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EFFICIENCY IN SPANISH BANKING: A MULTISTAKEHOLDER APPROACH ANALYSIS

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Abstract

Searching for greater inter efficiency has been used as a reason to modify the Spanish banking system since 2009. This paper aims to contribute to quantify the magnitude of efficiency, but not only the economic one, but also social and overall efficiency from 2000 to 2011. The case of Spain -compared to other banking systems- provides unique information regarding the stakeholder governance banking literature because over the last century savings banks have become rooted in the Spanish culture. The results -confirmed by a two-stage frontiers analysis, a DEA and a model combined with bootstrapped tests- indicate that Spanish savings banks are not less efficient globally than banks and are more efficient socially. Moreover, our results–with potentially important implications- encourage the participation of stakeholders in banking systems and underline the importance of attaining long-term efficiency gains to support financial stability objectives.

JEL classification: D21; G21; M14

Keywords: Stakeholder Theory, Banking Governance, Social Efficiency, Banks, Savings Banks, Data Envelopment Analysis (DEA), Bootstrap.

1. Introduction

Since 2009, the Spanish financial system has undergone wide-ranging changes that have radically transformed it. One of the most affected financial institutions -by mergers and model transformation- has been saving banks, which represented, in 2010, more than 30% of total assets in banking system and more than 35% of market share (Asociación Española de Banca, 2011).

This type of financial institution is based, at least theoretically, on social issues. Saving banks aim to contribute to social and sustainable enlargement of the society and close environment but they have been questioned because of their lack of economic viability (Carbó et al., 2002). Moreover, the economic routine and public administrations have driven their transformation into traditional banking institutions. In fact, savings banks have been characterized as socially-engaged financial institutions, but besides this differentiation, their maturity in terms of governance has been to avoid being governed by shareholders' capital which has been one of their leitmotifs. Hence, in terms of models, traditional banks are, on the one hand, based on the property right model which establishes the capital as the key to governance. And on the other hand, savings banks are based on a multi-fiduciary model that takes into consideration not the capital as the element to determinate the governance of the institution, but other features such as work, human resources or society decision legitimacy (García-Cestona and Surroca, 2008; Boatright, 2008).

Hence, an economic-social duality exists: banks are radically interested and oriented to economic and financial results whereas basic aims of savings banks have to do with social issues. That's the reason why it is questioned if they are different in terms of economic and social efficiency. In fact, the differentiation between these two efficiency measures could be used as the basic argument or contra-argument to develop a Spanish banking model without duality discrimination and maybe with another form to organize the decision-making system in banking governance.

A substantial body of literature has emerged on bank efficiency (Fiordelisi, 2007; Hughes et al., 2003). Studies dealing with bank efficiency focus on methodological issues (e.g. Berger et al., 1993), estimating bank efficiency by focusing on countries differentiations (e.g. Dietsch and Lozano-Vivas, 2000; Chortareas et al., 2013; Lozano-Vivas and Pasiouras, 2010; Beccalli, 2004; Beccalli et al., 2006) or evaluating and analyzing the relationship between bank efficiency and shareholder value creation (Beccalli et al., 2006; Fiordelisi, 2007) and also fhe influence of central banks' supervision (Gaganisa and Pasiouras, 2013). But, the most common element of bank efficiency literature is that it is focused on cost-benefit analysis. The findings are not conclusive probably because of the quantification of the efficiency based on costs (Berger and Humphrey, 1997; Chortareas et al., 2013) instead of on other determinants (Berger and de Young, 2001; Berger and Bonaccorsi di Patti, 2006) that need to be recognized explicitly in empirical models. Particularly, when financial institutions oriented to social value creation –such as savings banks- are analysed, social value outputs such as employment maintenance, taxes generated, credit invested in the real economy and funds destined to social foundations should be included as efficiency determinants. All these items have been taken into consideration in this paper.

There is not a substantial body of literature relating to savings banks' efficiency. Few studies deal with the measurement of the efficiency of entities that pursue alternative objectives (Berger and Humphrey, 1997; Carbó et al., 2002; Fiordelisi and Salvatore, 2013; Williams, 2004). However, it is highlighted by Altunbaş et al. (2001) the importance of the empirical studies in this research line because of the need to improve the knowledge about an efficient bank management model with earning and social capacity to be competitive.

As a continuation of the suggestion of these authors, but with the aim to make not only a contribution to the empirical research of savings banks, but also to the development of the theory by means of explaining management efficiency, it is necessary to bring the multi-fiduciary theory to the fore. The main argument is the following one. This multi-fiduciary theory of stakeholder developed by Goodpaster (1991) and Boatright (2008) establishes the relationship between different stakeholders -not only shareholders- that are the principals and the agent - that is the person with fiduciary responsibility behind the stakeholder group. Then, the agent will be legitimately obligated to respond to the interests of stakeholders. In this regard, other authors -such as Jensen (2002)- argue that it is not possible to manage the interest of all stakeholders because there is not a person with enough legitimacy to monitor the decision-making agent because those that are the controllers (several stakeholders with autonomy) have dispersed or –even more- incompatible interests (in the scientific community it is called Jensen's "problem of governance"). As a result, the effective power would be moved from the principal to the agent, who may act selfishly without any plausible control from the stakeholders group. Under the assumption of this thesis, savings banks would have been worse managed in comparison to banks and, as a consequence, savings banks would be less efficient when measuring the relationship between used "inputs" and generate positive "outputs".
It is really very important the fact that –as far as we know- there are not any studies that have attempted specifically to bring together these two branches of literature by empirically analysing the relationship between bank efficiency taking into consideration the bank type -banks versus savings banks- and economic-financial and social efficiency. Therefore, the aim of this study is to advance in the established literature by using a two-stage frontier analysis in order to show if the multi-fiduciary governance model in financial entities is confirmed by a significant differentiation in terms of efficiency when comparing savings banks to banks (less efficiency could be expected). The determinant type in Spanish bank is also evaluated by using the Tobit regression model approach (Casu & Molyneux, 2003; Harris, Huerta and Ngo, 2013) in order to analyse the influence of this factor on bank efficiency. Following Casu and Molyneux (2003: 1866) "to overcome the problem of inherent dependency of DEA efficiency scores when used in regression analysis a bootstrapping technique is applied"[1]. This study aims to improve on the previous empirical literature by taking into consideration the types of financial institution and highlights not only economic efficiency but also the social one. Precisely, the lack of literature of social efficiency in banking does not permit us to develop a DEA network (Fare and Grosskopf, 2000; Fukuyama and Matousek, 2011) that potentially increases the reliability of the input and output causal relationships because of in-deep shown model. However, it will not affect negatively the main objective of this paper, because of the basic model used represents independently but with factor relation different efficiencies. Then, three models are developed -economic, social and overall efficiency models- using the type of entity as external controller factor to analyze the discrimination between the models. Our data set consists of more than six-thousand bank and savings bank observations in Spain. The investigation period begins in 2000 and finishes in 2011. The efficiency of financial institution is measured by using Data Envelopment Analysis (DEA) and following a Tobit regression is applied.
This paper contributes in three different ways to the existing literature regarding bank efficiency in Spanish banking. First of all, unlike previous studies, our sample includes banking

[1] Simar and Wilson (2007) demonstrated that conventional, likelihood-based approaches to inference are invalid, and developed a bootstrap approach that yields valid inference in the second-stage regression. In this paper the bootstrap is applied, but the censured model is used because the approach of this paper is to show the influence of the type, as it has been considered in the second-stage. As the comparison is made using the same regression, the result and contribution will not be affected by the regression used.

data from 2000 to 2011. Thus, data covers the period of financial banking crisis, which has increased pressures on financial entities to operate more efficiently. Secondly, while previous studies of this type mostly focus on economic efficiency (e.g., Berger et al., 1993) another important efficiency is estimated in this paper: the social one. Thirdly, the Spanish case provides unique information compared to other banking systems concerning stakeholder governance in the banking industry, because Spanish savings banks have been existing over the last century and have been quickly removed, moving from 19 in 2011 to 2 in 2012 (Caixa Ontinyent and Caixa Pollensa are the only financial institutions that have been maintained legally as savings banks in Spain).

Hence, the obtained results have potentially important implications in order to encourage multi-fiduciary participation of stakeholders in financial institutions. As the world financial market is not perfectly competitive, banks will not be equally efficient regardless of their type. Thus, banks –that are based on property rights- are not necessarily more efficient overall, than saving banks –in which the participation of stakeholder is widespread. This might contribute to the development of the Spanish banking system in order to establish and strengthen collaborative and involvement practices of stakeholders to achieve not only economic but also social efficiency.

The article is organized as follows: Section II reviews the previous literature on the relationship between bank efficiency and stakeholder theory, taking into consideration the inclusion of savings bank during the analysed period of the Spanish financial system. Section III explains the Research Hypothesis to establish the basis of argument about the assumption made. Methodology, sample and input/output data used to measure bank efficiency are analysed in Section III. Thereafter, the empirical analysis results concerning banks and savings banks economic and social efficiency are shown and discussed -within the stakeholders' participation engagement into banking governance- in Section V. Finally, Section VI ends with a conclusion and recommendations for further research.

2. Literature review

The fundamental approaches to the productive efficiency of banks are two; the non-structural understanding that considers the relations between performance indicators and the characteristics of the governance, and the structural perspective, which presupposes theory option around the optimization concept. In concrete, the older bank efficiency literature applies the traditional microeconomic theory of production of non-financing companies to banking (Freixas and Rochet, 1997). It will be focused on technical efficiency. Recent works integrates the theory of financial intermediation with the microeconomics of bank production (Hermes and Hong, 2010) and they are focused on economic efficiency (eg Hughes et al., 2003).

Concerning the double orientation that is allowed by means of this technique –inputs or outputs-, some studies have chosen to reduce inputs (Berger and de Young, 2001; Williams, 2004; Altunbaş et al., 2001) and other studies to reduce outputs (Berger and Bonaccorsi di Patti, 2006; Salas and Saurina, 2003; Chortareas et al., 2013). However, it has been questioned if the assumption that profit maximization (and minimize costs) can be used as the sole criterion for the assessment of the outputs (Hughes, 1999, Hughes et al., 2003). The agency theory has marked the understanding of the management of corporations because of the agency cost that influences and determinates the objective of the entity, which necessarily is not directly related to the maximization of profit. In newer research (e.g., Hughes, 1999; Hughes et al., 2003) bank managers are modelled as maximizing their utility, which is a function of market value and risk. Continuing with this point of view the analysis of saving banks efficiency requires the optimization of other outputs that differ from those of commercial banks that are focused on profits. Hence, these outputs must take into consideration other items apart from banks profitability because of their specificities in their governance and socio-economic objectives (Carbó and Rodriguez, 2007; McKillop et al., 1996).

Banks owned by shareholders pursue shareholder wealth maximization except to the extent that agency problem diverts the pursuit of this goal. In line with this approach, the status of non-profit Spanish saving banks and the various social welfare goals might be used to judge the performance of these financial institutions into bank efficiency model of managerial utility maximization. Literature in general has taken into consideration the efficiency from a narrow view point (Tortosa-Ausina et al., 2002); however, there is the point to establish broadly the efficiency taking into consideration the economic efficiency with the aim to establish the outputs as indicators measuring the social value.

Another aspect mentioned in the literature has to do with the relationship between risk and efficiency, with an ambiguous result (Fiordelisi et al., 2011). In the last few years, different papers consider the need to introduce the risk factor regarding the analysis of banking efficiency (Berger and de Young, 2001; Hughes, 1999) and the contingency provisions (Altunbaş et al., 2001).

Concerning the inclusion of uncontrollable inputs, previous works such as Drake and Hall (2003) and Bos and Kool (2006), that follow the proposals made by Berger and Humphrey (1997), have found out that some factors such as environment, market specificity and the regional macroeconomic reality can affect efficiency. A discussion is opened in this line, because Simar and Wilson (2007) give a solution and present a statistical model in order to make clear how environmental variables might be relevant and they also describe a bootstrap method. In our study one external uncontrollable variable is included as environmental factor: the type of entity; because it is expected that the decision process related to the multi-lateral representative governing bodies influences the efficiency in their different perspectives: social and economic one, but also overall efficiency. Moreover the robustness of this analysis has to do with the fact that what it is intended is a comparative analysis between two kinds of entities with a balanced distribution between them and a number of subjects superior or near to 100 (depending on the year). Hence, the population is wide enough and heterogeneous and it will not be a bias in final results. In this regard, efficiency comparative analysis literature of different types of financial entities is limited, but there are relevant reference papers (Carbó et al, 2002; Williams, 2004), which results are debatable, though. Some authors consider that the different orientation that banking entities have regarding the achievement of profits might have derived into, on the one hand, a specialization of private banking in order to obtain more profitable customers and, on the other hand, savings banks and credit cooperatives have offered specific products for low income families and small enterprises (Carbó and Rodriguez, 2007; Fiordelisi and Salvatore, 2013; McKillop et al., 1996). This specialization in the orientation means that the use of comparative analysis concerning the classic efficiency indicators, generated from the identification with productivity, is not completely adequate because of the lack of adequacy to the aims that are not exclusively oriented in economic terms.

In the same line, Altunbaş et al. (2001) and Goddard et al. (2007) provide evidence that mutual banks don't aim to minimize costs or maximize profits and that private banks are not more efficient than any other kind of banking entity. Fiordelisi (2007), in a European level study, concludes that shareholder value efficiency in cooperative banking is 3% higher than the obtained by commercial and saving banks. Nevertheless, these differences are not consistent in all countries because, on the one hand, in Italy this kind of efficiency is similar to all kinds of banking entities, and on the other hand, savings banks in Germany and France are, on average, less efficient than cooperatives and commercial banks. The interest in this topic and the consequent variability of results create more expectation and interest in the proposed work, because the expected results are wider.

In this context, there are studies that have analysed the situation of savings banks in Spain. Financial literature has studied these issues with a narrow view towards making a profit. Thus, Kumbhakar et al. (2008) studied the technical efficiency of Spanish savings banks during the years 1986-1995 and concluded that it diminished over the period, even if they also found evidence of an increase in productivity in savings banks in Spain. Other authors like Tortosa-Ausina et al. (2002) have also studied the efficiency of Spanish savings banks, but for the years 1992-1998. They used the (frontier) DEA efficiency analysis technique. With regard to productivity rates, the conclusions that emerged from this study state that there is an increase in productivity due to improved production possibilities. As for efficiency, they concluded that the technical efficiency mean was very high and did not vary much throughout the period studied. However, it seems that there were significant differences among the banks. Their findings coincide with those obtained by Pastor (1995), but differ from those obtained by Grifell-Tatjé and Lovell (1996) and Pestana et al. (2012); this is mainly due to the choice of different outputs and because of having studied a period different from the same sample.

As it has already been mentioned, Spanish savings banks are a clear example of multi-stakeholder orientation, although their foundation is indeed earlier than stakeholder theory formulation (Freeman, 1984). These entities are characterized by not being capitalistic enterprises, in fact, they are non-profit entities. Hence, savings banks are not oriented to create value for shareholders because, actually, owners do not exist.

Stakeholder theory (Freeman, 1984) proposes that organizations must try to create value in a balanced way for all the stakeholders of the organization. Somehow, this theory has been applied to business reality, up to the point that 76% of Fortune 500 enterprises propose, as one of its objectives, optimizing the interest for the group of stakeholders (Agle and Agle, 2007).

Some scientists doubt about the applicability of the theory and propose it again. Goodpaster (1991), for instance, proposes an interesting paradox in terms of agency theory that consists in the following: if the agent favours the stakeholders' interests in detriment of –or against the will of- the principal, the agent is, in fact, lacking fiduciary responsibility given by shareholders. In other words, Friedman (1970) argues that managers cannot use shareholders' resources to develop Corporate Social Responsibility (CSR) actions. As an answer to this objection, two clearly differentiated perspectives of stakeholder theory have been developed. The first one is denominated instrumental (Boatright, 2008) and is based on the consideration that generation of value for the group of stakeholders will have, as a final consequence, value creation for shareholders. Under this perspective, stakeholders are considered as a mean and not as an end by themselves. The second perspective, known as multi-fiduciary theory (Goodpaster, 1991; Boatright, 2008), argues that since fiduciary responsibility among the agent and shareholders is amplified to the rest of stakeholders, a reformulation regarding the agency theory is proposed, that consists in amplifying the consideration as the principal of shareholders to all the group of stakeholders, in which shareholders are also included. This approach considers stakeholders as ends and not as means, and allows an interpretation of stakeholder theory as a firm theory –ontological view (Wieland, 2011; Retolaza, San-Jose & Ruiz-Roqueñi, 2014). Apart from legitimacy problems of this approach, Jensen (2002) highlights the "problem of governance" that could be summarized as follows: if some or the whole group of stakeholders of an organization is ascended to the principal category, principals will have divergent and even opposite interests; hence, an agreement to control the agent performance will be impossible to be obtained. On the contrary, the agent will be the referee of this conflict of interests and the real decision-maker in the organization. Besides the fact that even nowadays the dispersion and divergence of interests among shareholders make –in many enterprises- very difficult for the principal to control the agent (Boatright, 2008), increasing the number of princi-

pals by the inclusion of stakeholders –that can have extremely diverse interests- seems to complicate the problem considerably.
In this sense, Spanish savings banks are a clearly multi-stakeholders oriented organization, defined by law and with an administration board represented by a wide number of groups of interest (García-Cestona and Surroca, 2008). Saving banks are, in fact, a real experiment about the practical viability of the multi-fiduciary stakeholder theory.

3. Research Hypotheses

The problem that concerns us is analysing whether there is evidence that multi-stakeholder governance adversely affects the efficiency of a financial institution. To solve it, we have resorted to statistical hypothesis testing using the hypothetical-deductive method. Prior to this, we employed the synthetic analytical method to identify the components of the problem and to move them to a system of inputs and outputs.
The fundamental hypothesis (H_1) is founded on Jensen's "problem of governance" (Jensen, 2002). If it is right, the management efficiency of savings banks would be significantly inferior to the one obtained by banking entities oriented to shareholders. Consequently, the fundamental hypothesis (H_1) can be stated as follows: "There is a significant difference between savings banks and banks in relation with their overall efficiency". To conduct a more exhaustive analysis, this hypothesis is broken into another two hypotheses (sub-hypotheses).
In fact, the own ideology of saving banks along with some studies have manifested that –according to the multi-stakeholder objectives- economic efficiency is not the main aim of saving banks (Altunbaş et al., 2001; Goddard et al., 2007). Hence, the main efficiency hypothesis is explained using two hypotheses relative to the overall one, firstly, into a sub-hypothesis regarding the fact that banks are expected to have a higher economic efficiency than savings banks.

- (H_1a) *"There is a significant difference between savings banks and banks in relation with their economic efficiency"*.

Simultaneously, as a consequence of their social aim and multi-stakeholder orientation, a higher social efficiency is expected for savings banks versus banks.

- (H_1b) *"There is a significant difference between savings banks and banks in relation with their social efficiency"*.

As a consequence of the above, three technical models are shown in this paper relative to overall, economic and social efficiency in banking. The second stage of the analysis will reveal the influence of the governing body type into these three efficiency models and, consequently, if Jensen's "problem of governance" is confirmed, it is postulated that banks must have a higher global efficiency than saving banks, due to the residual loss generated by the own interest of managers. Therefore, if saving banks global efficiency is equal or higher than banks, it could be concluded that agent lack of control does not produce a residual loss for stakeholders as a group but at the most, a redistribution of the value created.

4. Methodology, Sample and Input/Output Data

Corporate finance literature determinates usually the company's performance using accounting-based profitability measures, market-based ratios and cash flow-based measures (Beccalli et al., 2006). However, the efficiency method –which is more sophisticated since it is derived from firms' inputs and outputs and because of the low possibility of manipulation in comparison to accounting ratios- is suitable to measure company's performance (Charnes et al., 1978; Banker et al., 1984). Thereby, the frontier efficiency analysis is used in this paper, particularly because it is widely used in banking literature (Berger and Humphrey, 1997).

An abundance of studies analyse banking productivity from quantitative data, using both parametric and non-parametric techniques (Berger et al., 1993; Berger and Humphrey, 1997). Nevertheless, in the last few years, a non-parametric technique called Data Envelopment Analysis (DEA) has begun to be used to esteem the efficiency function that enables both a quantitative and qualitative output to be incorporated in the efficiency analysis (Berger et al., 1993). This advantage added to the fact that it is not necessary to define in advance a production function, has established DEA as the most used non-parametric technique in these kinds of investigations (Goddard et al., 2007). Some examples are Fiordelisi (2007), Koutsomanoli-Filippaki et al. (2009), or Fiordelisi et al. (2011) that develop a comparative analysis of banking efficiency in EU countries; or, previously, Drake and Hall (2003) analyse Japanese banking efficiency. In particular, a non-parametric programming technique, Data Envelopment Analysis (DEA) is based on measuring relative efficiency, which traces back to Farrell (1957), who defines business efficiency considering multiple inputs. Specifically, efficiency is measured based on two basic components: technical and allocative efficiency, which combined allows to measure economic efficiency (Berger et al., 1993). For the data return, Constant Returns to Scale (CRS) of Charnes et al. (1978) has been used.
The two-stage estimation procedures are commonly used in the existing literature. These procedures consists of estimating by Data Envelopment Analysis (DEA) estimators of technical efficiency, in the first stage, and the resulting efficiency estimators are regressed with some environmental variables, in the second stage. (Simar and Wilso, 2007 cited 48 papers that used this technique and the Google Scholar search engine returned about 840 articles after a search on “bank efficiency,” “two-stage,” and “DEA” on 21 February 2014). The second stage lies in the application of a Tobit censured regression combined with a bootstrap because of the presence of the inherent dependency among the efficiency scores and with the aim to reduce the inappropriative and misleading possible results because of the lack of independence within the sample. As noted by Xue and Harker (1999) and continuing with Casu and Molyneux (2003) and Simar and Wilson (2007) the application of bootstrapping technique could be appropriate to attempt to overcome this problem.

Our data set consists of banks and savings banks from Spain since 2000 to 2011 (see **Table 1**) with financial information obtained from the Spanish Banking Association (*Asociación Española de Banca*, AEB) and the *Anuario Estadístico de las Cajas de Ahorros*, also since 2000 to 2011 and published by the Spanish Confederation of Savings Banks (*Confederación Española de Cajas de Ahorros*, CECA). It should be noted that credit cooperatives have been excluded from the study; while they make for a highly interesting financial model, they represent an intermediate (multi-fiduciary) approach in terms of multi-fiduciary theory, so their possible relationship with efficiency is not so clear when addressing Jensen’s “problem of governance”, the basic of this paper.

[Insert Table 1 here]

Frontier Analyst software has been used, which employs a scale of 100 and Stata is used to test the regression and to apply the bootstrap method. To the extent that a financial institution (considered as a DMU) is far from the frontier (which is determined by the group of decision-making units that obtain maximum efficiency), the value will fall to between 100% and 0%. This method allows us to obtain relative, but not absolute, efficiency. In this way we obtain the most efficient DMUs compared with the selection under consideration, meaning that the units that are more efficient when compared with the others are identified. This analysis

works best when, as in our case, we can perform it over the entire population and not just a sample of it.
Given that the DEA is based on a relationship between inputs and outputs, a challenge that applies in all studies of financial institution efficiency is the identification of inputs and outputs. In the existing literature four main approaches are used to develop bank efficiency model based on frontier analysis that influence in the selection of input and outputs: 1) the production approach, 2) the intermediation approach, 3) the cost-revenue approach and 4) the value-added approach. Firstly, under the production approach, one of the most used (Berger and Humphrey, 1997), banks are focused on the services given to depositors and borrowers, (Hermes and Hong, 2010, Fiordesili et al., 2011); then, the main inputs are based on those of production, labour and capital and outputs are deposits and loans. Secondly, under the intermediation approach, the aim of banks is to reduce transactional costs between depositors-borrowers relationship, and the financial resources efficient utility is the base (Aly and Grabowski, 1990; Hermes and Hong, 2010); then, the main inputs are bank liabilities (i.e. deposits) and outputs are bank assets (i.e. loans). Thirdly, the cost-revenues approach - considered as a more basic view point than previous approaches- focuses on the ability of banks to contribute the maximum banks' net revenue (e.g. Goddard et al., 2007). Fourthly, the value-added approach is identified according to the value added relationship between bank variables (Berger and Humphrey, 1997); then, inputs are those variables that banks use to get some outputs, which are measured in value terms, and not on physical ones related directly to depositors and borrowers, as in the production approach.
This article uses the value-added approach to develop bank economic and social efficiency in which bank resources and their utility are highlighted (Hermes and Hong, 2010) within value generation perspective.
Bank efficiency is measured in this article using different input/output variables; specifically three models are estimated to measure economic, social and overall efficiency. The models have the same inputs but different outputs (see **Table 2**).

[Insert Table 2 here]

Based on McGuire et al. (1988) and with the aim to control available funds included in the hypothesis related to the performance of corporations, three inputs need to be introduced: Equity, Total Assets and Deposits. The main reason is that although corporations "may wish to follow the normative rules of good corporate citizenship at all times, their actual behaviour may depend on the resources available" (Preston and O´Bannon, 1997: 423). Apart from the aim of the financial entity, the available resources -the inputs- are the variables that influence the bank efficiency and that determine banks' performance. Inputs and obtained three models will show a significant comparison between efficiencies, being comprehensible the contrast of the models focused on overall, social and economic efficiency banking versions. These inputs guarantee the economic-financial equilibrium of financial entities, because of the sustainability development of the resources and investments of banks, and this is the reason to maintain the same three inputs in the three contrasted models.
Other variables based on cost efficiency could be integrated to establish the efficiency from the bank production theory perspective (from balance-sheet, for example: the quantity of non-depositors borrowed funds, reserves, cash, and other liquid assets and off-balance-sheet financial services and products). But, the aim of the paper is to establish the bank efficiency comparing saving banks and non-saving banks considering various social welfare goals which might be used to judge the performance of these financial institutions and in an equilibrium form between inputs and outputs.

Specifically, deposits are resources managed by financial institutions. The relationship between deposits and the obtained outputs is part of the added-value generated by bank activity. Financial entities must optimize the use of deposits and that is the reason why it has been considered as an input and not an output variable. In other studies (e.g. Fiordesili, et al., 2011) deposits are used as outputs, but in this work the goal of the organization is not production or financial intermediation, but value added by entities. Moreover, the discussion of this paper, as we have already mentioned before, is to establish how to govern different types of financial institutions using efficiency as an indicator and not as an end, considering overall efficiency (defined as economic plus social efficiency).
Outputs are distinguished by the treatment of economic, social or overall efficiency. The economic efficiency is explained using the following outputs: results [profit-loss] and risk - introduced by Hughes (1999), Sala and Saurina (2003) and Fiordesili et al. (2011). Risk –was obtained as the inverse of the summation of the contingent risks and commitments recognised by the different institutions- is incorporated by Fiordesili et al. (2011) previously and we thought it was relevant because it represents approximately the sum of recognized hazard by the entity. Moreover, in some papers (e.g. Hughes, 1999) efficiency is modelled with regards to utility maximization, which is a function of market value and risk that makes extend the efficiency function to the affected bank risk. This economic efficiency considers how well institutions turn a given amount of assets, equity, and deposits into profit and risk that is not exactly a profit function but identifies best-practice performance of the banks in the Spanish sample based on value-added approach (Berger and Humphrey, 1997) explained in the previous section.
As for social efficiency, it was more difficult to identify possible outputs since there is no standardized system of indicators that measures social profitability or the profitability provided to other groups of stakeholders other than shareholders. The lack of literature in bank efficiency in this regards has pros and cons; pros because of the novelty and innovative perspective of the paper and cons because of the effort to justify the objective selection of the indicators not being ad hoc. These outputs have been chosen with the aim to reflect the interests of the most important stakeholder groups: customers, employees and the community at large (Preston & O´Bannon, 1997). Then, credits because this balance-sheet variable is part of the social functions and reflect the provided loans to families and businesses (real economy). Lending contributes to social development. The type of credit to customers should be considered, but due to the lack of transparency of financial institutions this information is not available; as a consequence, both the analysis and results are more opaque (San-Jose et al., 2011). It is desirable but not possible to analyse the type of credit in depth; therefore it is considered as a whole in a positive way. Thus, labour (number of employees) is one of the main problems that citizens have; hence, employment creation is a social contribution. It reflects the interests of the bank workers, then, it contributes to the social efficiency in a specific way. Generally, previous studies have considered labour as an input, but as this paper focuses on the social value created by two differently governed financial entities, this variable should be considered as a generated output. Social contribution (using taxes) represents money that financial institutions pay back to society through tax administration or distribute it via social work in the case of savings banks case. This balance-sheet variable reflects the general interest of the community. Finally, a fourth output has been introduced: risk. It is important because, as it can be seen in the results of the crisis in Spain, risk is transferred to society –in fact, the risk assumed by financial institutions can be quantified and currently the first bailout amounts to 40.000 million euro that has been transferred to third parties, in this case, the Spanish public system. Labour (number of employees) has been reduced drastically due to the

financial crisis and in 2013 the unemployment rate in Spain is 26% with no prediction to being reduced in the next two years.
Overall efficiency includes the determinants used previously in social and economic efficiency; thus, all previous outputs are introduced: results [profit-loss], risk, customer credit, labour, and social contribution.
All this can be seen as algorithms (See **Table 3**).

[Insert Table 3 here]

5. Results and Discussion

Using the Data Envelopment analysis, in the first stage, and a regression combined with bootstrap, in the second stage, with the sample of Spanish banks institutions we have obtained a comparison between the efficiency scores in the three levels for banks and savings banks. The efficiency scores for banks and savings banks on each of the three analyses (economic, social and overall) are shown in Table 4 for the period analysed (since 2000 to 2011). As expected, savings banks are less efficient economically but more efficient socially. The overall efficiency shows considering overall input and outputs that –for most of the periods but not for all of them- savings banks are more efficient.

[Insert here Table 4]

Once the efficiency scores for each of the DMUs was obtained, a comparison of measurements was made with the Tobit Regression combined with bootstrap (C=2000) the results obtained appear in **Table 5**.

[Insert here Table 5]

There are significant differences, over the period 2000-2011 favourable to banks in relation with their economic efficiency. On the other hand, there is a significant difference favourable to savings banks in relation with their social efficiency, but only in 2001 and in 2002 and from 2008 to 2011. Finally, overall efficiency is favourable to savings banks, but it is not significant.
In summary, the results suggest about the previously developed hypotheses that:

- *"There is a significant difference between savings banks and banks in relation with their economic efficiency"*.
- *"There is a significant difference between savings banks and banks in relation with their social efficiency"*. At least in 2001 and in 2002 and from 2008 to 2011, years those correspond to the crisis period.
- *"There is a significant difference between savings banks and banks in relation with their overall efficiency"*. For overall efficiency, understood as a combination of economic and social efficiency input and outputs, we must uphold the null hypothesis, since no significant differences were noted between banks and savings banks.

Savings banks in Spain have been a significant financial actor, even to the point that its market shared has historically been bigger than the one of banks. In this sense, we can affirm that it is not a residual phenomenon –like ethical banks in Spain or, in a lower measure, credit cooperatives- but an agent similar to banks concerning importance and dimension.
The comparison made in this paper with data of twelve years -from 2000-2007 (before the crisis) and 2008-2011 (fully immersed in crisis)- in terms of efficiency among banks and savings banks using the Spanish population and Data Envelopment Analysis followed by a Tobit

censured regression combined with bootstrap, leads us to determine that banks are more efficient concerning the generation of economic outputs, but not concerning the generation of outputs that create socioeconomic value. These differences can be reasoned as a consequence of their different business model: banks are more oriented to economic results and savings banks are, in parallel, less alienated with these objectives but more oriented to social objectives. Despite the reasonableness of this argument, results do not confirm this relationship, at least in a conclusive way, because only in 2001 and in 2002 and also since the financial crisis (2008 onwards) savings banks have obtained a higher social efficiency with significant statistical support.

Furthermore, efficiencies are relative and not absolute, hence, we cannot confirm that difference in social efficiency since 2008 exists due to an increase of efficiency of savings banks, that assume a more social role in periods of crisis; because it could also be explained as a decrease of social efficiency of banks, which in an unstable financial situation strengthen their alignment around their pure economic objectives motivated, probably, to ensure their continuity.

On the other hand, results refute Jensen's "governance problem" hypothesis attributed to multi-fiduciary stakeholder theory. According to this hypothesis, it was expected that organizations with a wide diversity of interests and complexity in their control, such as savings banks, were significantly less efficient than banks. On the contrary, it is demonstrated that, if both economic and social outputs are considered, there is not a significant difference between these two kinds of entities. Although it is true that banks are more efficient economically –similar results are obtained by the bootstrap, the regression and the classical ANOVA-, this is consistent with the fact that they are more oriented to shareholders; whereas savings banks are more oriented to a wide group of stakeholders and generate both economic and other kinds of return (outputs). The point that during years of bonanza (2003-2007) a significant difference did not exist in social efficiency between banks and savings banks could be explained by the fact that banks compensated the direct social contribution of saving banks by means of the payment of taxes to the administration in order to be redistributed.

Likewise, saving banks have lasted more than one and a half centuries, had achieved a market share higher than 50% of the Spanish financial sector (35% in the last year of survival) and have obtained similar efficiency rates to the ones obtained by banks. Thus, savings banks are a clear example of the possible multi-fiduciary governance. Nevertheless, the fact that during the period of bonanza the economic efficiency of savings banks was clearly inferior and that their social efficiency was not higher, questions the model suitability concerning the objective generation of social value outputs.

6. Conclusions

In this paper, we assess the efficiency of banking in Spain during the period 2000-2011 by using the frontier methodology combined with a bootstrap regression model. We delve more deeply into financial entities' efficiency than previously by including several definitions of bank efficiency: overall, economic and social. We have also built on previous work by using banking data for different types of financial entities –banks and savings banks- before and during the financial crisis. It is shown the influence of governance based on stakeholders' responsibility comparing the shareholder based model (banks) and the stakeholder based model (savings banks). This paper contributes to the debate about multi-fiduciary view of stakeholder theory using the analysis of savings bank efficiency.

The findings of this paper are similar to those obtained by former European studies, and they suggest that European savings banks can be efficient –at least- as much as banks are. Moreover the main finding seems to be the relationship between the bases of the financial entities analysed: shareholder versus stakeholder model.

Several important and interesting findings are reported in this study. It appears that the stakeholder model followed by savings banks in Spain is not a differentiation mark by which to base the different level of efficiency of different types of financial entities. There is little evidence of any strong causal link between shareholder based financial institution model and their higher efficiency. What is more important, it reveals that the hypothesis of Jensen's "problem of governance" is over assumed and –at least- there is a case in which a stakeholder based model (savings banks) is not less efficient than a shareholder based model (banks).

In addition to the gains from building on previous work on the relationship between bank and savings bank efficiency, we believe that our empirical results are important from a stakeholder-based financial institution model. On the other hand, during the period of bonanza, the economic efficiency of those financial entities based on a stakeholder model (savings banks) was lower than those entities based on shareholder interests (banks) and the difference in terms of social efficiency was not fully significant. Hence, there is a demonstrated need to develop a stakeholder-based financial institution model based on outputs that generate added social value. It is a good starting point for a future research in this research area.

Moreover, we would like to point out that the research's main limitations come, on the one hand, from the use of inputs and outputs related to social efficiency, because of the lack of literature on savings banks and the consequent lack of standardized indicators establishing the social mission of financial institutions; and, on the other hand, from the use of a censured model instead of a model based on a complete data-generating process (DGP) where second-stage regression would be more appropriate. Then, probably with the approach of this paper the model will be ad hoc instead of structural; very sensitive to other structure for inputs, outputs, and environmental variables. Fortunately, it will not affect the contribution about Jensen's "problem of governance" because one model is enough to arise a reasonable doubt.

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Table 1. Data Sheet.

VARIABLES	
Sample:	Population
Country:	Spain
Data:	2000-2011
Database:	AEB & CECA
DMU:	Financial Institutions: banks and saving banks
Observations:	6000
Method:	Frontier. Data Envelopment Analysis (DEA)
Program:	Frontier Analysis 4/STATA
Execution:	From November 2013 to February 2014
Statistics:	Bootstrap Tobit Regression

Table 2. Inputs and outputs of Overall, Social and Economic Efficiency: the Spanish banks vs. saving banks efficiency model.

	INPUTS	OUTPUTS
Overall Efficiency (OE)	Equity (E)	Profit (P)
	Total Assets (TA)	Loss (L)
	Deposits (D)	Customer credit (CC)
		Jobs (J)
		Risk (R)
		Social Contribution (SC)
Social Efficiency (SE)	Equity (E)	Customer credit (CC)
	Total Assets (TA)	Jobs (J)
	Deposits (D)	Risk (R)
		Social Contribution (SC)
Economic Efficiency (EE)	Equity (E)	Profit (P)
	Total Assets (TA)	Loss (L)
	Deposits (D)	Risk (R)

Table 3. DEA Algorithms for CRS using banks and savings banks as DMUs.

K homogeneous **DMU** (savings banks and banks) represented by: k (k=l,…,K).

N: inputs (E, TA, D) (see Table 2) ~ X_{jk} (j=1,…., n)

M: outputs (P, L, R for economic efficiency; CC, J, R, SC for social efficiency and P, L, CC, J, R, SC for overall efficiency) ~ Y_{ik} (i= 1,..., m)

$$TE_K = \frac{\sum_{i=1}^{m} u_i\, y_{ik}}{\sum_{j=1}^{n} v_j\, x_{jk}} \leq 100\ where, u_i\ and\ v_j \geq 0$$

To select optimal weights the following mathematical programming is specified:

The aim: Max. TE_k. Subject to:

$$\sum_{i=1}^{m} u_i y_{ik} - x_{jk} + w \leq 0\ r = 1, \dots, K$$

and

$$v_j x_{jk} - \sum_{i=1}^{m} u_i X_{jk} \geq 0, and\ u_i\ and\ v_j \geq 0$$

The above model shows CRS if w = 0.

Table 4. Overall, Social and Economic Efficiency Mean and Standard Deviation. Data Enveloped Analysis from 2000 to 2011.

		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
	Entities	Mean (σ)	Mean (σ)	Mean (σ)	Mean (σ)	Mean (σ)	Mean (σ)	Mean (σ)	Mean (σ)	Mean (σ)	Mean (σ)	Mean (σ)	Mean (σ)
Overall Efficiency	Savings Bank	78.02 (11.68)	78.80 (12.98)	79.56 (10.68)	78.90 (9.78)	83.46 (9.04)	82.92 (9.30)	84.90 (8.74)	84.83 (7.25)	82.98 (7.49)	83.82 (7.92)	87.46 (8.61)	81.06 (12.70)
	Banks	77.55 (24.20)	75.48 (26.00)	77.27 (23.09)	79.47 (21.72)	81.11 (23.31)	81.43 (21.43)	86.61 (18.05)	85.65 (18.76)	81.28 (20.23)	79.91 (23.53)	83.20 (20.90)	76.03 (25.31)
Social Efficiency	Savings Bank	77.89 (11.51)	78.50 (13.05)	79.40 (10.65)	78.50 (9.27)	82.19 (8.83)	82.55 (8.92)	84.04 (8.02)	84.34 (6.97)	82.79 (7.58)	82.54 (8.02)	86.64 (8.68)	80.58 (12.61)
	Banks	74,85 (24.97)	71.45 (27.41)	72.30 (25.67)	75.13 (24.10)	77.36 (25.48)	77.50 (25.53)	83.29 (20.69)	81.57 (23.17)	75.48 (25.44)	74.46 (27.09)	75.13 (27.22)	67.28 (28.80)
Economic Efficiency	Savings Bank	3.91 (6.61)	15.60 (12.47)	29.14 (13.24)	17.51 (14.04)	15.65 (14.33)	12.50 (21.84)	25.66 (13.51)	31.33 (13.17)	19.29 (15.95)	21.96 (18.62)	23.09 (19.58)	14.66 (20.04)
	Banks	18.85 (26.73)	27.06 (29.62)	45.98 (35.31)	39.15 (34.57)	34.45 (33.39)	32.19 (34.52)	48.92 (29.90)	50.58 (29.33)	36.12 (33.98)	35.26 (34.07)	36.85 (37.45)	39.79 (34.34)

Table 5. Overall, Economic and Social Efficiency: bootstrap Tobit regression analysis using Type.

Years /Dependent Variables	Overall Efficiency β; t value[p]	Social Efficiency β; t value[p]	Economic Efficiency β; t value[p]
$TYPE_{2000}$ Wald Chi	0.02	0.81	19.17***
Type	0.14	0.90	-4.38***
Constant	12.67***	11.69	5.09***
Observations	116	116	116
$TYPE_{2001}$ Wald Chi	0.94	3.19**	9.01**
Type	0.97	1.98**	-3.00**
Constant	11.98**	10.24***	5.61***
Observations	128	128	128
$TYPE_{2002}$ Wald Chi	0.53	4.45**	14.43***
Type	0.73	2.11**	-3.80***
Constant	13.25***	10.57***	7.58***
Observations	119	119	119
$TYPE_{2003}$ Wald Chi	0.03	1.09	22.04
Type	0.18	1.05	-4.70***
Constant	14.31***	11.96***	7.12***
Observations	112	112	112
$TYPE_{2004}$ Wald Chi	0.57	1.94	13.07***
Type	0.76	1.39	-3.62***
Constant	13.53***	11.08***	5.68***
Observations	112	112	112
$TYPE_{2005}$ Wald Chi	0.24	2.02	12.06***
Type	0.49	1.42	-3.47***
Constant	14.36***	10.80***	5.40***
Observations	106	106	106
$TYPE_{2006}$ Wald Chi	0.41	0.07	27.50***
Type	0.64	0.26	-5.24***
Constant	18.20***	15.17***	8.92***
Observations	105	105	105
$TYPE_{2007}$ Wald Chi	0.09	0.76	19.38***
Type	0.30	0.88	-4.51***
Constant	17.37***	12.96***	8.76***
Observations	104	104	104
$TYPE_{2008}$ Wald Chi	0.34	4.13**	7.71***
Type	0.52	2.03**	-2.78***
Constant	14.42***	9.89***	4.82***
Observations	101	101	101
$TYPE_{2009}$ Wald Chi	1.38	4.78***	2.71*
Type	1.17	2.19**	-1.65*
Constant	12.06	9.32***	3.73***
Observations	101	101	101
$TYPE_{2010}$ Wald Chi	1.8	8.87***	5.46**
Type	1.39	2.98***	-2.34**
Constant	13.59***	8.72***	4.88***
Observations	91	91	91
$TYPE_{2011}$ Wald Chi	1.22	7.16***	13.01***
Type	1.10	2.68***	-3.61***
Constant	9.45***	6.37***	5.67***
Observations	72	72	72

[1] Constant= constant term.

[2] Continuing Simar and Wilson (2007, 2011) it has been used 2000 bootstrap replications for the confidence intervals of the estimated coefficients. However, we have not used a complete data-generating process because of the lack of uncontrolled variables and the lack of literature about the approach of the used model.

[3] Significance intervals

*p<0.1 Significance from zero at the 10% level according to bootstrap confidence intervals.

**p<0.05 Significance from zero at the 5% level according to bootstrap confidence intervals.

***p<0.01 Significance from zero at the 1% level according to bootstrap confidence intervals.

[4] It has previously been used an ANOVA analysis which results (p-value probability) show that the H1a and H1b are not rejected; but H1 hypothesis has been rejected because the probability is lower than the significance level. Moreover, Levene-test is significant at 1% for overall, social and economic efficiency during the period from 2000 to 2011; then, the sample in overall period is free from homoscedascity assumptions and it is statistical possible to use F-test to compare means.