficiency.

In this context, and in order to evaluate the effect of ownership structure on the economic behavior of *SBs*, this paper aims at fulfilling a double objective. As a first goal, we elaborate an aggregate performance index that combines multiple goals and calculates the relative importance of each goal. This process implies remarkable empirical difficulties, particularly in contexts where firms are characterized by multiplicity of inputs and outputs, or when the weights (i.e., the relative importance) attached to each input/output become unknown or, finally, when inputs and outputs are hard to define and the organizations under analysis do not behave as traditional firms. Data Envelopment Analysis (DEA) techniques provide answers to some of these problems, as discussed in Berger and Humphrey (1997). The idea of adapting DEA to assess and compare relative performances of multiple-goal firms has already been used in a broad range of applications. For instance, in the banking industry, Piesse and Townsend (1995) evaluated the efficiency of building societies in the United Kingdom, and Mester (1993) applied it to the Savings and Loans in the United States. The

interaction between DEA and multiple criteria decision-making has also been receiving increasing attention in other contexts (for example, see Bendheim et al. 1998, Bougnol et al. 2005, Caporaletti et al. 1999, Lovell 1995, and Lovell et al. 1995).

The second objective of this paper is to use this methodological proposal for comparing efficiency under multiple goals to Spanish savings banks. As it is often the case in other scenarios, here we have an agency relationship between the executive managers of the savings bank (the agents) and the legislator (the principal) that establishes the wide mission for the bank. Accordingly, a savings bank's manager should replace then the goal of profit maximization with the maximization of the aggregated goals included in the mission. Yet, agents have their own preferences on how to combine those multiple goals, and they are not always coincident with the legislator's. Thus, our measure of performance incorporates this multiplicity of goals, and subsequently, it also includes the legislator's preferences over the multiple (competing) objectives. We assume that these preferences are implicitly expressed by means of the vote distribution among stakeholders in the general meeting, through the percentages established by the legislator. By adding this constraint (i.e., the vote distribution) to the DEA model, we enhance the analysis, defining what the legislator considers as a best or worst practice, and allowing us to make comparisons between the management choices and the legislator preferences.

To reach these goals, we first describe the existing agency relationship between the *SBs* managerial team and the legislator, based on standing legislation. Secondly, we identify differences among banks in terms of their ownership structure and their mission. Thirdly, we evaluate *SBs* according to their ability to fulfill the multiplicity of goals, and for this we propose an initial performance index. Later, we contribute to better define the mission of the firms by identifying the different weights associated to each one of the savings banks' goals. Finally, we include the legislator preferences, using the legislation on governing bodies and with all these elements we elaborate a second index of performance. Overall, the results show that efficiency depends on the agent's decisions (as in the first index), and also on the ability to correctly understand the legislator preferences.

This study advances our understanding of the ownership structure effect on the economic behavior of organizations in five important ways. First, we measure the performance of organizations with multiple goals and for which profit maximization (or cost minimization) is only one among several goals to be achieved. Second, we examine in detail the ownership structure of organizations, describing differences in the composition of general meetings within the same organizational form. In particular, we empirically investigate the effect that different compositions of general meetings exert on the degree of corporate goals achievement, and we test if managers take into account the stakeholder preferences at the time of establishing goal priorities. Third, we build up an aggregate measure of performance which incorporates the different regulatory constraints faced by managers in different ownership types, that is, different legislator's preferences over the multiple goals. Finally, we extend the empirical evidence on the effect of government ownership on efficiency, and explained the possible causes of inefficiency.

The article is structured as follows. In Section 2, we briefly review the history of savings banks to define their mission and to identify the stakeholders. In Section 3, we present the relationship between the proposed methodology and the underlying economic problem. The data and variables used in the empirical application are described in Section 4; while the results of this application appear in Section 5. The paper ends with a discussion of the results, limitations and conclusions.

2. Spanish Savings Banks: Mission, Stakeholders and Ownership Structures

SBs compete among themselves, with commercial banks, and credit cooperatives. Therefore, they are subject to the general discipline of the loan and deposit markets. This competition is particularly relevant now, after a deregulation process that demands from savings banks similar levels of efficiency to their private competitors (Kumbhakar et al. 2001). On institutional terms, *SBs* are private foundations and, as such, their social function requests that part of their profits be addressed to activities that improve the well-being of the region where they belong. Moreover, in absence of shareholders, the ownership of these banks corresponds to the different groups represented in the general meeting and, therefore, ownership is not the result of a purchase or exchange as it is the case

for commercial banks. Even more interesting for our purposes is the presence of multiple goals that the regulator explicitly includes in the savings banks' mission. We proceed now to develop this point.

2.1. Mission and stakeholders

Savings banks appeared in Europe by the end of the 18th century and the beginning of the 19th century as a tool to encourage savings among the popular classes and, by doing that, reduce their dependence on charity. In Spain, unlike what happened in other countries, the lack of confidence in both the existing financial institutions and in the state's financial soundness forced the participation of another institution: the Pawnshops. Furthermore, the nature of the *SB* mission has changed from a mutual one to a more charitable and social mission. Later, in the 1970's, the regulation became more focused on solvency issues and not so much on social goals.

The current situation is mostly the result of the Law 31/1985, (LORCA), which favored the inclusion of the interests of the regions where savings banks are present, along with a more professional management of *SBs*. Thus, on one hand, savings banks could adapt to the peculiarities of their region, looking for a greater implication of *SBs* in the regional development and, on the other hand, they have experienced an organizational change, trying to balance the interests of the different social groups (founders that made possible the creation of the *SB*, depositors, employees and local corporations). The current regulation establishes the composition of the governing bodies (general meeting, board of directors and control commission) of the savings banks with representation for four groups: between 15 and 45 percent of the seats for the representatives of depositors, employees with 5-15 percent of the seats, founder entities with 10-35 percent and, finally, between 15 and 45 percent of the seats for the public administrations.

The result of this particular evolution of the *SBs* is a group of organizations whose legal nature resembles to that of "commercial non-profit organizations" in the words of Hansmann (1996). Their foundational character and their non-profit nature, become evident in their use of profits, going mostly to social programs and charity. Furthermore, their social programs are open, confirming the non-mutual use. Finally, their commercial nature guarantees that *SBs* will undertake the typical activities of banks, searching for economic efficiency and profit maximization.

All these ideas allow us to talk of multiple goals for *SBs*; that is, a wide mission justified by the presence of stakeholders represented in the governing bodies. Table 1 summarizes the different goals of *SBs*. This wide mission, or social mission, has been the result of a long process of changes and insertions in the legal nature of savings banks where different groups have played a decisive role. Consequently, these groups also became the main stakeholders and favored their own goals inside the savings banks. Although not directly represented in the governing bodies, the regulator also pursues its own goals and, for example, the Bank of Spain plays an active role monitoring the banks' solvency. As a summary of this, we define the *SBs* mission in the following terms: "*SBs* help to make financial services a universal service, rendered under conditions of economic efficiency, preventing abuses of market power, at the same time that they contribute both to a better allocation of the created wealth and to the sustained development of those regions where they are present".

[Insert Table 1 about here]

2.2. Ownership Structures and revealed preferences on the goals of the mission

Spanish savings banks can be divided in two groups: The first group includes those savings banks controlled by public administrations (henceforth, *public SBs*); that is, those savings banks in which the public administrations (*PA*) concentrate more than 50 percent of the votes in the general meeting of the savings bank. To calculate this, we add up local, provincial and regional *PAs*, along with public founders. The second group is formed by savings banks controlled by insiders (henceforth, *insider SBs*); that is, savings banks in which employees, depositors and private founders accumulate 50 percent or more of the votes. Incidentally, this distinction also responds to the European authorities' concern regarding the role of banks controlled by public administrations.

Voting distribution among the stakeholders not only implies differences in ownership structure, it can also reveal the preferences of the regional administrations on bank's goals, which – by virtue of the previously mentioned law, LORCA – have competence to rule on the governing bodies' composition. For this matter, the legislator preferences are implicitly expressed through the voting distribution among stakeholders in the general meeting. In *public SBs*, when the legislator explicitly gives more than 50 percent of the votes in the general meeting to *PA*, a preference for the

goals associated to this group should follow. That is, as shown in Table 1, the aims of universal access, competition enhancement and regional development should be favored over profit maximization and wealth redistribution. On the other hand, if the legislator allocates control of savings banks to insiders, the order of priorities will favor profit maximization and growth over the other goals.

In *insider SBs*, the group formed by managers and workers enjoy the control, although their number of seats in the general meeting is lower that 50 percent. The power of managers and workers is derived from the limited ability of depositors – the group that has the most significant percentage of votes – to influence the functioning of savings banks. There are at least two reasons for supporting this fact: 1) Depositors' goals are already protected by means of a debt contract, deposit insurance and an exit option without excessive costs. 2) The system to elect their representatives (a lottery and a fixed period of time) along with the limited power they concentrate (one delegate, one vote) make it extremely difficult for this group to act in a coordinated way. In fact, managers exert a remarkable influence on this group. The depositors' situation contrasts with that of the employees, who have more capacity to influence managers in spite of lacking high levels of participation in the distribution of decision rights. Employees maintain a stable and lasting relation with the organization and, furthermore, the group has quite homogeneous preferences. Therefore, it seems reasonable to think that employees share decision power with the managers, as both groups show a clear preference for the entity's growth. Certainly, growth implies more reputation and power for managers, along with wage improvements and the possibility of becoming more independent in their decision-making. For employees, growth means more opportunities for internal promotion and wage increases. At the same time, both groups also pursue the goal of profit maximization, needed to preserve their jobs and to justify wage increases. According to this view, concessions to workers (reward them with generous salaries) are simple self-entrenchment strategies for incumbent CEOs to avoid their replacement (Pagano and Volpin 2005).

Last but not least, the legal nature of savings banks makes them more dependent on their ability to grow through the use of internal funds. For all this, we have interpreted that the allocation of control to insiders shows the legislator preference for growth and profit maximization.

3. Measuring savings banks' performance with DEA

Here we describe the methodology used to analyze how different ownership structures contribute to the attainment of those goals established in the mission of Spanish savings banks. Data Envelopment Analysis (DEA) techniques turn out to be, in our opinion, particularly relevant in this case for three reasons. First, DEA does not try to estimate the form of the production function, but it uses the existing observations to elaborate a non-parametric empirical frontier where the exact form of the function that relates inputs and outputs is unknown. Although non-parametric, statistical properties of DEA estimators are well discussed in several papers (Banker 1993, 1996). Applying DEA, we obtain an aggregate performance index for each *SB*, in comparison to the rest of observations. This index measures the distance between a particular *SB* and the frontier. Second, by means of a dual transformation of the DEA maximization programs, it becomes possible to assign weights to each one of the multiple goals. The only assumptions are that each observation should be placed on the extreme frontier or below it, and the set of weights must be feasible for any of the sample observations. Finally, these techniques offer the possibility of including a priori information on the relative importance of the variables (Golany 1988, Thomson et al. 1990, Roll and Golany 1991, Allen et al. 1997, Halme et al. 1999, Joro et al. 2003). More specifically, if we restrict the weights values associated to the variables, we will be able to calculate a new aggregate performance index that takes into account a given preference relation among goals. We now proceed to analyze these three issues formally.

3.1. Multiplicity of goals and DEA

We focus on the agency relationship between the principal –on behalf of the different stakeholders– and the agent –the bank's management team–. The contract that regulates this relationship establishes that the principal delegates on the managers of savings bank i, $i = 1,...,I$, the task of transforming the n inputs, $x^i = \left(x_1^i,...,x_n^i\right) \in \Re_+^n$, into the goals or outputs that stakeholders are interested in, $y^i = \left(y_1^i,...,y_5^i\right) \in \Re_+^5$. If each savings bank uses different quantities of these n inputs to obtain these m outputs, we will construct the set of production possibilities from the data

$$T = \left\{ (x, y) : x \geq \sum_{i=1}^{I} \lambda^i x^i ; y \leq \sum_{i=1}^{I} \lambda^i y^i ; \sum_{i=1}^{I} \lambda^i = 1; \lambda^i \geq 0; i = 1, ..., I \right\} \quad (1)$$

which is the smallest set that includes all observations and satisfies the free input and output disposability conditions. This set also fulfills the convexity and the monotonicity assumptions (Banker and Thrall 1992) and the technology described in (1) exhibits variable returns to scale. Here we should mention that Spanish savings banks differ widely in terms of size, operational activity, objectives and geographical market. All this leads us to favor a model with variable returns to scale.

Once the set of production possibilities T is defined, we formulate next the problem of measuring *SBs* efficiency. In this study, we employ an output-oriented DEA model to analyze the effect that governance characteristics of Spanish savings banks exert on the attainment of their mission. The implicit assumption here is that *SBs* management teams aim at maximizing output levels (i.e., the stakeholders' goals) while keeping the current input levels. The optimization problem for a given *SB* "$\circ$" can be written as the following linear program, solved I times, one for each *SB* (Banker et al. 1984):

$$\left(IP^{\circ *} \right)^{-1} = \max \left\{ \theta^{\circ} \left| \sum_{i=1}^{I} \lambda_i^{\circ} y_j^i \geq \theta^{\circ} y_j^{\circ} ; \sum_{i=1}^{I} \lambda_i^{\circ} x_k^i \leq x_k^{\circ} ; \sum_{i=1}^{I} \lambda_i^{\circ} = 1; \lambda_i^{\circ} \geq 0; \; j = 1, ..., m; k = 1, ..., n \right. \right\} \quad (2)$$

The solution to (2), $\theta^{\circ *} \geq 1$, represents the proportion in which the five outputs or goals of the analyzed *SB* must be increased to move the bank to the production possibilities frontier (i.e. the frontier of good practices). Therefore, a bank will be efficient only if $\theta^{\circ *} = 1$. The inverse of this value is an aggregate index of performance $IP^{\circ *}$, the value of which quantifies, in relative terms, how each manager uses the inputs to obtain the maximum level of outputs for stakeholders. Consequently, $\left(1 - IP^{\circ *} \right)$ measures the degree of inefficiency. Non-negative values of $\lambda^{\circ *}$ identify the reference set for the evaluated *SB*; i.e., the set of banks that define the section of the frontier where that *SB* is projected. For those cases in which a *SB* is located on the frontier, we will have $\lambda_{\circ}^{\circ} = 1$ and $\lambda_i^{\circ} = 0$.

Let us consider now the dual form corresponding to program (2):

$$\left(IP^{\circ *} \right)^{-1} = \min \left\{ \sum_{k=1}^{n} v_k^{\circ} x_k^{\circ} + \phi^{\circ} \left| \sum_{j=1}^{m} \mu_j^{\circ} y_j^{\circ} = 1; \sum_{k=1}^{n} v_k^{\circ} x_k^i - \sum_{j=1}^{m} \mu_j^{\circ} y_j^i + \phi^{\circ} \geq 0; v_k^{\circ}, \mu_j^{\circ} \geq 0; \phi^{\circ} \text{ free}; i = 1, ..., I \right. \right\} \quad (3)$$

Program (3) is solved I times as well, and it allows us to simultaneously identify ϕ°, which represents a measure of the possible existence of economies of scale, and the optimal output and input

weights (or multipliers) for each *SB*, μ_j° and v_k° respectively. In doing so, we assume that with the set of weights of the evaluated *SB* no other entity obtains a value for $IP^{\circ *}$ over 1 (the point of maximum efficiency corresponding to the frontier). Moreover, the duality theorem guarantees that solutions to programs (2) and (3) are identical.

The weights that solve program (3) represent each *SB*'s achievement of goals (Caporaletti et al. 1999), and there is no other weight combination that, given the possibilities of transformation of this technology, could provide a higher performance index (Allen et al. 1997) to the evaluated *SB*. Therefore, we interpret these weights as a measurement of the relative importance that each *SB* confers to the goals in its mission. Such weights would be the result of private negotiations among stakeholders.

Next, we modify program (3) so that we can incorporate the (revealed) legislator preferences. Thus, we construct a second performance index to evaluate the management of the *SB*, and by comparing both indexes we will be able to identify and calibrate the allocative inefficiency of savings banks. That is, we measure that part of inefficiency explained by the fact that managers, when facing multiple goals, are not always able to accurately interpret the legislator preferences.

3.2. Legislator preferences and DEA

As it has already been pointed out, the inclusion of the legislator preferences into program (3) imposes additional restrictions on weights. Provided that these weights represent the relative importance of each goal, the legislator preferences are expressed in the form of a given arrangement of the goals included in the mission. Therefore, the additional restrictions to program (3) could be written in terms of marginal rates of transformation (Thomson et al. 1990) or by means of an ordinal relation among the weights (Golany 1988):

$$\mu_s^i \leq \mu_r^i \leq \mu_t^i \tag{4}$$

where (r,s,t) denote outputs. An interesting advantage of these restrictions is that we only need to arrange the weights according to the legislator preferences, that is, there is no need to establish the lower limit or the upper limit. Such feature is particularly relevant in this context where the information concerning the general meeting composition only allows us to arrange the goals.

According to the description in Section 2, when the legislator allocates control to the public administrations, this means preferences towards the goals of universal access (y_1), competition enhancement (y_3) and regional development (y_5). Without further additional information to arrange prioritized goals, we can represent such preferences in the following way:

$$\mu_1, \mu_3, \mu_5 \geq \mu_2, \mu_4 \tag{5}$$

Similarly, the legislator's preference for those goals associated with insiders, that is, universal service (y_1) and profit maximization (y_2) could be expressed with another set of additional constraints on weights:

$$\mu_1, \mu_2 \geq \mu_3, \mu_4, \mu_5 \tag{6}$$

DEA techniques contemplate the inclusion of restrictions on weights, like equations (5) and (6) into program (3), and as a result we obtain a value, $IPR_R^{\circ *} \in [0,1]$, (where R means restricted), which is our second performance index. $IPR^{\circ *}$ indicates the ability to produce, given the transformation possibilities of the technology and the preferences of the "social planner", the highest levels of outputs $\left(y_1^i,...,y_5^i\right)$ from the fixed endowments of inputs $\left(x_1^i,...,x_n^i\right)$. With this new index, we can measure the contribution of a bank's managers to welfare maximization. Thus, $\left(1 - IPR^{\circ *}\right)$ indicates the distance between the current decisions and the legislator's good-practice frontier.

Obviously, adding constraints implies a decrease in the performance index, unless managerial decisions respect the legislator's priorities on goals. Therefore, $1 \geq IP^{\circ *} \geq IPR^{\circ *}$ must be fulfilled. Besides, by comparing these two indexes we can calculate a third one, allocative efficiency (AE):

$$AE = \frac{IPR^{\circ *}}{IP^{\circ *}} \leq 1 \tag{7}$$

This AE index enables us to evaluate how well the manager has envisioned the principal's directives at the time of taking decisions. If *SB* managers respect the legislator priorities, the $IP^{\circ *}$ performance index, and the one using restrictions on weights, $IPR^{\circ *}$, will be equivalent and allocative inefficiency will not occur, (i.e., $AE = 1$). In general, we can always decompose the global performance index into the initial performance and the allocative efficiency,

$$IPR^{\circ *} = IP^{\circ *} \cdot AE \tag{8}$$

In the following section we show an application of these indexes and measures to the case of Spanish savings banks.

3.3. Savings banks' technology: one or two frontiers?

Estimating the efficiency of firms with different ownership forms poses an important research decision: We must decide whether to compute efficiency by means of a single frontier that includes all savings banks or, alternatively, by using a different frontier for each type of ownership (public and insider-controlled *SBs*, in this paper). As Altunbas et al. (2001) already pointed out, two frontiers will be more appropriate if each ownership type pursues different objectives, since in doing so technology differences will be controlled for. Moreover, Mester (1993), who estimated a separate (cost) frontier for each ownership type, argued that results obtained under a common frontier confound technology choice and inefficiency. However, researchers have rarely recognized the effect of technology choice on efficiency, and few scholars (Cebenoyan et al. 1993, and Elyasiani and Mehdian 1992) have tested the underlying technologies in their samples. When no significant differences have been found (Cebenoyan et al. 1993), the use of a common frontier seems adequate; otherwise (Elyasiani and Mehdian 1992), comparing efficiency figures obtained from a single frontier becomes inappropriate. In the latter case, the common-frontier results could have certain interest, even when the null hypothesis of identical technologies has been rejected. In particular, the findings under a pooled frontier will reinforce and strengthen the results obtained from the group-specific frontier if both evaluations are consistent (Elyasiani and Mehdian 1992, 1995).

To test the hypothesis of identical frontiers (technologies) for *insider* and *public SBs*, we apply a two-stage test that has been already used in DEA literature (Elyasiani and Mehdian 1992). In the first stage, the performance indexes are evaluated for the joint sample, assuming, therefore, they share a common technology. In the second stage, these indexes are calculated for each subsample of *SBs* (*insider* and *public*), assuming then different technologies. Under the null hypothesis, the ordering of *SBs* on the basis of their performance indexes for the joint sample turns out to be the same as the ordering that results from calculating performance indexes separately for each subsample. Then, if the null hypothesis cannot be accepted, we should evaluate the managers after controlling for

technology. That is, the performance measures of each *SB* must be assessed relative to a frontier of firms with the same ownership type. Therefore, in our empirical application, we test for the presence of a common technology in public and insider *SBs*.

4. Data and variable description

The data used in this paper is extracted from the Statistical Yearbook of the Confederate Savings Banks (published by the Spanish Confederation of Savings Banks). We complement this data with three additional sources: the Economic Bulletin of the Bank of Spain, the Green Book of Financial institutions and the individual annual reports. The empirical application covers the period 1998-2002, and we construct a pool with all the savings banks contained in the Record of Entities of the Bank of Spain. Thus, the total number of savings banks in our sample is of 50, 49, 47, 46 and 46 in the years 1998, 1999, 2000, 2001 and 2002, respectively.[1]

Our sample includes 226 observations (savings bank-year). We exclude four observations from the initial sample (238) due to missing data.[2] Besides, and as a previous step to the estimation of performance, we analyze the presence of outliers. As it is well known, the analysis of efficiency with deterministic DEA models is quite sensitive to the presence of outliers in the sample. This is due to the fact that the frontier could be determined by observations that are extreme points, and this might affect the efficiency evaluation for the rest of entities. In order to overcome these problems, we applied the Wilson's (1995) proposal to deal with extreme observations. After this, we exclude eight additional observations from the sample: Municipal de Burgos (all years), Municipal de Vigo (1998 year), Pollensa (1999) and Manresa (2000).

The next step in modeling *SBs* efficiency is the specification of inputs and outputs of the production process. A survey of the different conceptual approaches can be found in Berger and

[1] Three take-over mergers have taken place during this period. In 1999, Vigo SB took over Ourense SB, and in the year 2000, Pamplona SB was taken over by Navarra SB, while Pontevedra SB was taken over by the resulting entity of the previous merger between Ourense SB and Vigo SB.

[2] These exclusions are the Baleares and Carlet *SBs*.

Humphrey (1997). We follow here the production approach, since it deals with our main objective: to explain how closely a *SB* moves toward its multiple goals. The analysis focuses on service production and the stakeholders' objectives attained by each *SB*. More specifically, service production requires the consumption of physical and material inputs, as well as human resources. Consequently, we select three inputs closely related to these three resources: the staff, the use of capital in terms of depreciation, and the use of other inputs.

Furthermore, we select five outputs that represent the goals included in the banks' mission. The first goal consists in providing universal access to financial services, that is, the promotion of savings among the popular classes, preventing their exclusion from the financial system and trying, at the same time, to move the services closer to all citizens and locations in the territory. We evaluate the contribution of a financial institution to the prevention of social exclusion (or lack of banking activity) through a territorial dimension –the proportion of branches in villages and small towns– and through the offering of financial services to customers with low resources, or small balances. Accordingly, we use two proxies for this goal. The first one is the proportion of branches outside the province capital, which is measured by a Herfindahl-type index (Fuentelsaz et al. 2002).[3] High values of this index mean that *SBs* locate their branches in small towns. The second one is the inverse of the average balance of deposits (ABD), calculated as the ratio of the total volume of deposits (in euros) to the number of current accounts, saving accounts and deposit accounts. Low values of the ABD ratio imply that the bank is rendering financial services to clients with low revenues (i.e., customers that generate a high cost per unit of deposit).

The second goal is profit maximization, that is, the use of savings to obtain high profits and avoid, at the same time, bankruptcies or insolvencies (i.e., profitable and safe investments). Safety

[3] These authors used a Herfindahl-type index to measure rivalry among *SBs* in geographical markets. However, their index differs from ours because it does not consider the intra-regional distribution of branches. In our proposal we take into account the ratio of branches outside the capital over the total number of branches in a given region. We think that this captures the idea of proximity to customers more accurately.

improves with the level of reserves, which themselves are an increasing function of the savings bank's profits. Therefore, we use the variable profits after taxes to measure this second goal.

Competition enhancement and avoidance of monopoly abuse is the third goal included in the mission of savings banks. To obtain better conditions and lower prices for customers would be the updated version of fighting usury, the traditional goal. The contribution of savings banks to competition enhancement within the Spanish banking sector should be seen in the use of competitive prices; i.e., prices closer to marginal costs.[4] Because public accounts of *SBs* are not sufficiently detailed, we have not considered the possibility of approaching prices through the average interest rate in the Assets and Liabilities data. Nevertheless, the Bank of Spain publishes the (non-regulated) interest rates applied by financial institutions to their clients: prime rates, interest rates for overdrafts in checking accounts and interest rates for exceeding the limit (prices of other banking products are not free). To measure the difference between price and marginal cost in this case, we use the interest rate for overdrafts as an indicator of price. We rely on that the people that pay such price are precisely the ones with less bargaining power (as opposed to what happens with the prime interest rate) and, consequently, the *SB* has more degrees of freedom to exercise its monopoly power on them. On the other hand, we use the Spanish Confederation of Savings Banks reference on interest rates for assets published on December 31 of each year as an approach to marginal cost. Since the difference between price and marginal cost becomes a measure of market power, we use the inverse of that difference in the empirical application as a proxy of the *SBs*' contribution to "competition enhancement". Thus, the indicator is one divided by the difference between the interest rate for overdrafts and the reference interest for assets.

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[4] The difference between price and marginal cost provides an approximation to the competitive structure of the market, as the Boston Consulting Group has already pointed out. When firms compete in a non-differentiate market on the basis of quantity (*á la* Cournot), profit maximization requires satisfying the following first-order condition: $(p_i - c_i,)\ (p_i)^{-1} = S_i \mid e_p \mid^{-1}$; where p_i, c_i, S_i, e_p denote price, marginal cost, market share, and price-elasticity for the firm *i*, respectively. Solving for market share and dividing by firm *j's* market share, it follows that the ratio of market shares should be equal to the ratio of margins.

The fourth goal is the contribution to wealth distribution and welfare, measured by the amount of resources that *SBs* spend in "obra social", that is, services with a charitable or social character.

The contribution to regional development is the last goal. This could be understood as the provision of funds that generate social externalities that the private sector does not provide. This lack of interest on the part of the private sector could be compensated by the regional administrations. Therefore, the bank's contribution to regional development is calculated through the proportion of loans (in euros) granted to the Public Administrations over the total figure of loans.

[Insert Table 2 about here]

Table 2 presents some descriptive statistics. One important methodological issue in this approach is the combination of multiple variables expressed in different units, percentages or indexes. This fact increases the difficulties of estimating performance indexes. Moreover, the measuring approach will also affect the calculation of weights and restrictions that represent the legislator's preferences. For all these reasons, and following the recommendations found in Dyson et al. (2001), we first express all variables in percentages, and, later on, we standardize each variable.

5. Empirical results

5.1. Aggregate performance indexes under a common frontier

Table 3 contains the summary statistics for the aggregate performance indexes calculated using the pooled frontier. In order to evaluate the management of *SBs*, the performance index that incorporates the preferences revealed by the legislator (*IPR*) provides us with a measurement of the overall efficiency reached by the bank. The *IPR* reflects differences both in goal achievement (performance index, *IP*) and optimality of the goal mix (allocative efficiency, *AE*). According to the figures in Table 3, *insider SBs* exhibited higher performance indexes in terms of every efficiency measure than *public SBs*. The differences observed in performance indexes for the *insider SBs* and the *public SBs* are all statistically significant, suggesting that *insider SBs* operated closer to the pooled frontier than *public SBs* did.

[Insert Table 3 about here]

Thus, the average *IPR* for the insider banks is 82.76 percent and 75.45 percent for *public SBs*. These results indicate that those banks controlled by insiders could increase the outputs or the level of their mission's goals a 17.24 percent, on average, while keeping constant the current consumption of inputs. This figure expresses the level of overall inefficiency of *insider SBs*. For those *SBs* controlled by public administrations, the inefficiency increases to 24.55 percent. In order to better explain the reasons for these numbers, we break up the *IPR* index in two: the performance index without restrictions (*IP*) and the allocative efficiency (*AE*). As shown in Table 3, a larger proportion of the overall inefficiency in the *SBs* seems to obey to poor *IP* ratios and, in a lesser extent, to problems with the allocative efficiency. We observe that *insider SBs* are more efficient than *public SBs* when we maximize the mission without imposing restrictions on weights. More specifically, *insider SBs* reach an *IP* of 84.04 percent, while the aggregate performance index lowers to a 79.94 percent in the case of *public SBs*. Allocative efficiency, *AE*, evaluates the way in which managers satisfy the legislator's preferences. For this measure, efficiency reaches a 98.53 percent when insiders have the control, in contrast to 94.38 percent when public administrations hold a majority of votes in the bank.

Two main conclusions follow. First, in both types of *SBs* managers respect the priority order defined by the legislator; the index *AE* reaches values close to 100 percent in both groups. Accordingly, the overall inefficiency (*IPR*) of savings banks can be explained, mainly, in terms of technical inefficiency (*IP*). Second, according to the *IP* figures *insider SBs* perform better than *public SBs*. This better performance of the *insider SBs* is mainly due to their managers' ability to use productive resources and improve the stakeholders' goals more efficiently than *public SBs*' managers.

5.2. Aggregate performance indexes under differentiated frontiers

However, as discussed above, these results based on the use of a common frontier would be inaccurate if the hypothesis of identical frontiers failed to be sustained. Table 4 shows the results of the test and suggests that the average of the sample (ANOVA), the distribution functions (Kruskal-Wallis) and the median (Wilcoxon) of the performance indexes in the combined sample and the separate samples are statistically different, at a 5 percent significance level. Therefore, we must

assume the use of different technologies for each type of bank. Furthermore, this result is independent of the performance index chosen for the test.

[Insert Table 4 about here]

Following Elyasiani and Mehdian (1992), we can also justify this technological difference between the two groups of *SBs* upon the idiosyncratic characteristics of each model of organization, either in terms of its productive specialization or its organizational characteristics. Regarding product specialization, the descriptive statistics shown in Table 2 indicate that *public SBs* are smaller in size. This could explain why these entities are more present in less competitive regional markets (where they can offer services at higher rates of interest). Quite on the contrary, *insider SBs* are much larger in size and, predictably, they participate on more competitive markets where they must also face commercial banks as competitors. Savings banks of such relevance as "Caixa d'Estalvis i Pensions de Barcelona" or "Caja Madrid" (ranked as No. 56 and No. 98, respectively, in the The Banker 2003 *Top 1000 World Bank* ranking) belong to this group. Both their size and the intensity of competition in the markets in which they operate certainly demand more sophisticated management and, consequently, more qualified managers as well. Moreover, these firms achieve higher levels of efficiency.

Regarding organizational characteristics, we can also say that ownership structure seems to have an effect on *SB* efficiency. More specifically, those *SBs* with an ownership structure that assigns a majority of control rights to *PA* have lower performance indexes, on which we comment in more detail below. This may indicate, for instance, that a significant presence of *PA* inside the governing bodies excessively politicizes the firm's performance, hindering decision-making and exerting, eventually, a negative effect on efficiency.

For the rest of the paper we evaluate the management practices of *SBs* after controlling for technology. This means that the performance measures of each *SB* must be assessed relative to a frontier constructed only from that particular group (Elyasiani and Mehdian 1992). As it has been previously stated, this does not mean that findings under pooled frontier are uninteresting; rather, these findings reinforce the group-specific findings. That being said, the efficiency figures can differ substantially between both estimation procedures (as it can be seen by comparing Tables 3 and 5) because group-specific frontiers envelope the data more closely (Elyasiani and Mehdian 1992).

In order to evaluate the management of *SBs*, the performance index that incorporates the preferences revealed by the legislator, *IPR*, measures the overall efficiency reached by the bank. Due to the construction of this model, all *SBs* fulfill now the externally imposed restrictions. Thus, we evaluate the management in an agency framework that specifies the goals to be reached and the order of preference among them. The results in Table 5 indicate that *IPR* is higher, on average, for the subsample of *insider SBs*, showing that they are, on average, more efficient in relation to their own frontier, than *public SBs*. The insider subsample frontier is formed by those entities that, after "exhausting" the transformation possibilities their own technology offers, still respect the order of priorities defined ex-ante by the legislator. A total of 29 *SBs* form this frontier, almost a 32.58 percent of the subsample. Furthermore, the distance between the remaining *SBs* and this frontier, that is, total inefficiency, can be quantified in 10.10 percent. The performance index of *public SBs* is lower, 85.53 percent. In other words, the average inefficiency of that subsample amounts to 14.47 percent.[5]

[Insert Table 5 about here]

In order to better explain the overall efficiency reached for a savings bank, our performance index with revealed preferences has been decomposed into two elements: a performance index without restrictions and the part corresponding to allocative efficiency. With this, we evaluate the managers in two dimensions: their skill to transform inputs into stakeholders' goals and their ability to implement the legislator's preferences.

Table 5 shows the results of this analysis of the *SBs* to maximize the mission when the legislator's preferences are not taken into account, the previously mentioned performance index (*IP*). As these results show, when we maximize the mission without imposing restrictions on weights; i.e., when we apply programs (2) or (3) to each subsample, we observe the following: 31 entities lie on the frontier, or 34.83 percent of the group, reaching an *IP* of 90.32 percent. This value indicates that, with the current consumption of inputs, the outputs represent 90 percent of the transformation possibilities

[5] In this application, we have assumed variable returns to scale (VRS) DEA model. Although not reported here, we have also tried the case of constant returns to scale and the efficiency levels for all *SBs* remain practically the same: 94.5 per cent for *public SBs* and 97.4 per cent in the case of *insider SBs*.

that the technology offers. Therefore, to reach the frontier, *insider SBs* should increase all their outputs a 10 percent on average, a figure that represents the average inefficiency.

For the case of *public SBs*, 35.77 percent of them are on the frontier and the aggregate performance index lowers to an 85.09 percent. From these results, we can state that the management of *insider SBs* gets closer results to their group's frontier of good practice. In other words, they are more efficient than *public SBs*, if we define efficiency as the managers' ability to reach the goals with the productive resources given and the preferences on goals determined by negotiation among the stakeholders.

Furthermore, the previous analysis allows us to evaluate the way in which managers satisfy the legislator's preferences. For this, we have calculated the allocative efficiency (*AE*), which is the relation between overall efficiency (the above-mentioned *IPR*) and the performance index without restrictions (*IP*), as described in equation (7). *AE* provides a measure of congruence between the legislator's preferences and the prioritization of goals that comes from the negotiation among the different stakeholders. From the results shown in Table 5, one can see that *AE* reaches values close to 100 percent in both groups. In particular, when insiders have control, *AE* becomes 99.53 and is 98.09 percent when *SBs* are controlled by *PA*. It is interesting to highlight that, despite the moderate decrease in the number of *SBs* placed on the respective frontiers, the number of allocative-efficient *SBs* increases considerably (66.29% for insiders and 52.55% for *PA*), once we include the legislator's preferences.

Managers seem to identify quite accurately the legislator's preferences revealed on the composition of governing bodies. Similarly, if we assume that managerial decisions are the result of negotiation among different groups, and final decisions are taken according to previously corporate governance rules and stakeholders' power, our results indicate that there is no difference between the formal allocation of control (through voting distribution) and the real control eventually exercised by each group. So, in practice, from the negotiation process among stakeholders one obtains a preference order not different from the preferences defined ex-ante by the legislator. Consequently, the differences in performance between both types of savings banks should be explained by the managers' ability to use the productive resources in a more efficient way and reach the goals pursued

by the stakeholders. In other words, the difference observed in the *IPR* index does not respond so much to a problem of interpretation of the legislator's preferences (allocative efficiency), as to a problem in the implementation of goals (performance index without restrictions, *IP*). Furthermore, these results are independent of the frontier (the results from a pooled frontier and from group-specific frontiers are consistent). We have already controlled by technology (using group-specific frontiers), so we can now attribute the lack of efficiency in a particular *SB* to its managers. This issue becomes more problematic for larger *SBs* where the intensity of market competition forces managers to focus on economic results and the achievement of higher returns, whereas other goals receive less attention.

5.3. Priorities and control types

After verifying that allocative inefficiency is very low, we focus next on the identification of the mission's structure. That is, we want to determine the relative importance of each goal as the result of private negotiation among stakeholders. Later, we compare this with the preference order defined ex-ante by the legislator.

The weights attached to each goal are obtained from the application of the dual program (3) to the two subsamples. According to the results shown in Table 6, the goals that receive more attention in insider-controlled *SBs* are profit maximization (μ_2) and universal financial service (μ_1), while enhancing competition (μ_3) and regional development (μ_5) are poorly valued. These results corroborate our initial intuition that the allocation of control rights to insiders has consequences on the choice of goals finally implemented, confirmed by their bet on growth and the search of higher levels of profits.

[Insert Table 6 about here]

As far as *public SBs* are concerned, universal financial service (μ_1), regional development (μ_5) and competition enhancement (μ_3) are the goals that receive larger weights. It is also worth emphasizing that the last objective, in terms of relative importance, is given to profit maximization (μ_2) in the preference relation of this type of banks.

Although not reported here, we have also run this analysis with differences in bank size and the main results remain unchanged. Nevertheless, as size increases, the economic goal gains in importance inside the objective function of *insider SBs*. In fact, it becomes the only goal for *SBs* in the fourth-quartile (i.e., for very large banks, economic performance receives a much larger weight compared to other goals).

Due to the characteristics of the optimization program, both groups of savings banks respect the priority relation entrusted to them by the legislator (defined in equations (5) and (6)). Nevertheless, the information obtained by comparing weights before and after the use of constraints is far from irrelevant and it suggests possible ways for improving the *IPR* performance of savings banks.

6. Conclusions

In this paper we have investigated the connection between ownership structure and economic behavior of organizations. This is an important issue for both management researchers and practitioners. Also for governmental authorities, as the quantification of effectiveness is an increasingly important matter in order to guide reform processes of the public sector. In this sense, the recent reforms of the public sector show governmental organizations or state agencies with a complex set of activities and services, and for which the Government wants to measure how well they perform, encouraging them to become more efficiency-based. There are other contexts where the quantification of effectiveness may prove a key issue; many foundations and non-profit organizations created to accomplish certain social goals, while pursuing efficiency, would also fall into this category. These and other situations present common features: a wide mission with multiple goals, and different incentives and constrains faced by managers. Hence, any attempt of reform should pay attention to the effects of new regulation on this set of goals, incentives and constrains, because they affect the overall performance of organizations. In this context, we have argued that the Spanish saving bank industry is an excellent study case, because these banks possess theoretically-undesirable features to behave efficiently. Paradoxically, *SBs* have historically performed better than commercial banks. These outstanding results of *SBs* call for an in-depth analysis of the effect of ownership structure on their economic behavior.

Reviewing the historical procedure and the standing laws of *SBs*, we have identified two dimensions that define their management system: first, a wide mission that explicitly mentions several goals to be pursued and an ownership structure where different stakeholders take part. In this sense, the current European legislation distinguished between savings banks controlled by public administrations and savings banks controlled by insiders. The multidimensionality of the mission and the differences in ownership structures in *SBs* demand the design and use of aggregate efficiency measures that allow us to evaluate the managers' contribution to the maximization of a mission with multiple goals. To answer this concern, we have proposed a first performance index (i.e. a technical efficiency index).

In addition, the legislator (the principal) occasionally interferes in the negotiation among agents, trying to impose their own preferences by means of specific regulation on the composition of governing bodies. Therefore, one important issue is to determine whether regulation succeeds in implementing the legislator's preferences in the organization. For this reason, we have proposed two additional performance indexes: overall efficiency and allocative efficiency indexes. Overall, the executive managers (the agents) of these firms with a wide mission should be evaluated on the basis of both their ability to conform to the principal's priorities (i.e. allocative efficiency) and their efficient use of resources to reach stakeholders' goals (i.e. technical efficiency).

In this paper, we have used the Data Envelopment Analysis (DEA) to elaborate such performance indexes and we have obtained different weights attached to each one of the goals. These weights must be interpreted as the relative importance assigned to each goal. In other words, each weight is the outcome of negotiations among stakeholders, after taking into account some previously defined governance rules and the specific allocation of control rights. Additionally, weight comparisons will be possible since each variable has been previously standardized.

Our results show that the differences in the overall efficiency of banks are explained not so much by managers' mistakes on interpreting the current legislation (allocative efficiency reaches values of almost 100 percent in both types of savings banks), as by the presence of substantial differences in technical efficiency. That is, there are important differences in the managers' skills to transform inputs into goals for stakeholders. These results suggest that banks' prioritization of goals

seems to be coherent, in principle, with the legislator's preferences. More specifically, we have verified how the voting distribution (established by the legislator) of savings banks' general meetings has an effect on the goals to be reached by each entity, and it goes in the direction pursued by the legislator. Thus, the goals of regional development and universal financial services receive higher attention when public administrations hold the majority in the governing bodies, whereas the attainment of economic growth and higher profits are favored when insiders hold the control.

This research enriches the existing literature on efficiency differences across ownership types in a number of ways. We have argued along this paper that differences in ownership structure give rise to differences in *SBs* technology and priorities, including the importance attached to profit maximization. This is the reason why we think that savings banks, in particular, and other multi-objective organizations in general, should not be evaluated exclusively in terms of profits (or costs), since they pursue multiple and different goals which, presumably, they would not carry out if their ownership structure or their goal priorities were different. Following this argument, it does not seem reasonable to evaluate managers of these organizations only by their economic results. More specifically when the legislator, by means of regulation (for example, in the case of *SBs*, the regulation on the composition of governing bodies) does affect the technological possibilities of the savings bank and it encourages managers to pursue different goals, which might even be in contradiction with profit maximization.

Moreover, in our empirical application, we have found that, by reducing the relative weight of the governmental authorities in decision bodies, the legislator is changing the structure of priorities (i.e., it increases the weight of the "profit maximization" goal to the detriment of other goals as "regional development") while causing only a light increase in the overall performance index (in our analysis, *IPR*). Global inefficiency remains, nevertheless, high in our study (around 10 percent). Hence, to the extent that the differences we found among the ownership structures in the *SBs* sector are due to differences in technical efficiency, any further reform should pay particular attention to the new regulation's effects on enhancing the technical ability to transform inputs into outputs, rather than in changing the mission to favor more financial-oriented goals.

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Table 1. Mission and stakeholders for the Spanish savings banks

Mission goals	Description	Stakeholders
y_1: Universal access to financial services	Favor popular savings and avoid the exclusion from the financial system	Founders Public Administrations Employees
y_2: Profit maximization	Collect savings and make investments under safe and profitable terms	Depositors Bank of Spain Employees
y_3: Promote competition and prevent monopoly abuse	Fight usury	Founders Public Administrations
y_4: Make a contribution to social welfare and wealth distribution	Provide services of not-for-profit and charitable nature	Founders
y_5: Make a contribution to regional development	Take notice of the genuine interests of the territory	Public Administrations

Table 2. Average Input and Output Levels

		Full sample	*Insider SBs*	*Public SBs*
Average 1998-2002				
Inputs	Employees expenditure	105951*	150225	77190
	Operating expenses	49946*	69928	36965
	Depreciation expenses	18909*	29912	11760
Outputs	Average balance of deposits	6.0627*	5.4887	6.4357
	Herfindahl index	0.2644	0.2882	0.2490
	Profits after taxes	69675*	92663	54741
	Interest rates for overdrafts	21.6859	21.4288	21.8529
	Charitable-social programs	19284*	26353	14693
	Loans to public administrations	261345*	369398	191150
Number of observations		226	89	137

Notes: (a) Average values expressed in thousands of €. (b) Average values expressed in thousands of €/account. (c) Average value between 0 and 1. (d) Average value expressed in percentage.

* Significant differences at a 5% level (ANOVA) within the two control models (insiders and public).

Table 3. Aggregate performance indexes. Common frontier

PANEL A: Summary statistics for performance indexes			
		Insider SBs	*Public SBs*
IPR	Mean (St.Dev.)	82.76% (15.46%)	75.45% (16.78%)
	# *SBs* on the frontier	17	17
IP	Mean (St.Dev.)	84.04% (15.75%)	79.94% (16.66%)
	# *SBs* on the frontier	24	28
AE	Mean (St.Dev.)	98.53% (2.83%)	94.38% (5.98%)
	# *SBs* on the frontier	38	28

PANEL B: Statistical tests of equality of performance indexes between *insider SBs* and *public SBs*			
	ANOVA *F* (Prob > *F*)	Kruskal-Wallis *x* (Prob > *x*)	Wilcoxon *Z* (Prob > *Z*)
IPR	10.840	11.088	-3.330
	(0.001)	(0.001)	(0.001)
IP	3.402	3.825	-1.956
	(0.066)	(0.051)	(0.051)
AE	37.329	36.102	-6.009
	(0.000)	(0.000)	(0.000)

Notes: IPR: Performance index with preferences revealed by the legislator. *IP*: Performance index as the result of private negotiations among stakeholders. *AE*: Allocative efficiency. The null hypotheses are that the average of the sample (ANOVA), the functions of distribution (Kruskal-Wallis) and the median (Wilcoxon) of the performance indexes for the *insider SBs* and *public SBs* are equal.

Table 4. Statistical test of equal technologies between insider and public savings banks

	ANOVA *F* (Prob > *F*)	Kruskal-Wallis *x* (Prob > *x*)	Wilcoxon *Z* (Prob > *Z*)
IPR	23.620	25.395	-12.131
	(0.000)	(0.000)	(0.000)
IP	13.502	12.663	-11.177
	(0.000)	(0.000)	(0.000)
AE	34.404	31.693	-8.678
	(0.000)	(0.001)	(0.000)

Notes: IPR: Performance index with preferences revealed by the legislator. *IP*: Performance index without restrictions. *AE*: Allocative efficiency. The null hypotheses are that the average of the sample (ANOVA), the functions of distribution (Kruskal-Wallis) and the median (Wilcoxon) of the performance indexes for the pooled frontier and the group-specific frontiers are equal.

Table 5. Aggregate performance indexes. Group-specific frontiers

PANEL A: Summary statistics for performance indexes

		Insider SBs	*Public SBs*
IPR	Mean (St.Dev.)	89.90% (11.61%)	83.53% (15.73%)
	# *SBs* on the frontier	29	45
IP	Mean (St.Dev.)	90.32% (11.60%)	85.09% (15.39%)
	# *SBs* on the frontier	31	49
AE	Mean (St.Dev.)	99.53% (0.92%)	98.09% (3.06%)
	# *SBs* on the frontier	59	72

PANEL B: Statistical tests of equality of performance indexes between *insider SBs* and *public SBs*

	ANOVA *F* (Prob > *F*)	Kruskal-Wallis *x* (Prob > *x*)	Wilcoxon *Z* (Prob > *Z*)
IPR	10.761	6.088	-2.467
	(0.001)	(0.014)	(0.014)
IP	7,507	3.410	-1.847
	(0.007)	(0.065)	(0.065)
AE	18.458	10.681	-3.268
	(0.000)	(0.001)	(0.001)

Notes: IPR: Performance index with preferences revealed by the legislator. *IP*: Performance index as the result of private negotiations among stakeholders. *AE*: Allocative efficiency. The null hypotheses are that the average of the sample (ANOVA), the functions of distribution (Kruskal-Wallis) and the median (Wilcoxon) of the performance indexes for the *insider SBs* and *public SBs* are equal.

Table 6. Goals relative weights. Group-specific frontiers

PANEL A: Summary statistics for goals relative weights			
		Insider SBs	*Public SBs*
With restrictions (IPR) (a)	μ_1	0.8152	1.0866
	μ_2	1.1922	0.1407
	μ_3	0.0844	0.5104
	μ_4	0.1403	0.1869
	μ_5	0.1188	0.945
Without restrictions (IP) (b)	μ_1	0.6658	0.9224
	μ_2	1.053	0.2693
	μ_3	0.1467	0.316
	μ_4	0.2028	0.2806
	μ_5	0.2099	0.8966

PANEL B: Statistical tests of equality of goals relative weights between *insider SBs* and *public SBs*				
		ANOVA *F* (Prob > *F*)	Kruskal-Wallis *x* (Prob > *x*)	Wilcoxon *Z* (Prob > *Z*)
With restrictions (IPR) (a)	μ_1	8.601 (0.004)	9.638 (0.002)	-3.105 (0.002)
	μ_2	191.413 (0.000)	108.136 (0.000)	-10.399 (0.000)
	μ_3	43.412 (0.000)	56.645 (0.000)	-7.526 (0.000)
	μ_4	2.282 (0.132)	3.476 (0.062)	-1.865 (0.062)
	μ_5	49.472 (0.000)	95.272 (0.000)	-9.761 (0.000)
Without restrictions (IP) (b)	μ_1	6.681 (0.010)	6.917 (0.009)	-2.630 (0.009)
	μ_2	66.655 (0.000)	27.704 (0.000)	-5.263 (0.000)
	μ_3	6.126 (0.014)	1.046 (0.307)	-1.023 (0.307)
	μ_4	2.264 (0.134)	2.800 (0.094)	-1.673 (0.094)
	μ_5	26.666 (0.000)	32.000 (0.000)	-5.657 (0.000)

Notes: (a) Weights are obtained by applying the program (3) first to *public SBs*, and then adding restrictions (5). Similarly for *insider SBs*, adding restrictions (6) to program (3). (b) Weights are obtained by applying the program (3) to each *SBs* subsample.

The null hypotheses are that the average of the sample (ANOVA), the functions of distribution (Kruskal-Wallis) and the median (Wilcoxon) of the goal weights are equal for *insider SBs* and *public SBs*.