Italian Saving Banks efficiency, is unity strength? Bank groups versus stand-alone

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Abstract. This study investigates the Italian SBs sector efficiency over the 2012–2013 period. The measure of efficiency is estimated via SBM Data Envelopment Analysis. In the first stage, we evaluate the SBs efficiency while in the second we compare the performance of SBs belonging to bank groups with those stand-alone. To evaluate the impact of be part of a bank group we use Policy Evaluation tools, performing an impact evaluation with the controlled by a group considered as the *"treatment"* variable and checking for relevant banking ratios. To deal with self-selection bias (heterogeneity in treatment propensity related to variables), we use the PS Matching estimating the average treatment effects with the Ichino-Becker propensity scores. The research novelty resides in the combined application of DEA and Policy Evaluation tools for the specific field. Results show that when comparing SBs belonging to a banks group with stand-alone SBs, although a positive but not significant ATT, we find no relevant differences between the SBs part of group and the stand-alone. However, with reference to Technical Efficiency the stand-alone SBs experience the worst performance while after an insight into the inefficiency decomposition is clear that difficulties are due to managerial inefficiency. Finally, we present speculation, linked to real circumstances, with respect to the Italian SBs sector.

Keywords: Saving Banks, Efficiency, Data Envelopment Analysis, Policy Evaluation, Average Treatment Effect on the Treated

JEL Classification: G32 - G21 - C61 - C21 - O12
AMS Classification: 30C40 - 03B48 - 32S60

1 Introduction

The banking sector is still playing a crucial role in countries economics and Saving Banks (SBs), part of it, are fundamental in the economics developments as in [24]. The global crisis and the weak economic reestablishment belong to what Hansen [26] defined during the Great Depression as the economic *"secular"* stagnation being, in such periods, the efficiency pursue vital in supporting local economies mainly composed of SMEs and families. During the years, SBs evolved into full-service banks and JSCs (joint stock companies) and currently they are full commercial competitors that maximize profits being indistinguishable from other competitors as per [24]. Focusing on Italy, local SBs had a great influence on small territories while being the driver of local economies development.

With respect to the present framework, the aim of our study is to investigate whether, and to what extent, belong to a banking group improves the performance in terms of efficiency.

2 Theoretical background and a brief note on the Italian SBs sector

Studies on the Italian banking sector efficiency are few such as the Favero-Papi [21] and Resti [33] about the determinants as scale inefficiencies and regional disparities and one on Italian cooperative banks as per [6]. Casu and Girardone [14] compared results obtained in different countries focusing on commercial banks. Since the work of Sherman and Gold [37], considered the first on banking industry, scholars refers to the DEA technique as a useful tool to measure the relative efficiency of banks as in [13] and [22]. Berger and DeYoung [12] and Williams [42] shows that a low levels of efficiency lead to lack of credit monitoring and inefficient control of operating expenses. With respect to the role of management and efficiency, from a managerial perspective, the *"agency theory"* as in [20] and [29] is relevant when referring to the separation of ownership and control thus implying conflicts of interests between managers and shareholders. On the other hand, the *"stewardship theory"*

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argues that managers are reliable and there are no agency costs as in [18] and [19]. This latest viewpoint is typically a pre-financial scandals one within a paradigm of 10/15 years ago. Currently, the banking efficiency is evaluated via financial ratios, parametric and non-parametric approach as in [8] with different results by using divers methods as shown by Cubbin and Tzanidakis [16] where the mean DEA efficiency is higher than OLS analysis. Thanassoulis [38] found that DEA outperforms regression analysis on accuracy of estimates, but regression analysis offers a greater stability of accuracy even if Resti [32] shows that, both scores do not differ substantially. The Basel Committee [7] states that frontier efficiency measures are better representative in capturing the concepts of *"economic efficiency"*, *"overall economic performance"*, and *"operating efficiency"* providing a superior understanding on corporate governance topics. The main reason for the use of DEA technique is the smallest number of observations requirement and because it takes into account multiple inputs and outputs simultaneously, compared to ratios where one input relates to one output at each time as per [38].

Italian SBs started operating in the nineteenth century as institutions in which the credit and social aspects were living together rooted in the social and economic goals. However, at the end of the twentieth century due to sectoral regulatory developments they turn into full joint stock companies operating under complete commercial principle taking into consideration both stakeholder values and shareholder value. The Bank of Italy Report for 2014 [3]) states that in 2008-2014 period the bank employees and branches decreased by about 17,900 (-5.6%) and 3,400 (-9%) units because of distribution channels. As contribution to sector, Italian SBs at the end of 2014 are forty and holds 4,345 branches, more than 36 thousand employees, total assets of 206.2 billion and 144.4 billion in direct deposits. Currently, groups (which partly belongs to the local territorial Foundations) own SBs to cover the link between the ancient SBs and local communities. The SBs nature most of the time is still reflecting s the local political powers variable influence.

Recently, the Italian Government [26] after some financial scandals issued the Law Decree 22 November 2015, n. 183 (a.k.a. *"decreto salva banche"*) and chose to terminate four banks while setting up four new substitute entities. It was the *de facto* transfer on local territories of the high socio-economic cost impacts and families and countryside people lost all their money because of the lack of financial skills to understand the nature of the business and risk level (a real fraud via the sale of a huge amount of subordinated debt). Interestingly, two recipient of the decree are SBs and part of our sample as another well-known troublesome (CR Ferrara, CR Chieti and Carige). Currently, the SBs sector is mainly hold by bank groups as result of the last 10/12 years mergers and takeovers, which led SBs to the loss of independency and links to territories.

3   Data specifications and methodology

The analysis covers a 36 Italian SBs sample during the 2012-2013 and the data source is Bankscope [4]. Four SBs were not included due to lacks of data. We have 20 SBs part of a bank group (representing the 55% of the sample) and 16 stand-alone SBs (45%). In the first part of the analysis, we evaluate the efficiency of SBs as per the Tone [38] SBM model while in the second part we compare the performances of the 20 SBs part of a bank group with the performances of 16 stand-alone SBs via policy evaluation tools. Table 1 provides the variables descriptive statistics.

Variables	Type	2012 Min	Max	Std. Dev.	2013 Min	Max	Std. Dev.
Total Assets	Input	799,70	49.322,00	10249,91	709,70	50.162,70	9740
Operating Expenses	Input	17,20	1.187,40	237,193	19,80	1.009,90	195,1604
Impaired Loans	Input	45,70	3.141,00	815,513	60,90	3.895,00	1062,465
Loans	Output	703,40	35.128,10	7082,896	639,10	36.391,90	6844,524
Pre-tax Profit	Output	-205,10	163,20	50,3527	-2.205,80	251,90	380,1767
Customer Deposits	Output	410,50	22.018,80	4241,049	482,40	23.251,80	4396,648

Table 1 The 2012 and 2013 Data in Mln. of €– Source: Bankscope - Bureau Van Dijk (2015)

The most used approach in banking efficiency measurement is the intermediation approach as per [36], which considers the bank as intermediators by transforming the production factors into outputs. The alternative approach is the production approach that uses traditional factors of production such as capital and labour to produce the number of accounts of loan and deposit services. In a mix-approach, deposits are likely to be take into account as both inputs and outputs. Referring to the banking sector, Anouze [2] presented a table showing that the intermediation approach is the most applied approach while the mix-approach represents 1/5 of the studies. The chosen variables able to measure the relative efficiency of the Italian SBs lies within the mix approach and the intermediation one. Total assets, operating expenses and impaired loans are inputs variables. Total assets is a proxy for the bank size, operating expenses (sum of personnel other operating expenses)

represents the labour input. Although many take it into the NPLs, we chose to refer to Impaired Loans as a risk proxy as in [33] that need, in any case, a reduction and envelops the potential risks that are likely to hit the banks and the stakeholders. With reference to the outputs side we chose the total loans, customer deposits (considered by many as an input and by other as an output) and pre-tax profits. The deposit variable is widely used as input or output as per [40] with a prevalence for an outputs consideration as in our case, and the pre-tax profits output variable is able to encompass both traditional operational and extraordinary activities that may, economically, impacts on financial statements.

To measure efficiency we use DEA as in [5], a non-parametric technique in a SBM as per the Tone [41] version; hence, t multiplies all the variables. The linear program is the following:

$$\min_{t,\lambda,S,Z} \tau = t - P_c Z$$
$$t + P_y S = 1$$
$$x_0 = X\lambda + Z \quad (1)$$
$$y_0 = Y\lambda - S$$
$$\lambda \geq 0, S \geq 0, z \geq 0$$

where x_0 is the vector (3x1) of actual inputs under evaluation, X is the costs matrix (3 x 72) of banks sample (36 times 2 years), Z is the vector (3 x 1) for inputs excesses, y_0 is the vector (3 x 1) of firms outputs under evaluation, Y is the matrix (3 x 72) with the outputs of all the firms sample, S is the vector (3 x 1) with the output slacks, λ is the vector (72 x 1) of intensity and P_c and P_y are the vectors (1 x 3) that contains weights.

The result of the linear program solution (1) is τ, the relative efficiency of the Bank, where (1 - τ) is Technical Inefficiency: the averaged distance from the Constant Returns to Scale frontier, it includes both Managerial and Scale Inefficiency. The first depends directly on the management while the second is due to the dimension of the Bank. The SB is efficient and has an optimal dimension $\tau = 1$. By changing the specification of the problem (1) it allows the measure of Managerial Efficiency τ_{VRS} (adding $e\lambda = t$ to the program) (1) as suggested by [5] and Scale Inefficiency ($\tau_{vrs} - \tau$). The Managerial Inefficiency (1 - τ_{vrs}) is due to the management, being the averaged distance from the Variable Returns to Scale frontier. The Scale Inefficiency is due to the dimension, so generally in the short run the management does not have enough discretion to fill this gap.

Uncovering the effects of being part of a group on efficiency is arduous because of the merge of a bank does not happens randomly. In order to evaluate this kind of influence, we perform an impact evaluation considering SBs part of a group as the *"treatment"* variable. Our check relies on a set of banking sector ratios measures such as, Impaired Loans to Gross Loans [33], Loans to Customer Deposits [42] and [1], and Interest Income on Loans to Average Gross Loans [23]. Moreover, we add the Cost to Income Ratio [9], [27] and [30]) and the Tier 1 Regulatory Capital [31] and [11]. The last two ratios are significant because of their being a proxy for cost efficiency and a benchmark for the operational efficiency while a high Tier 1 shown by banks during the subprime crisis led to higher returns; hence to a substantial resilience.

To address self-selection bias (heterogeneity in treatment propensity that relates to the variables of outcomes), we refer to the PS Matching as per Rosenbaum and Rubin [34]:

$$P(X) = \Pr(D = 1|X) = E(D|X) \quad (2)$$

where $P(X)$ is the PS: the conditional probability of receiving the treatment that in our case is being part of group$(D = 1)$ given certain characteristics (X). The variables taken in to account for the PS estimates (X) are the above-mentioned ratios. Taking the PS, the results of the Average Effect of Treatment on Treated (ATT) is the estimation of the Becker-Ichino [10] as follows:

$$ATT = E_{P(X)|D=1}\{E[Y(1)|D = 1, P(X)] - E[Y(0)|D = 0, P(X)]\} \quad (3)$$

where $Y(0)$ is the performance (efficiency) of non-treated and $Y(1)$ is the performance of treated, with the same PS $P(X)$. To derive(3), given(2), we need two hypothesis: the Balancing Hypothesis and Unconfoundedness Hypothesis. The Balancing Hypothesis states that observations with the same PS $(P(X))$ must have the same distribution of observable and unobservable characteristics (X), independent of treatment status (D):

$$D \perp X \mid P(X) \quad (4)$$

The Unconfoundedness Hypothesis says that the assignment to treatment is unconfounded given the PS:

$$Y(0), Y(1) \perp X \mid P(X) \quad (5)$$

with $Y(0)$ and $Y(1)$ representing the potential outcomes in the two counterfactual situations of non-treatment and treatment. In our case, the Technical Efficiency and the Managerial Efficiency outcome are the measure of

(1). As robustness checks, to estimate ATT, we use four matching methods: Stratification as per Rosenbaum and Rubin [34], Nearest Neighbour as per Rubin [35], Radius as per Dehejia and Wahba, [17] and Kernel [25].

4 Italian SBs efficiency results and Group versus Stand-alone

The figure 1 highlights the level of the SBM relative efficiency of the SBs part of a group and the stand-alone.
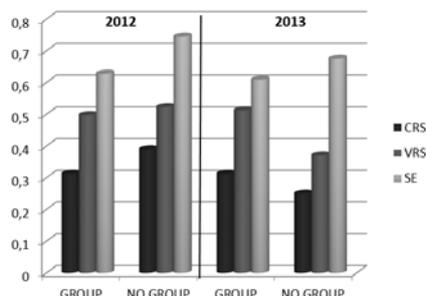

Figure 1 Efficiency of Italian SBs over the 2012 – 2013 period

The figure 2 and table 3 show the Technical Efficiency and inefficiency decomposition. With reference to Technical Efficiency, the stand-alone SBs are experiencing the worst performance while an insight into the inefficiency decomposition clarifies that difficulties are mainly due to managerial inefficiency. In terms of inefficiency the dimensions (Scale) of the stand-alone SBs allows for a better performance.
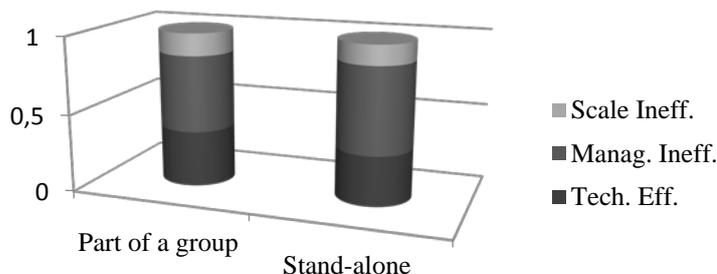

Figure 2 The Technical efficiency and Inefficiencies of Italian SBs over the combined 2012 – 2013 period

SBs efficiency decomposition	Technical Efficiency	Managerial inefficiency	Scale Inefficiency
Part of a group	0,359470231	0,495401225	0,145128544
Stand-alone	0,319707487	0,55351431	0,126778201

Table 2 The SBs efficiency decomposition over the 2012-2013 period

The figure 3 refers to the slacks issues. The SBs part of group outperform respect the others when considering Loans and Customer deposit while the stand-alone SBs outperform with respect to the pre-tax profit and total asset.
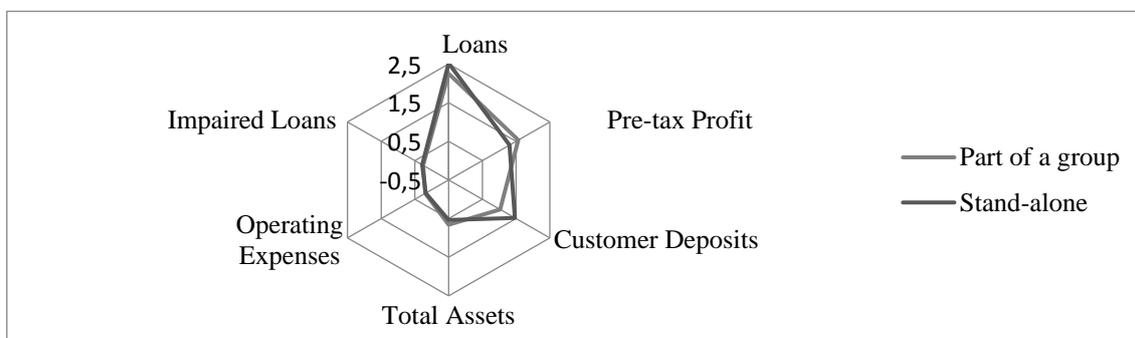

Figure 3 The Slacks (refers to the whole 2012 – 2013 period)

Yet we face the first self-selection problem: the performance difference is due to the Groups policies or to the self stand-alone performance? A merger or a takeover is never a casualty. Hence, we choose to compare the last

performances by controlling for a set of variables using the PS Matching approach. Having estimated the PS and following the Becker-Ichino [10] algorithm, we detect the ATT, where the treatment is to be part of a group. As table 3 shows, although the ATT is slightly positive but not particularly significant revealing that the economic side controls shows no significant differences between the 20 SBs part of a bank group and the 16 stand-alone.

Method	Technical Efficiency				Managerial Efficiency			
	ATT	Std. Err.	95% Conf. Interval		ATT	Std. Err.	95% Conf. Interval	
Stratification	0,167	0,132	0,196	0,377	0,271	0,144	0,068	0,616
Nearest neighbour	0,152	0,097	-0,053	0,315	0,286	0,146	-0,147	0,473
Radius	0,089	0,090	-0,076	0,271	0,114	0,089	-0,040	0,293
Kernel	0,123	0,106	-0,087	0,271	0,176	0,136	-0,204	0,342

Table 3 The ATT Results, Table 3 Stand-alone (0) vs Group (1) - Bootstrap statistics100 replications

5 Conclusions

Our study shows the level of relative efficiency of Italian SBs and when consider their belonging to a group or not we observe no significant differences. However, with reference to Technical Efficiency the stand-alone SBs are experiencing the worst performance while after an insight into inefficiency decomposition it becomes clear that difficulties are due to managerial inefficiency. In addition, via policy evaluation tools, we find no relevant dichotomies among SBs belonging to groups with those not part of it. It is important to consider that the driver that leads to the dismissal of power from local influencing policy-maker politicians' people, which leads the Foundations that formally owns the SBs, usually (in the Italian framework), is the results of a financial scandal. According to the mentioned results, statuses are in line with real circumstances such as the Italian Law Decree 2183/2015 - the first application of the bail-in rules, even before the European Bank Recovery and Resolution Directive. Indeed, given the fact that ATT reveals no great differences, currently SBs seems to belong to a bank group or not on the base of their previous financial conditions or because of financial crime scandals that are always exceptional and not ordinary events. Not only a common bad management behaviour drives merger and takeovers but, actually, unrevealed and covered financial crimes, concretely, comparable to exogenous and unpredictable shocks. This is also an indirect confirmation that the mergers and takeovers of last 10/12 by large bank groups were, mainly, hiding rescue actions (widely known in Italy), being illogical the fact that the loss of independency by local political influencers and business groups was due only to low management standards.

5.1 References

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