REGULATION CAN FOSTER MERGERS, CAN MERGERS FOSTER EFFICIENCY?

THE ITALIAN CASE.

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Abstract: *In the last decade, due to a new regulatory framework a wave of mergers has taken place in the Italian banking system, and many more are to come. In this paper, after a quick glance at the existing literature, a sample of 67 deals is analyzed by means of a DEA methodology; the relative performances of buyers, targets and merged banks are estimated, using a measure of "extra efficiency" derived from a comparison with a benchmark. Surprisingly, buyers look, on average, less efficient than their targets; such findings seem to indicate that market discipline does not work in Italy, probably because of the low number of listed banks. However, merged banks seem to have increased their efficiency in the years after the merger; this is especially true when the deal occurred between two banks operating on the same local markets and when the size of the new entity was not too big. This sounds intuitively correct, since it is easier to implement cost savings when the institutions involved are not located too far from each other, and when the overall size of the new bank remains manageable. Moreover, mergers between two equally-sized banks generate better efficiency gains.*

***Running title**: Can mergers foster efficiency? The Italian case*

***Key words**: Bank mergers, efficiency, DEA, Italian banks.*

1. Foreword

The Italian banking system is often said to be among the less efficient ones in the advanced economies[i]; one of the possible causes might lie in the low level of market concentration, since the presence of too many small banks might prevent the industry from reaching an adequate, cost-efficient scale. In order to stimulate a process of consolidation in the industry, the Italian Parliament and the Treasury have passed several laws that make bank mergers easier, and many deals have taken place in the latest years, although many more probably are to come.

The research questions addressed in this paper are: did this new regulatory framework lead to higher levels of efficiency in the market? Are mergers beneficial to the process of cost reduction in the banking system? And, if so, how (through what mechanisms) and when (for what kind of banks involved) should regulators promote mergers?

To sketch an answer to those questions, we will review the main regulatory innovations of the last decade (§2) and try to assess their effect on efficiency using a sample of about 70 mergers. After a quick glance at the existing literature (§3), we present our data and methodology (§4), then the results of our empirical test (§5), and finally their implications for bank strategists and policy-makers (§6).

2. Recent regulatory innovations in Italy

Before we turn to bank mergers, we wish to give the reader some hints on the general framework in which they took place. The Italian banking system is formed by almost 1,000 banks (937, according to the 1996 data by the Bank of Italy); most of them (some 600) are small credit cooperatives, usually covering a very small area, with just one or few branches. There are also some 80 larger credit cooperatives (known as "popular banks", some of which have been turned into joint-stock companies over the last decade) and 50 foreign banks (which usually have a very small network,

based in the main cities). The remaining 200 banks are joint-stock companies; many of these are controlled by the State through the Treasury, the local councils and the so-called "foundations", the role of which will be explained in the following.

As a result of this considerable fragmentation, the average size of Italian banks is remarkably small: only 1,080 billion Itl. of customer deposits (some 650 million Usd.) per bank. The average figure improves when we consider only joint-stock companies (2,4 billion Usd.) or "popular" banks (1,3 billion Usd). Only some 30 banks are publicly listed; although some privatizations have taken place in the latest years, the presence of the State is still massive, and it is argued that more than 50% of the banking system is still in public hands. Credit cooperatives have a special status and are usually controlled by a wide basis of small stakeholders (each one having the same decisional weight, regardless of the size of her stake), and sometimes by bank employees.

Mergers are thought to be beneficial to bank efficiency from several points of view: scale economies, diversification of risks, operational synergies and the disciplinary effect on bank managers of the possibility of a takeover (the so-called "market for corporate control" theories)[ii]. For all these reasons, and more generally to help Italian banks achieve the “critical mass” needed for global competition, a set of regulatory innovations was introduced in the early 90s.

The Italian banking law dated back to the 30s, and had segmented the industry into many categories of banks, each one with a separate area of business. So, for instance, “ordinary banks” were not allowed to issue a significant amount of long-term loans, which were left to the so-called “special credit institutions” (which in turn could not raise checkable deposits). Cooperative banks were granted special privileges, but were limited in their scope and their development outside local markets. Moreover, a large share of the industry was held by State-controlled banks, which enjoyed a special legal status and were not subject to the same regulation as ordinary banks. Most of the

State-owned banks were not joint stock companies, but operated as public foundations, under the direct control of national or local authorities.

While it was possible for a public bank to buy or incorporate a private one, the opposite was not allowed: therefore, the public influence tended to increase, rather than shrink, and the banking industry was virtually "frozen". No significant consolidation process could take place.

In 1990, with the law 218 (also known as the Amato Law, after the name of a former prime minister), the public foundations were induced to spin-off their banking activities into a separate joint stock company. Although they initially retained control over the new company, the foundations were subsequently allowed to sell their majority stake or to merge the banking firm with those controlled by other foundations or by private investors. The process of transformation and consolidation of the banking firms was also supported through some fiscal incentives: the amount of taxes to be paid (due to the revaluation of the merged assets) was reduced or deferred.

Although its contents were not strictly compulsory, the Amato Law stimulated a considerable wave of spin-offs and created some favorable conditions for a process of concentration in the industry. For example, under the provisions of the Amato Law, over 90 percent of the banks previously acting as public foundations had become joint stock companies by the end of 1993[iii].

Three years later, the Government's decree 385 (universally known as the "new banking law") removed the functional specializations created in the 30s and introduced some incentives for bank mergers[iv]. The two most important changes were:

- although mergers still have to be approved by the Bank of Italy, the central bank can object to a merger only if the "safe and careful management" of the new banking firm is somehow endangered by the merger;

- cooperative banks may now be incorporated into “normal” banks (joint stock companies), even if a minority of their shareholders does not agree.

As these regulatory innovations were enacted, a sharp increase occurred in the number of mergers in the system (see table 1).

INSERT TABLE 1

3. Mergers and efficiency: a quick glance at the existing literature

Bank mergers have stimulated much economic research, which we can roughly subdivide in two areas: studies dealing with the impact of merger announcements on the price of publicly listed banking companies and studies dealing with the link between mergers and the productive efficiency of the banks involved, measured through accounting data.

As usual, studies dealing with the U.S. have played a path-breaking role. American researchers can observe a high number of banking institutions, all reporting their financial data in a standardized form (which is not the case for banks in the European Union) and often listed on the stock exchange. The reactions of the U.S. stock market to merger announcements were studied, e.g., by Hannan and Wolken (1989); here, the weighted sum of bidder and target abnormal returns is analyzed, in order to assess whether mergers lead to an increase in the overall market value of the new bank (and not only to a redistribution of wealth from the buyer's to the target's shareholders). According to these authors, the answer seems to be negative, since no clear evidence of net worth creation is found; moreover, the market reaction is negative when big targets are involved, probably because the merger is supposed to be more difficult to handle. On the other hand, Hawawini and Swary (1990) found some significant excess returns for the target banks, strong enough to prevail over the slightly negative abnormal returns experienced by the buyers.

Several studies have focused on productive efficiency[v]. Berger and Humphrey (1992) analyze some 60 large mergers in the 1980s and find no significant efficiency increase. On the other hand, DeYoung (1997) finds that 58 percent of a sample of 348 deals (studied by means of a "thick-frontier" cost function) generate cost efficiencies. Although some of these gains are due to mergers involving insolvent targets (where support from the FDIC might have helped improving the bank's performance), also 61 percent of the solvent bank purchases generate cost efficiencies. Moreover, DeYoung's results suggest that mergers of equal sized banks capture smaller than average cost efficiencies, and that buyers that are experienced deal-makers obtain larger than average improvements.

Although the main stream of research still focuses on cost efficiency (one recent example being the paper by Peristiani, 1997), some authors have tried to cover all possible effects of mergers (also on the income side) by using a profit function. This approach, the advantages of which were clearly shown by Berger et al. (1993), has recently been applied to mergers by Akhavein et al. (1997). These authors found that "megamergers" of U.S. commercial banks (i.e., both partners with more than $1 billion in assets) generate improvements in post-merger profit efficiency, but that the gains tend to be due to output (revenue) efficiencies rather than input (cost) efficiencies. Although increased revenue efficiency can be caused by an increase in market power, it can also be caused by producing a combination of outputs that is more desired by the marketplace or by pricing those outputs more effectively.

Generally speaking, since mergers can have a significant impact not only on production costs, but also on output prices, it is clear that profit functions can prove very useful in applied research, above all when analyzing mergers that took place in the same local market.

Finally, some American papers combine both approaches: Pilloff analyzes 48 mergers occurring from 1982 to 1991, both from the market's point of view and from the productive efficiency

perspective. Both value-weighted abnormal returns and performance changes are small or non-existent. While performance improvements are more likely when the target shows a low efficiency, the market seems to appreciate mergers between institutions with high expense-related variables, since they show the greatest potential for cost reductions. These results contrast with those by Cornett and Tehranian (1992) where both the operational returns and the market value of merged banks are found to perform better than those of a benchmark sample.

As far as Europe is concerned, Cybo Ottone and Murgia (1996) have studied market reactions to a sample of 26 merger announcements (some of which were not actually carried out) across 13 countries. They found a very modest increase in value for the average merger. Vander Vennet (1996) has focused on the performance side, considering some 500 takeovers among European banks and financial institutions. Using a set of financial ratios and a measure of cost efficiency derived from a stochastic frontier, he concludes that the amount of the benefits arising from mergers and acquisitions varies with the characteristics of the deals: cross-border acquisitions and domestic mergers among equal-sized partners bring about a significant improvement in cost efficiency; on the other hand, domestic majority and integral acquisitions do not show any remarkable impact on performance.

In Italy, the small size of the equity market and the low number of listed banks make it very difficult to conduct studies on the market reaction to announced deals. That is why Italian authors have concentrated on financial statements (as we do in the present work), trying to measure the effect of mergers on costs, efficiency, profitability. For instance[vi], Comana (1995) studied 34 mergers by means of descriptive statistics; the frequency distribution of a number of financial ratios for a wide set of Italian banks was analyzed, to assess the movement of merged banks up or down across deciles in the years following the merger. No strong conclusions arise, and the variety of the

patterns found suggests that mergers in themselves do not represent a solution to the efficiency problems of the Italian banking system.

4. An empirical test: sample and methodology

As shown in table 1, we are going to analyze only a part of the mergers that took place in the last 10 years, namely those for which we could trace at least one financial statement before and one after the merger. Our data source will be the Bilbank database, created by Assbank (the association of Italian private banks) and covering almost the whole banking industry.

The characteristics of the mergers in the sample are described in figure 1. Most deals concern medium to small institutions, and the relative weight of the target is usually small. Mergers of equals are not very frequent[vii]. Note that some mergers were classified as "overlapping" or adjacent, since the banks involved used to operate in the same regional markets[viii].

INSERT FIGURE 1

We will measure the efficiency of both the acquiring bank and the target in each of the three years before the deal took place. We will assess the performance of the merged bank in the merger year and in each of the three years following the merger.

We cannot observe efficiency for each bank in all seven of these years. There are several reasons for this: first, older statements can be missing, since the coverage of our electronic database has been growing over time; second, for the most recent deals we lack post-merger statements simply because they have not been published yet; finally, since some banks have taken part in several mergers during the period covered in this study, we had to cut their time-series each time a new deal took place, thereby limiting the number of pre- or post-merger observations.

Besides the 114 institutions involved in the 67 mergers, we also measured the efficiency levels of 956 other banks, in order to build a benchmark against which the merging institutions could be evaluated. This "control data-set" includes all the balance-sheets available in the Bilbank database, except a small group of banks that incorporated their long-term credit subsidiaries: we preferred to leave them out of the sample because long-term financing (and funding) is much less labor-intensive than commercial banking, so the financial aggregates (loans, funds from customers) used as a proxy of the banks' product would not have been homogeneous.

Efficiency will be measured through two different ratios, both derived from two well-known DEA algorithms[ix]. The first one measures the overall cost-efficiency of bank *j* at time *t* by solving the following linear programming model, where the inputs (vector **x**), the input prices (**w**) and the outputs (**y**) of bank (*j*,*t*) are compared to a convex linear combination of all *n* banks operating at time *t*:

$$\begin{aligned} \min \quad & \mathrm{pE}_{jt} = \theta - \boldsymbol{\varepsilon}'\mathbf{s}^{+} \\ s.t. \quad & \left[\mathbf{y}_{1t} \quad \ldots \quad \mathbf{y}_{nt}\right]\boldsymbol{\lambda} - \mathbf{s}^{+} = \mathbf{y}_{jt} \\ & \mathbf{w}_0'\left[\mathbf{x}_{1t} \quad \ldots \quad \mathbf{x}_{nt}\right]\boldsymbol{\lambda} = \theta\mathbf{w}_{jt}'\mathbf{x}_{jt} \\ & \mathbf{e}'\boldsymbol{\lambda} = 1 \end{aligned} \qquad [1]$$

Note that $\boldsymbol{\lambda}$ is the vector containing the coefficients of the convex linear combination, $\boldsymbol{\varepsilon}$ is a vector with positive, arbitrarily small components ε, **e** is a vector of ones, and $\mathbf{s}^{+}$ is a vector of slack variables.

The second algorithm focuses on pure technical efficiency (that is, input prices are not controlled for) of bank *j* at time *t* by solving the following problem

$$\begin{aligned} \min \quad & \mathrm{tE}_{jt} = \theta - \boldsymbol{\varepsilon}'\mathbf{s}^{+} - \boldsymbol{\varepsilon}'\mathbf{s}^{-} \\ s.t. \quad & \left[\mathbf{y}_{1t} \quad \ldots \quad \mathbf{y}_{nt}\right]\boldsymbol{\lambda} - \mathbf{s}^{+} = \mathbf{y}_{jt} \\ & \left[\mathbf{x}_{1t} \quad \ldots \quad \mathbf{x}_{nt}\right]\boldsymbol{\lambda} - \mathbf{s}^{+} = \theta\mathbf{x}_{jt} \\ & \mathbf{e}'\boldsymbol{\lambda} = 1 \end{aligned} \qquad [2]$$

Both pE_{it} and tE_{it} vary positively with cost efficiency. pE_{it} is equal to the total expenses a bank would have incurred had it operated on the best practices cost frontier divided by the bank's actual total expenses. Similarly, tE_{it} is equal to the amount of inputs a bank would have consumed had it operated on the best practices cost frontier, divided by the bank's actual input consumption. In either case, a score of 100% indicates that the bank operated on the best practices frontier.

We specify our model as follows. For outputs, we use loans to customers (net of bad loans), customer deposits, and non-interest income. The inputs are labor (number of employees) and capital (fixed assets, corrected by the effect of asset revaluation laws). The costs associated with the two inputs are personnel expenses and other costs (including depreciation)[x].

As mentioned above, all banks taking part in a merger will be compared to a benchmark. Since the efficiency levels tend to vary with the year considered, the size of the bank analyzed and the geographical area where it is located, we will use a different benchmark for each possible combination of year/area/size. This will be computed as an average (weighted by customer deposits) of the efficiency scores of all banks pertaining to that combination. In symbols[xi]:

$$\hat{pE}(y,a,s) = \frac{\sum_{(j,t)\in Q(y,a,s)} w_{jt}\, pE_{jt}}{\sum_{(j,t)\in Q(y,a,s)} w_{jt}} \qquad [3]$$

where w_{jt} is a weight (customer deposits, in our case), and $Q(y,a,s) = \{(j,t) \mid t = y;\ A(j,t) = a;\ S(j,t) = s\}$ denotes the subset of banks *j*, taken at time *t=y*, such that they belong to the geographic area *a* and to the size class *s*.

Comparing each bank to the proper benchmark we obtain a measure of "extra efficiency" (XE), computed as:

$$XpE_{jt} = pE_{jt} - p\hat{E}(j, A(j,t), S(j,t)) \qquad [4]$$

Note that this index is positive if bank (j,t) performs better than its benchmark, negative otherwise. It will be the starting point for further aggregations explained in the next section.

5. Main results

Table 2 shows the general background against which the results for mergers will be compared, reporting the benchmarks for all years and regions. Among the banks with a clear local basis, those situated in the North-West are the most efficient ones, while the South and Isles (Sicily and Sardinia) get the worst scores; the gap between the two has widened over the past decade. The North-East and the Center are somewhere in-between: the latter gets worse over time, while the former shows some improvement (at least in relative terms)[xii].

"Scattered" (that is, multiregional) banks usually get the highest efficiency indices. These are, on average, the biggest banks in the sample, so their scores might be somewhat inflated by the fact that the DEA models used in our analysis tend to over-estimate the efficiency of the units belonging to extreme, less populated size-classes[xiii]. However, we evaluate mergers against a benchmark that depends on their size class, which should reduce this source of bias.

INSERT TABLE 2

Table 3 summarizes our findings on the banks taking part in a merger. Average XE indices are computed for both buyers and targets, for each of the 3 years before the mergers, for the merger year and for the following three years. Note that we are working with an open sample, therefore the number of units on which each average is based may change over time.

The main result in table 3 is somewhat counterintuitive: in principle, one might expect efficient banks to buy the inefficient ones (perhaps at a discount price) in order to increase their productivity and their value. Yet, things in Italy seem to have taken place in a different way: buyers were significantly less efficient, on average, than their benchmarks and bought banks with no dramatic performance problems.

INSERT TABLE 3

We now turn to the analysis of the merged banks as a whole. To assess the increase (or decrease) in efficiency ratios we want to compute them both after and before the merger. In each of the three years before the deal (h = -3, -2, -1), we can compute an average (weighted by customer deposits w_{jt}) of buyer and target efficiency:

$$XpE_{m,h} = \frac{\sum_{(j,t)\in J(m,h)} w_{jt} XpE_{jt}}{\sum_{(j,t)\in J(m,h)} w_{jt}} \qquad [5]$$

(where by $J(m,h)$ we indicate the set of banks, usually two, that will take part in the m-th merger at time t-h, that is, t+1, t+2 or t+3).

After the merger, average extra efficiency is simply the average of the XE indices of the new banks resulting from the merger:

$$XpE_{m,h} = \frac{\sum_{m} \left\{ \sum_{(j,t) \in J(m,h)} XpE_{j,t} \right\}}{\sum_{m} \psi[J(m,h)]} \qquad [6]$$

(here J(*m*,*h*) denotes the bank, if available, originated from the *m*-th merger that took place at time *t*-*h*; ψ[J(*m*,*h*)] equals one if the data for this bank at this time are available, zero otherwise).

The values for those indices are reported in table 4. The most significant result is that, on average, merged banks increase their cost efficiency in the years after the merger.

INSERT TABLE 4

Furthermore, we note that, on average, institutions that decided to merge were undergoing a period of decreasing efficiency. The decision to merge may have represented a reaction against a decline in performance.

Finally, we observe that, surprisingly enough, efficiency scores tend to decrease again in the third year after the merger. This could be due to the fact that we do not have a whole series of seven observations for all mergers comprised in our list. Therefore, the result for *h*=3 could be biased by the presence of a relatively small number of deals. This is why we prefer to look at the average values for the whole pre- and post-merger periods; these were computed using the average XE scores (over a variable number of years, depending on data availability) of all *M*=67 mergers.

We have re-computed these averages for some specific subsets of mergers, in order to look at the possible factors behind successful operations. In table 5 we see that deals between two overlapping banks can markedly increase efficiency (the XE indices more than double) while no significant improvement occurs when the market basis of the buyer is different from the target's (or is "scattered"). Such a result looks very interesting, since mergers among overlapping banks are often (said to be) driven by the quest for a bigger market power, while our efficiency indices analyze only

cost efficiency, that is, the capability of producing a higher volume of products with a lower amount of inputs. In fact, output prices are not even included in our model: this means that the good performance of this category of mergers cannot be due to higher monopoly power in output markets.

Table 5 also suggests that small banks can improve their cost efficiency more quickly and significantly via merger than can large banks. Finally, the effects of the mergers are better when the size of the banks involved is similar.

INSERT TABLE 5

6. Final remarks

In this paper, an analysis of Italian bank mergers was carried out, based on a sample of 67 deals and a DEA methodology; the efficiencies of buyers, targets and merged banks were estimated, relative to their peers. On average, buyers look less efficient than their targets. Such findings seem to indicate that market discipline does not work in Italy: targets are not inefficient banks, bought by some more productive institutions which aim at replacing the management, improve performance, restore profitability. This can also be a consequence of the poor development of the Italian capital markets: only a small number of banks are listed, and even in that case control is often held by a well-defined core of shareholders. This makes hostile takeovers more difficult, so there is not a market for control and inefficient banks are not threatened by outside raiders.

Merged banks seem to have increased their efficiency in the years after the merger; this is especially true when the deal occurred between two banks operating on the same local markets and when the size of the new entity is not too big. This sounds intuitively correct, since it is easier to implement cost savings when the institutions involved are not located too far from each other, and when the overall size of the new bank remains manageable (mergers between big banks might also have been

dictated by political reasons, which prevented the achievement of a real efficiency improvement in the subsequent years).

Moreover, efficiency improves more when two equally-sized banks merge. This result fits well with the findings by Vander Vennet (1996) and Comana (1995), respectively on the European and the Italian market. However, it contrasts with the conclusions of DeYoung (1997) based on U.S. data.

From our empirical exercise, some policy implications arise that might be of some interest to bank managers and policy-makers:

1. Although the majority of the mergers we studied here did generate improvements in post-merger efficiencies, some specific types of mergers performed poorly.

2. Namely, mergers of large banks did not, on average, produce cost efficiencies; this result suggests that, for Italian banks, the achievement a "critical mass" large enough to compete with large European banks might turn out to be a very hard task (although a necessary one).

3. The mergers in our subset of "scattered" mergers also performed poorly. This result suggests that combining the banks of Southern Italy with those from other regions may not be enough to rid the former of their well-known inefficiencies. Yet, we feel that a closer integration between different areas could make the banking sector more stable and reduce systemic risk.

4. One of the reasons that large and/or interregional Italian bank mergers have not generated cost savings is the labor law that makes it difficult to lay off excess employees. Therefore, regulators should find ways of helping newly merged banks to cut jobs in a socially acceptable way.

5. Another reason that large corporate bank mergers have not performed well is the lack of a market for corporate control for many of these banks. This requires an increase in the number of listed banks and a larger presence of institutional investors, whose role in Italy is still too marginal.

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Tables

Table 1:
Bank mergers in Italy

	*Total # of mergers**	*Mergers in our database*
1987	13	4
1988	18	3
1989	29	7
1990	25	8
1991	50	14
1992	45	12
1993	44	2
1994	50	8
1995	51	9
Total	325	67

* source: AssBank database
based on the Supervisory Bulletin, Bank of Italy, various issues

Table 2:
Value of benchmarks for different regions/years
(size classes are not shown)

Year	*Score*	*Scattered*	*North-West*	*North-East*	*Center*	*South & Isles*
1986	*pE*	84.9%	90.5%	78.2%	90.5%	82.2%
	tE	92.7%	93.0%	83.1%	92.5%	85.9%
1987	*pE*	96.6%	88.7%	79.5%	89.3%	81.6%
	tE	99.1%	91.9%	84.7%	93.1%	85.4%
1988	*pE*	95.4%	86.1%	79.8%	82.1%	74.5%
	tE	98.3%	91.7%	86.3%	89.0%	82.3%
1989	*pE*	93.7%	86.4%	79.4%	82.9%	73.9%
	tE	97.6%	91.9%	87.1%	89.5%	83.4%
1990	*pE*	90.6%	84.6%	78.8%	88.7%	72.1%
	tE	96.5%	91.3%	86.9%	93.3%	84.3%
1991	*pE*	92.8%	87.7%	81.3%	88.7%	76.0%
	tE	96.4%	93.5%	89.5%	93.2%	87.2%
1992	*pE*	97.7%	85.7%	82.7%	89.9%	76.0%
	tE	99.7%	93.2%	91.3%	93.9%	84.0%
1993	*pE*	96.5%	84.9%	84.4%	81.0%	74.2%
	tE	98.5%	92.8%	92.3%	90.7%	86.8%
1994	*pE*	95.9%	81.3%	79.7%	71.7%	69.1%
	tE	98.4%	92.1%	91.9%	89.1%	88.0%
1995	*pE*	98.1%	85.3%	78.8%	74.8%	66.4%
	tE	99.9%	93.1%	89.1%	88.0%	84.5%
1986-95	*pE*	94.22%	86.12%	80.26%	83.96%	74.60%
averages	*tE*	97.71%	92.45%	88.22%	91.23%	85.18%

Table 3:
Extra Efficiency (XE) indices for buyers and targets

		# of years before merger			
		-3	*-2*	*-1*	*average*
XpE	*a) Buyer*	-3.8%	-2.6%	-4.2%	-3.4%
	b) Target	2.7%	-0.6%	0.2%	0.8%
	a) - b)	-6.5%	-2.0%	-4.4%	-4.2%
					(0.1%)
XtE	*a) Buyer*	-1.4%	-1.3%	-1.8%	-1.5%
	b) Target	0.5%	-1.3%	-1.3%	-0.8%
	a) - b)	-1.9%	0.1%	-0.5%	-0.7%
					(1.5%)

Value in brackets are p-values of a two-tailed paired t-test that XE indices for buyers and targets are identical

Table 4:
Extra Efficiency (XE) indices for merged banks

	h (number of years before the merger)			*average*	*h (number of years after the merger)*				*average*
	-3	-2	-1	*before*	0	+1	+2	+3	*after*
XpE	1.07%	0.70%	0.54%	0.97%	2.41%	2.82%	2.16%	1.48%	2.39%
XtE	1.29%	1.07%	0.64%	0.98%	3.08%	2.65%	3.07%	1.22%	2.99%

Table 5:
Extra Efficiency (XE) indices for merged banks of different subsets

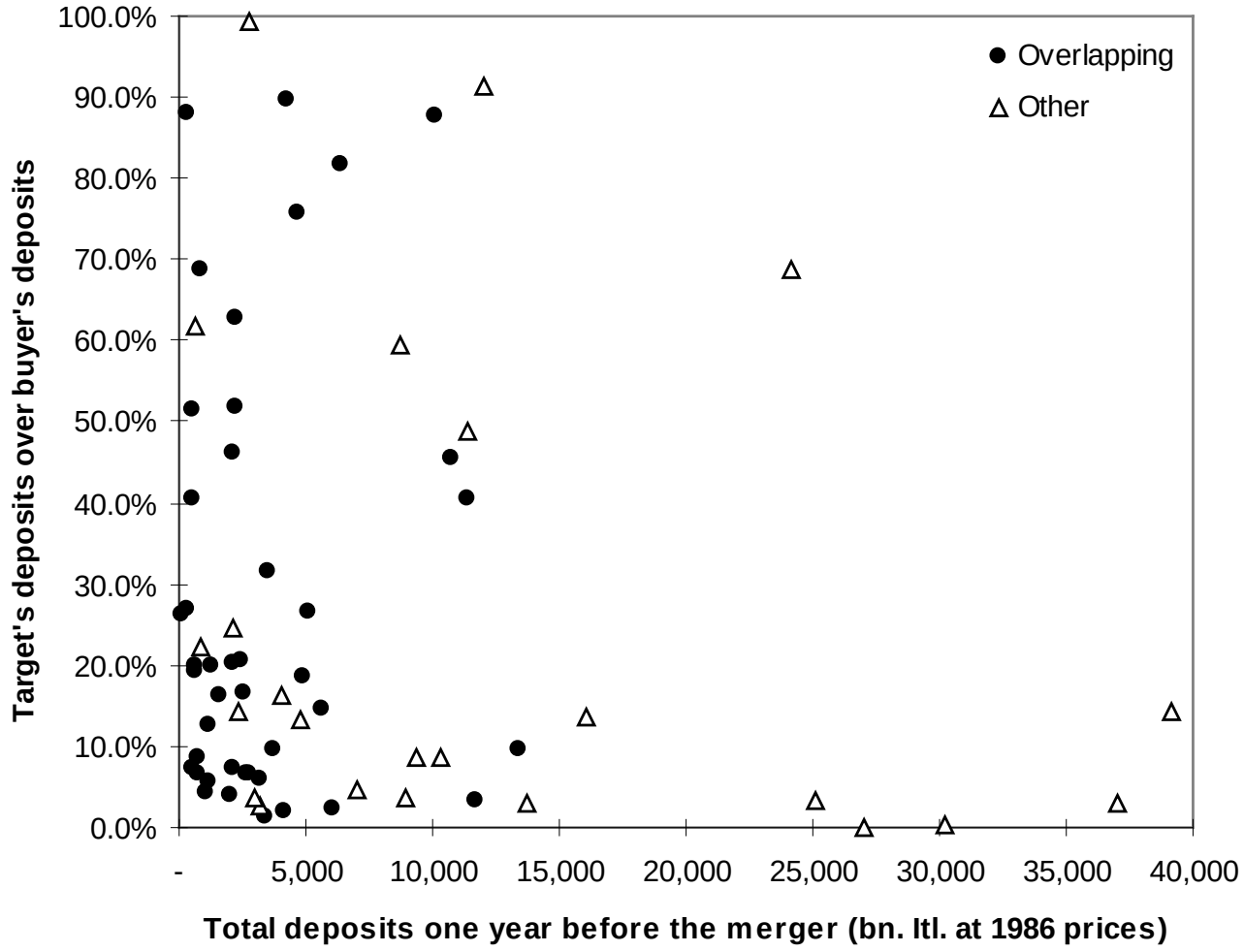
Regional basis	Different or scattered		Overlapping/adjacent	
	before	after	before	after
XpE	-0.82%	-1.44%	2.00%	4.57%
XtE	-0.30%	0.29%	1.71%	4.53%
Size of the combined entity	Small		Large	
	before	after	before	after
XpE	3.79%	8.77%	-2.98%	-3.99%
XtE	3.01%	7.72%	-1.73%	-1.09%
Relative weight of target	Small		Large	
	before	after	before	after
XpE	-0.15%	-0.41%	3.21%	5.34%
XtE	0.37%	1.22%	2.03%	4.68%

Regional basis: "different" if the buyer and the target operate in different regions (see footnote viii) or if at least one is a "scattered" bank; "overlapping/adjacent" if both operate on the same regional market. Size of the combined entity: "large" if bigger than the 60th percentile of the distribution of mergers ranked by total deposits at 1986 prices, "small" if smaller than the 40th percentile (the middle 20% is discarded). Relative weight of the target: same as before, except that the frequency distribution is based on the ratio "target's deposits over buyer's deposits", computed one year before the merger.

Figure caption(s)

Figure 1: characteristics of merger operations

Figure(s)


100.0%
90.0%
80.0%
70.0%
60.0%
50.0%
40.0%
30.0%
20.0%
10.0%
0.0%
Target's deposits over buyer's deposits
Overlapping
Other
-
5,000
10,000
15,000
20,000
25,000
30,000
35,000
40,000
Total deposits one year before the merger (bn. Itl. at 1986 prices)

Footnotes

[i] See, e.g., Conti and Resti (1994), Conti et al. (1997), or Resti (1997b), where such a view is supported through extensive statistical data.

[ii] Anyway, mergers might also respond to some other motives, which are not necessarily optimal from a social point of view: the quest for a bigger market power, the expense-preference behavior of bank managers who consider size as an intangible perk, the search of a bigger size as a way to acquire a "too-big-to-fail status". See Vander Vennet (1997) for a detailed analysis of the motivations behind mergers.

[iii] Note that the Amato law allowed institutions not only to merge, but also to convert into a stock company. Many banks therefore underwent both a merger and a change of legal status; as pointed out by a Referee, these "merger/conversions" are more difficult to evaluate, because, in addition to combining operations, the institutions involved have changed their organizational structure. Some of the efficiency improvements found in our empirical results might therefore be abscribed to the reduction of agency costs due to this new structure.

[iv] See Lamandini (1996) for a thorough review of the new regulatory framework.

[v] See also Rhoades (1994), Berger and Humphrey (1994) and Pilloff (1994) for comprehensive surveys of U.S. studies.

[vi] Other works are by Lalli (1996), where bank mergers are studied from a theoretical point of view and no empirical test is made, Altunbas et al. (1994) where the cost implications of a set of simulated mergers among Italian banks are studied, Malavasi (1997).

[vii] On average, 22% of the combined deposits of the two merging organizations belong to the target. As a benchmark, a similar ratio (based on total assets) averaged 26% for the 48 U.S. mergers examined by Pilloff (1994); however, Pilloff's sample represented only a small part of the mergers that took place in the U.S. market.

[viii] For our analysis, Italy has been divided into 4 regions: North-West, North-East, Center, South & Isles. A bank is said to belong to one region if both its headquarters and at least 75% of its branches are located there. Otherwise, the bank is said to be “scattered” on the whole nation. Banks taking part into a merger are called “overlapping or adjacent” if all of them belong to the same region.

[ix] Since these are rather standard algorithms, their description will be kept to a minimum, to save room for the results. The interested reader is referred, e.g., to Charnes et a. (1978), Banker et a. (1984), Färe et a., (1985), Aly et a. (1990)

[x] This description of a bank's products and inputs is similar to that used by Resti (1997a), where such a choice is extensively explained and justified. Again, to save room, the interested reader is referred to that paper for details.

[xi] All formulae in the following will be shown for the productive efficiency indices (pE): those for the technical efficiency indices (tE) are exactly the same.

[xii] The efficiency and profitability gap between Northern and Southern banks in Italy is a well known problem to Italian banking experts. So our results are consistent, e.g., with those of Bank of Italy (1997) where it is shown that the banks' return on equity in 1996 averages 5.5% in the North (reaching 6.7% in the North-East) while it turns to be heavily negative (-14.5%) in the Southern regions. The existence of such a gap was also confirmed, by means of DEA and translog estimates, by Resti (1997a).

[xiii] See Resti (1997a) for an analysis of the relative weaknesses and strengths of different DEA models.