

Measuring value creation in bank mergers and acquisitions^{*}

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Abstract

This paper analyses the market reaction to M&A in the banking sector, particularly interesting because of the higher complexity of corporate governance and the importance that the M&A activity has had in recent years in Europe, especially in Italy. In this research we perform an event study on the Italian market (in the period 1994-2003) with two main goals: first we observe if and when there is a positive value creation, and when private benefits of control represent one of the drivers of the operations; second we investigate the determinants of our results, looking at the characteristics of the banks, regulation, the role of minority shareholders and that of the Bank of Italy.

In our research the methodology used and the hypotheses about the event date play a fundamental role, and we show that earlier studies focused too much on the choice of the methodology and too little on the identification of the event date, which proves instead to have higher impact on results.

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1. Introduction

This paper studies the reaction of the market to mergers and acquisition among publicly listed commercial banks, with the main goal of analysing the value creation that the market expects as a result of these operations; a second and subsequent important object of this study is to analyse the determinants of the results that we observe.

In the last ten years we witnessed in Italy a substantial increase in the Mergers and Acquisitions (M&A) activity in the banking sector. A relevant part of that involved, either as a target or as a buyer, a listed company and, in relatively few cases, we observe both companies listed in the official stock market. The last case is particularly interesting and significant, because the banks were subjects to the market judgement on the value creation resulting from such operations, and on the possible value transfer between stockholders.

In these operations, we also observe that the price paid is usually significantly higher than the price previously observed on the market; this is true for the banking sector as it is in general, and that is because the price must be such that the stockholders of the target prefer to sell their stakes to the bidder than directly on the market (see Grossman, Hart, 1980). The reasons for the buyer's willingness to pay such a higher price are typically attributed, in the literature, to the higher post-acquisition efficiency and synergistic gains, to the control premium and private benefits.

After one decade of such deals in the Italian banking sector, it is interesting to discover if these mergers were able to create benefit and value for the stakeholders, be they the buyer's, the target's, or not. Existing literature is mainly focused on the American context, and, even if in a limited number of cases, on the European one, but there are only a few contributes studying the Italian market. In this paper, then, we perform an event study applied to the M&A operations in the last decade involving Italian listed commercial banks.

Previous literature on the subject presentes contradictory results (see the next sections for a brief survey); we also have eterogeneity of results in our sample, then we

decided to improve our understanding of the operations under study by concentrating on their characteristics going deep in the information we collected on each of them. We have then a limited sample (21 operations in the period 1994-2003), exogenously bounded by the listing requirement we pose, but a broad set of information on it.

We attempted to apply different methodologies found in previous literature, that is combinations of models and hypotheses of the event study, but we find that these does not basically change the results; we conclude that previous studies concentrate too much on methodological issues, and maybe too little instead on a central variable of an event study, that is the event date. We have been able to identify three different event dates, that is the announcement date of the event, like most of the previous literature, the date when the final outcome becomes public knowledge, and most important the date of the first rumors; our results show that this date is better than the others in capturing market reaction to the information, but can not replace them, it is only complementary, in that captures another part of the market reaction.

Beyond the methodological issues, the principal results of the present research are in part confirming previous literature, and in part peculiar to our analysis. Among the first ones we have that: acquired banks present a positive performance, contrary to the acquiring ones; non voting shares are worse off compared with the voting ones, both bidders' and targets' ones; the presence of the Bank of Italy in the negotiations seems to indicate a problematic operation, consequently penalized by the market; finally, acquisitions showed to be value creating whereas mergers are not. Other results peculiar to our research regard: the analysis of pre/post change in take-over regulation in 1998, in the middle of our period of analysis; the effect of the size of the two merging institutions; the public offering versus the private deal; and the analysis of operations that did not eventually took place.

The rest of the paper is organized as follows: in the next section we will briefly review the main theoretical assumptions that can explain the opportunity to undertake such deals, specially in the banking industry, while in section 3 we will discuss the outcomes of previous empirical research; in section 4 we will describe the sample and the methodology, while section 5 will be entirely dedicated to the empirical investigation; section 6 is left for conclusions.

2. Theoretical determinants of M&A

In many cases, one firm chooses to grow by a merger or an acquisition because of the awareness that this way is the faster way to reach satisfactory size level to operate in some sectors; this is especially true in the banking sector, in which the growth through an internal path is particularly hard¹. On the other hand, this external path also has its drawbacks: the most considerable threats come from the organizational integration as well as the merging of different procedures and corporate cultures. In other words, a deal is able to create value for the bidder and/or the target's shareholders if they can profit from the synergies resulting from the deal itself.

In the existing literature (e.g. Jensen and Ruback, 1984, Berkovitch and Narayanan, 1993), the commonly recognised factors justifying M&A deals can be divided in two main groups: factors that are supposed to increase shareholder's wealth and those that are beneficial to the management only (private benefits). Within the first category we have the economies of scale and scope (see Boot, 2003 for a specific treatment of the banking sector case), the increase in market power (i.e. monopolistic advantage), and other motivations of speculative nature².

The private benefits of control instead, particularly important in Italy³ (see Zingales 1994), are the dark side of the moon in the M&A deals, because can be responsible for a firm overbidding on a target, without having value creation objective. With private benefits a firm could be paid more than due just because the new controlling shareholders believe they can extract higher private benefits than previous ones (see Grossman and Hart, 1980, for further discussion).

A wide theoretical literature was interested in explaining why banks engage in merger activities, e.g. see Hawawini-Swary (1990) and Vander Vennet (1996); thus, the

¹ In the literature, it is often pointed out that banks cannot quickly gain a considerable market share, mainly because the banking sector is almost mature (and so it can not satisfy a latent need without take over a market share of another bank) and because of the so-called relationship banking (entry barriers). See Ferretti et al. (2004) for further discussion on this point.

² Like the achievement of tax benefits and the replacement of inefficient managers.

³ In Italian firms the private benefits could be particularly important because of the conflict between majority and minority shareholders (due to the pyramidal structures of groups and to the presence of non-voting shares).

specificities of the banking industry have suggested some motives standing behind the decision to acquire another bank. For example, the recognition of the status of a bank “too big to fail” by the Central Bank could be an important achievement; in other words, banks have an incentive to grow with the awareness that they will be supported by the Central Bank in case of problems. Furthermore, globalization of the economy and integration of international financial markets impose banks (Italian ones in particular) to operate in the market with a critical size that could allow them to compete internationally (that could explain the merger between two big banks, see for example in Italy the mergers which originated the two big groups San Paolo-IMI and Banca Intesa). Finally, with regard to the specific case of Italian banks, an important role has been played so far by the Bank of Italy, the Central Bank, which often interferes with the decision and the opportunity of a deal.

During the last few years and in different contexts, the above motivations, such as the creation of value as a result of these deals, have been subjected to a great number of empirical investigations. The most relevant will be presented in the next section.

3. Empirical evidences on M&A deals in the banking sector

The creation of value as a result of an M&A deal is still an ongoing debate; however, this controversial issue has mainly been studied in the empirical literature using two distinct approaches: the first is that based on financial performances (from now on FP approach) of firms using accounting data, while the second uses the event-study methodology (in which also this study belongs).

The first approach tries to observe the creation of value looking at the efficiency of the firms involved in a deal; the general methodology used by these studies is to analyze changes in indicators of profitability (like Return on Equity) or cost ratios (like Cost/Income), or both, before and after a deal. The second approach is more standardized than the first one, and it is based on the analysis of the acquiring and/or target firms’ stock returns by computing their abnormal performances after an event

date that should represent the moment in which the market reacts to the information related to the operations of concentration.

Our choice to follow this second approach is mainly based on two considerations: first, the FP methodology presents the problem that company accounts used as data sources are less objective and not always available⁴; second, because we want to investigate the value creation and the short term effects, for which the natural choice is the event study methodology.

The FP studies, however, are also interesting: to briefly overview them we remember Amel, Barnes, Panetta and Salleo (2004); reviewing these studies, the authors eventually find little variability among the north-American (in which they notice a little gain of efficiency) and the European results (in which they find higher gains, a result mainly driven by some mergers occurred between banks within the domestic market and with similar sizes) as far as efficiency gains are concerned⁵. Cavallo and Rossi (2001), analysing the most recent European banking mergers, find, although in an opposite direction to the foregoing studies, a significant existence of economies of scale and scope apart from the firm size⁶.

On the other hand, the great majority of the event studies, in particular those focused on the American banking sector, eventually conclude that, on average, these deals were able to generate value, although there exist a transfer of wealth towards target's shareholders but often no significant gains for the bidder, see for example Amel et al (2004) and Rhoades (1994) reviews⁷.

Regarding the previous FP studies in the Italian M&A banking sector, they do not always reach univocal outcomes: Comana (1995), regarding strictly banks mergers, show positive effects on stability and profitability, but in other cases he cannot find any microeconomic advantages; Resti (1997) finds some improvements in efficiency in the

⁴ This is specially true in the short-run, which is also the period our analysis is often focused on.

⁵ In the literature on the effects of general M&A deals, it is often pointed out that the few cases of efficiency gains are obtained when the acquirer firms are small; see Gugler et al. (2003) for an analysis based on accounting data, and Moeller et al. (2004) for an event-study. Both of them find the same "size effect".

⁶ They used the specification of cost functions in order to catch the banks' efficiency improvement.

⁷ These studies get for the banking sector the same outcomes of other existing works referring to the overall market, see for example Bradley, Desai and Kim, 1988, Asquith, 1983 and Jensen and Ruback 1983.

years following the deal, also showing that a bidder buys a more efficient bank than itself instead of a bank that needs to be restructured. On the contrary, Focarelli, Panetta and Salleo (2002), focusing on the period 1984-1996, eventually suggest that the targets are often characterised by high cost levels, deducing that the main motivation underlying the Italian M&A has to be found in the improvement of value of the target bank. Pesic (2003), through an analysis of 6 main Italian banking deals⁸, concludes that improvement in efficiency can be observed with accounting data only in the long-run.

Regarding the event studies, on the contrary, Cybo-Ottone and Murgia (2000), in a setting similar to the present analysis, analyze 54 deals between European banks during 1988-1997; their outcome is in an opposite direction to previous studies (often on US deals): they show an overall significant increase of the market value of the banks involved in these deals. Ferretti (2000), analyzing 75 announcements of acquisitions between both Italian and European banks during 1994-2000, finds a negative market reaction for bidders, but this result is economically significant only in the second half of the period considered and particularly for the Italian banks. Recently, Savona (2002) pointed out some speculative market reactions in the proximity of the announcement date, even if this reaction disappears in a wider event window.

Finally, it is necessary to mention an analysis by Resti and Siciliano (1999), who used both the FP and event study methodology find on average, both a significant increase of value of the target banks, and an improvement in efficiency in the short run using target's accounting data⁹.

Despite the diversity and the variety of the outcomes, all the mentioned event studies have one thing in common: they choose as event date the announcement date of the deals, and we will show this can be a misleading choice.

⁸ A similar approach is followed by Rhoades (1998), who considered 9 case studies in the banking sector during the early '90; his outcomes showed efficiency gains as a result of M&A deals.

⁹ Authors get an outcome reached also by Resti (1997): bidding banks do not buy inefficient or relatively less efficient banks.

4. Sample and Methodology

4.1 The Sample

The last ten years, as we said before, have been characterised by intensification in the M&A activity in the Italian banking industry; we can easily see this in Table 1¹⁰.

Table 1
M&A operations between Italian banks in the period 1994-2003; the temporal classification has been based on the announcement date.

Year	Number of Banks	Mergers	Acquisition of the majority of voting shares	Total	Listed Banks	
					At least one bank listed	Both banks listed
1994	994	42	10	52	3	1
1995	970	47	19	66	14	3
1996	937	37	19	56	3	0
1997	935	24	18	42	5	1
1998	921	27	23	50	6	2
1999	876	36	28	64	4	1
2000	841	33	24	57	8	4
2001	830	31	9	40	7	1
2002	814	18	12	30	10	1
2003	788	19	7	26	11	0
Total	-	314	169	483	71	14
Annual Average	891	31.4	16.9	48.3	7.1	1.4

Source: our elaborations on Bank of Italy data, “*Relazione annuale sul 2003, Bollettino di Vigilanza*”, various years, and Nomisma data, “*Acquisizioni fusioni concorrenza (e supplementi)*”, various years.

Table 1, in fact, shows that the numbers of banks decreased in the last decade; this was, at least in part, a result of the M&A activity (on average 30 in a year, and almost 50 if we consider the acquisition of the majority of voting stocks that resulted in the

¹⁰ See also Panetta (2004), where is shown that the banking sector has been the most active one, in the last decade, with respect to the M&A activity; moreover, Panetta shows that, compared to the other

cancellation of the acquired bank)¹¹. A subsample of these operations involved at least one of the participants listed on the stock market (7.1 per year on average out of the 50) and in a smaller subsample we have operations which see both the banks listed on the market (only 1.4 per year on average); the number of operations between listed banks is then quite small¹², but very informative because it is possible to rely on market data, rather than on accounting ones.

Our analysis focused, then, on mergers and acquisitions between banks listed on the Italian Stock Exchange in the period 1994-2003; overall, we examined 21 operations (43 banks involved¹³) where both banks were traded on the market; the constituted dataset also includes those operations that had a negative eventual outcome, that is that never ended up with a concentration (7 out of 21).

The period under study is particularly interesting because of two considerations: on one hand, starting from 1994-1995 all main stocks on the ISE are traded in continuous time with a sufficiently liquid market and then with quite significant prices; on the other hand, in the last ten years, the M&A operations grew considerably (as shown by the data on Table 1).

The details of the banks in the sample are reported on Table 2.a, and also reported are the three different event dates, the are being better defined in the following, and now we anticipate they are corresponding, respectively, to the rumors, $t(0)$, the announcement, $t(1)$, and the certainty of the final outcome, $t(2)$.

European countries, Italy distinguished itself for the relative importance of banking M&A compared to other sectors.

¹¹ The operations did not see only big banks buying small ones (see, for more details, Comana 2001a, 2001b and 2004); as a matter of fact, the results of these operations was mainly that of consolidating the competitive position of medium-sized banks. This result is also stressed by Gandolfi (2002), who concludes that the competitiveness of the banking sector has been preserved, also with the intervention of the Italian Central Bank (Bank of Italy).

¹² Also because the Italian market is still characterised by a limited development and the number of medium sized listed banks is scarce.

¹³ The relatively small number of cases in the dataset is due to the listing condition (as we said) imposed on both the buyer and the target bank of each operation; the sample dimension, in fact, is in line with other researches that used the same condition (i.e. Cybo-Ottone, Murgia, 2000).

Table 2.a
M&A operations and related event dates.

N°	<i>Buyers</i>	<i>Targets</i>	<i>t(0)</i>	<i>t(1)</i>	<i>t(2)</i>
01	Banca di Roma	Bonifiche Siele	07/09/1994	16/02/1995	07/06/1995
02	Banca Popolare di Lodi	Banca Mercantile	26/10/1994	10/01/1995	17/02/1995
03	Credito Italiano	Credito Romagnolo- Rolo	27/10/1994	19/12/1994	24/01/1995
04	Banca Popolare Commercio Industria	Banca Popolare Luino e Varese	27/11/1995	21/12/1995	21/02/1996
05	Istituto bancario S.Paolo TO	Imi	17/11/1997	12/02/1998	31/07/1998
06	Credem	Banca della provincia di Napoli	12/12/1997	12/12/1997	30/01/1998
07	Banca S.Paolo Brescia	CAB	08/07/1998	23/09/1998	16/11/1998
08	Banca Intesa	Comit	01/06/1999	01/07/1999	15/10/1999
09	S.Paolo-IMI	Banco di Napoli	16/11/1999	08/06/2000	28/11/2000
10	Banca Popolare di Lodi	BP Crema	29/02/2000	18/04/2000	20/10/2000
11	Banca Popolare di Milano	Banca di Legnano	19/12/2000	19/12/2000	20/08/2001
12	Banca Popolare di Verona	Banca Popolare di Novara	24/09/2001	14/11/2001	10/03/2002
13	Popolare Bergamo	BPCI and B.P. Luino e Varese	23/10/2002	13/12/2002	24/03/2003
14	Banca di Roma	Banca Nazionale dell' Agricoltura	07/09/1994	16/02/1995	17/02/1995
15	Banca S.Paolo Brescia	Banca popolare Brescia- Bipop	15/12/1997	12/03/1998	27/05/1998
16	Comit	Banca di Roma	17/04/1998	05/06/1998	18/12/1998
17	Credem	Banca Popolare di Novara	09/07/1998	21/07/1998	27/10/1998
18	Unicredit	Comit	19/03/1999	26/03/1999	18/05/1999
19	Banca S.Paolo-Imi	Banca di Roma	19/03/1999	26/03/1999	27/04/1999
20	Banca Popolare Commercio Industria	Banca Popolare di Novara	24/02/2000	10/05/2000	06/07/2000
21	Banca Popolare Emilia- Romagna	Banco di Sardegna	20/01/2000	18/04/2000	24/05/2000

4.2 *The Methodology*

The analysis we are going to conduct on the constituted dataset will be a classic event study with the relative standard methodology. However, within this kind of analysis, there are many choices to be made by the researcher, which are somewhat subjective or related to the type of data we are dealing with. Our choice is then to preliminary compare the results from different possible methodologies, in order to capture the sensibility of the analysis's output to the type of analysis conducted.

A first important choice is that of how to calculate the *abnormal returns* (AR): as we know, the event studies usually consider the abnormal performance of some asset with respect to a presumed normal one; clearly, while the performance is an objective thing to measure, the normality for an asset behaviour is strongly dependent on the hypothesis we made. In the literature, the most frequent methods to correct the effective

returns (measuring the performance) are with: 1) the market return; 2) the sector index return; 3) the market model expected return with beta calculated with respect to the market index; 4) the market model expected return with beta calculated with respect to the sector index.

In formula we can write:

$$AR_{j,t} = R_{j,t} - R_{M,t}; \quad [1] \qquad AR_{j,t} = R_{j,t} - R_{S,t} \quad [2]$$

$$AR_{j,t} = R_{j,t} - (\alpha_j + \beta_j R_{M,t}); \quad [3] \qquad AR_{j,t} = R_{j,t} - (\alpha_j + \beta_j R_{S,t}); \quad [4]$$

In the last two cases, the output depends on the way the market model's parameters are estimated, particularly the beta: however, about this choice there is higher convergence in the literature, and the prevailing one is using daily data, in a period from 6 to 12 months before the first event window under study¹⁴. Consequently the choice adopted in the present research will be that of using a window of 6 months, [-150, -30]¹⁵ days with respect to the first event date, $t(0)$, better defined in the following.

It does not exist a method always preferred to the others, and the choice depends on the specific data we are dealing with. The [1] option is better for short event window, where there is not a clear trend to be captured by a market model, while the option [3] is then preferred for larger event windows¹⁶. The choice of the option [2] and [4], which is that of using the sector index instead of the market one, can lead to a more appropriate measure of the AR; on the other hand we may have the problem of the effect the stocks' abnormal performance involved in an operation can have on the sector index itself¹⁷.

¹⁴For instance, Cybo-Ottone and Murgia (2000) in the window [-270,-21], Allen and Cebenoyan (1990) in [-136,-16], Baradwaj, Fraser and Furtado (1990) in [-210,-61].

¹⁵We have chosen to use a six month window because our estimates come from windows of data ending in $t(0)$ and not in $t(1)$, as was instead for the earlier studies in the literature, because we did not want to include data already influenced by the rumors.

¹⁶However, notice that if the parameters' estimates of the market model come from daily data (as in most cases, also in order to have a sufficiently long time series and then significant estimates), beta tends to be underestimated and then the (absolute value of) AR overestimated (see for instance Hsun, Chen, 2003).

¹⁷This is an issue particularly important on the Italian stock market, where there are not so many listed stocks, so that a single stock can influence not only the sector index, but also the market as a whole. Moreover, in Italy the bank sector, after many years of quietness, has awakened in the nineties with several M&A operations, so that when an operation was coming out, the all sector was getting excited for the expectations of other operations. We will come back on this while discussing the results.

In the end, as shown by Brown and Warner (1980), the sensibility of results to the estimation method of AR is lower than expected¹⁸. In light of these considerations, we want to stress the fact that is maybe more important the choice of the event date or the event windows, rather than the estimation alternatives proposed in the literature, like that in Dodd and Warner (1983)¹⁹.

The last choice in an event study is that of the event windows to consider: first, then, it is necessary to determine the event date; second, we can proceed to define the event windows. At this regard, previous literature converges on the choice of short event windows (there are a few studies that try to analyse the long run effects, but usually they lose significance); the choice of the event date, instead, can be different and significantly affect the results we are going to measure, as we will see below.

Most of the event study researches on M&A choose the operation's official announcement as the event date²⁰, while a minority chooses the date of final regulation and consequent transfer of the majority stake, and so somewhat the final outcome of the operation itself²¹. While we can presume that the results can be different with either choices, is probably more important to stress the fact that the market (as outlined but not solved in the previous empirical literature) begins to react to the M&A operations before the announcement, and namely to the rumors relating to the operations themselves.

In the present research, contrary to the previous literature on banks' M&A and on the market in general, we try to clarify what we would find if measuring the abnormal performances with respect also to the rumors' dates. For every single operation in our dataset, in fact, we searched the most important Italian financial newspaper, *Il Sole 24 Ore*, for leakages (rumors) relevant for our cases.

We have been able to determine three event dates for the operations in our sample:

¹⁸ In previous literature, in fact, great attention has been posed on the methodology to compute the AR.

¹⁹ Dodd and Warner (1983) propose a methodology to use AR data both in cross section and in time series, in order to increase the sample dimension and so the significance of the statistical tests.

²⁰ See, among others, Cybo-Ottone and Murgia (2000), Baradwaj, Fraser and Furtado (1990), Allen and Cebenoyan (1990), Hawawini and Swary (1990), Ferretti (2000).

²¹ See Resti and Siciliano (1999), Cornett and De (1991), Hawawini and Swary (1990).

$t(0)$ = the day of the first rumors: represents the day before that of the first news on the newspaper that let understand the operation can take place;

$t(1)$ = the announcement day: that is the day before the news of the official decision by the buyer (or by both banks, if it is a friendly takeover);

$t(2)$ = the day the final outcome is official: that is the day in which the controlling stake changes hands or it is certain that the operation will never occur.

In our opinion, the choice of using all three event dates responds to the need of understanding what is the abnormal performance we are measuring: the results relative to $t(1)$, for example, could be only a fraction of the total market reaction, that started after $t(0)$; or the abnormal returns after $t(2)$, could be only the bouncing back after the abnormal returns with respect to the two preceding event dates.

Using different event dates will then let us understand if the previous researches have captured all the market reaction, or just a part of that and which one.

In Table 2.b we can see how drastically the analysed period can change by choosing different event dates. In many cases, the largest window mostly utilized in this type of study ($[t-30 ; t+30]$) would not include, choosing $t(1)$ as event date, neither the end of the same window but referring to $t(0)$ ²². The point we would like to stress is that the choice of different event dates can lead to observe different results, at least partially because they are related to windows substantially different. In Table 2.b we can also see the lags between $t(2)$, a quite rare choice as we have seen, and $t(1)$: it results that in 11 cases out of 21 the window $[t(2)-30 ; t(2)+30]$ does not include at all $t(1)$, and in the other cases the overlapping is only partial. Again, the results we are measuring, as we are going to see below, are necessarily influenced by the choice of the event date.

Table 2.b also shows the various categorisations we have been able to make about the banks and the operations of our sample; the so constituted subsamples will let us better understand the determinants of the results we are going to obtain in our empirical investigation. The characteristics we have chosen are: the size (“big” size banks, for us, will be those with a market capitalisation at $t(0)-30$ equal or bigger than 1.200 million of Euros), the type of operation (merger or acquisition), the transfer of the controlling

stake inside or outside the Stock Exchange, the final outcome of the operations (positive or negative) and the period of the operation (pre/post Tuif 1998, a legislative innovation which introduced new provisions protecting minority shareholders, particularly referring to takeovers²³). Eventually, we have been also able to identify the subsample of operations that most likely started because of the *moral suasion* of the Italian Central Bank²⁴.

Table 2.b
M&A operations and related characteristics.

<u>n°</u>	<u>Buyer's Size</u>	<u>Target Size</u>	<u>Merger/ Acquisition</u>	<u>In/Out Stock Exchange</u>	<u>Outcome</u>	<u>Bank of Italy intervention</u>	<u>Pre/Post Tuif (98)</u>	<u>t(1)-t(0)</u>	<u>t(2)-t(1)</u>
01	Big	Small	Acquisition	In	Positive	NO	Pre	112	76
02	Small	Small	Acquisition	Out	Positive	NO	Pre	50	28
03	Big	Big	Acquisition	In	Positive	NO	Pre	35	24
04	Small	Small	Acquisition	In	Positive	NO	Pre	18	47
05	Big	Big	Merger	In	Positive	NO	Pre	57	119
06	Small	Small	Acquisition	Out	Positive	YES	Post	0	249
07	Big	Big	Merger	In	Positive	NO	Pre	55	38
08	Big	Big	Merger	In	Positive	NO	Post	22	76
09	Big	Big	Acquisition	In	Positive	YES	Post	142	122
10	Small	Small	Acquisition	In	Positive	NO	Post	35	129
11	Big	Small	Acquisition	Out	Positive	NO	Post	0	167
12	Big	Big	Merger	Out	Positive	YES	Post	37	78
13	Big	Small	Merger	Out	Positive	YES	Post	37	71
14	Big	Small	-	-	Negative	YES	Pre	112	1
15	Small	Small	-	-	Negative	YES	Pre	58	52
16	Big	Big	-	-	Negative	NO	Pre	34	139
17	Big	Big	-	-	Negative	NO	Post	8	70
18	Big	Big	-	-	Negative	NO	Post	5	35
19	Big	Big	-	-	Negative	NO	Post	5	20
20	Big	Big	-	-	Negative	YES	Post	50	41
21	Big	Small	Acquisition	Out	Positive	YES	Post	63	23

²² Meaning [t(0)-30 ; t(0)+30] compared to [t(1)-30 ; t(1)+30]: we can see, in fact, as in 4 cases the period between t(0) and t(1) is bigger than 60 days, and in the majority of cases (14 out of 21) is bigger than 30 days (implying only a partial overlapping of the two windows).

²³ Effective from the 1st of July 1998, the new provisions contained in the TUIF (d.lgs.58/98) substantially modifies the previous regulation. The TUIF introduced the mandatory Public Offering each time a raider rises his stake above 30% of total voting shares of a listed companies, and that the offering must be on all floating shares; moreover, TUIF defines a new method to compute the price of the public offering. Both measures were in the direction to protect outside shareholders that under the previous regulation were often excluded from cashing in the voting premium.

²⁴ At this regard we interviewed Mr. Augusto Franchini who was a director of the Bank of Italy in the years we are studying, and so he was able to identify the operations started with the moral suasion intervention of the Central Bank itself.

A last peculiar aspect of the present empirical study is that it included non voting shares (from now on Rnc, that is the conventional Italian acronym), both of buyer and target banks (this way 10 stocks add to the dataset under examination); this let us study the performance for outsiders (non voting shareholders are by definition outsiders) in case of M&A operations, and check if they are penalized.

For example, if we consider the non voting shares of a buyer, a negative reaction could be interpreted as a bad economic valuation of the operation by the market, and if the Rnc discount with respect to the voting shares should increase, this would indicate the presence of private benefits among the motivations of the operation²⁵; speaking of Rnc shares of the target bank, their market reaction should reflect only the market valuation, in that these shares are often excluded from the public offerings, and, anyway, as a matter of fact do not cash in the controlling premium (which in Italy reaches extremely high levels²⁶).

Eventually, a measure of the success of an M&A operation that we will use is, beyond the abnormal returns of single stocks, the abnormal return of the single operation (following Cybo-Ottone and Murgia, 2000), obtained with the weighted average of the ARs of the single stocks:

$$AR_{(ij),t} = \frac{MV_{i,t} \times AR_{i,t} + MV_{j,t} \times AR_{j,t}}{MV_{i,t} + MV_{j,t}} \quad [5]$$

where as weights we used the market capitalisation (MV) of bidder and target in t(0)-30.

This way it will be possible to observe the overall value creation of the single operations, with results not influenced and distorted by the difference in size between the buyer and target banks.

²⁵ In the literature the Rnc discount is explained with the existence of private benefits of control (see Bigelli, 2003, for a review of the literature on this issue), which are bigger where the minority shareholders are less protected, particularly in case of takeover (see among others Nenova, 2000, for an international comparison on this issue).

²⁶ See, for example, Dick and Zingales (2004).

Finally, observing abnormal returns in windows $[t_a, t_b]$ of several days, we will compute the cumulative abnormal returns (CAR):

$$CAR(t_a, t_b) = \sum_{s=t_a}^{t_b} AR_s \quad [6]$$

5. Empirical analysis and results

5.1 The value creation

In Table 3 we can find the general results from M&As, following the equation [5] for every single operation²⁷. Looking at the data, we can say that we do not observe an overall value creation, given that the overall average gain in our sample amounts at a CAR of only 0,47%, statistically and economically not significant, in this confirming the results in Houston and Ryngaert (1994); however, there is great variability in the results themselves. We can notice, in fact, that on one hand we have operations which create value, like Credito Italiano on Credito Romagnolo-Rolo, Unicredit on Comit and others; on the other hand, as a counterpart, we also have operations which destroy value, like Credem on Banca della Provincia di Napoli and Banca Popolare di Verona on Banca Popolare di Novara.

The CARs of the single banks show that the operations which destroy value are more influenced by the acquiring banks' results (see also Figure A.1 in the appendix), while the operations which create value are more influenced by the acquired banks' results (with the self-evident exception of the two operations involving Banca di Roma²⁸); this is confirmed by the fact that, on average, the acquiring banks obtained a

²⁷ The performances reported in Table 3 are referred to the window $[t(1)-30, t(1)]$, because this is the window that, as we will see below, better captures the announcement effect on market values; note that the results are qualitatively the same in the window $[t(1)-30, t(1)+30]$.

²⁸ Because of the particular story that characterised those operations: the two contemporaneous cases involving Banca di Roma are anomalous because the rigorous application of the criterion to choose $t(1)$ excluded the great part of the effect on returns of the announcement. This effect, in fact, occurred the very same day of the news on the newspaper (because the decision was made the evening before and was not anticipated by almost any rumors influencing the market prices in the previous days). If we only included the day after $t(1)$, for this operation, we would see the CAR tend to reverse to a small and negative value, as we can see in windows symmetric with respect to the announcement, but for coherence we decided to keep the $t(1)$ and the results on Table 3.

negative performance (-2.37%), while the acquired banks obtained a positive performance (+3.30%).

Table 3

Capitalisations and CARs in the window $t(1)$ [-30, 0] using the market model with market index, of the banks in the sample, grouped by single operations.

<u>n°</u>	Buyer Bank	CAR	Cap. (mln €)	Target Bank	CAR	Cap. (mln €)	CAR Operation
01	Banca di Roma	13.46%	3168.88	Bonifiche Siele	2.24%	281.35	7.85%
02	B.ca Popolare di Lodi	7.17%	130.65	Banca Mercantile	-1.19%	62.85	2.99%
03	Credito Italiano	11.35%	1776.96	Credito Romagnolo-Rolo	16.08%	1270.55	13.72%
04	BPCI	1.59%	382.14	Banca Pop. Luino e Varese	-4.00%	201.82	-1.21%
05	Ist. Bancario S.Paolo TO	-0.88%	5701.88	IMI	2.54%	5326.74	0.83%
06	Credem	-21.28%	855.67	B.ca della Prov. di Napoli	-2.01%	83.51	-11.64%
07	B.ca S.Paolo Brescia	-11.26%	1356.31	CAB	-0.30%	1540.71	-5.78%
08	Banca Intesa	-7.34%	12775.40	Comit	4.06%	13150.77	-1.64%
09	S.Paolo-IMI	5.71%	17457.20	Banco di Napoli	3.83%	2824.10	4.77%
10	B.ca Popolare di Lodi	-15.59%	783.64	B.P. Crema	1.64%	376.68	-6.98%
11	B.ca Popolare di Milano	-1.86%	2031.66	Banca di Legnano	11.03%	347.35	4.59%
12	B.ca Popolare di Verona	-22.88%	2621.80	B.ca Pop. di Novara	-12.28%	1909.94	-17.58%
13	Popolare Bergamo	-5.99%	2643.83	BPCI and B.P. Luino e Varese	7.84%	1003.88	0.92%
14	Banca di Roma	12.62%	3168.88	BNA	2.32%	510.46	7.47%
15	B.ca S.Paolo Brescia	7.08%	697.40	B.ca Pop. Brescia - Bipop	7.66%	651.81	7.37%
16	Comit	0.11%	7496.79	Banca di Roma	7.62%	6824.73	3.87%
17	Credem	-0.35%	1276.93	B.ca Pop. di Novara	-3.70%	1488.52	-2.03%
18	Unicredit	2.02%	21517.82	Comit	18.43%	10170.88	10.23%
19	B.ca S.Paolo-Imi	-17.89%	20261.57	Banca di Roma	7.11%	7008.52	-5.39%
20	BPCI	-3.19%	1607.38	B.ca Pop. di Novara	-2.90%	1754.16	-3.05%
	Mean	-2.37%	5303.64		3.30%	2921.46	+ 0.47%²⁹

Notice: buyer's and target's CARs, in every single operation, are calculated as the single (rescaled) contribution to the weighted average in the last column, that is the CAR of the single whole operations, as in equation [5]. The case n. 21 has been excluded because not all the shares of Banco di Sardegna were listed (only the Rnc ones).

In Table 3 we can also see that acquiring banks are often larger in size than the acquired ones, with a few exceptions; in the following analysis we will try to understand if the size can help explaining the results of operations of concentration.

Given the great variability of results in our sample, we could think that in general there was a redistribution of value among acquiring firms and shareholders of acquired

²⁹ This is a simple mean of the operations' CARs; the result would be basically the same if we took the weighted average of single operations' CARs, choosing as weights the sum of the capitalisation of the two banks involved; in this case, in fact, we would also obtain a positive result of +1,73% but, like the original result, not significantly different from zero. The same is true for the two subsamples of acquiring and acquired banks, in fact, if we take the CARs weighted with the respective capitalisations, we would have that the performances of acquiring banks worsen substantially (-5.10%), while those of acquired banks does not change (+3.30%).

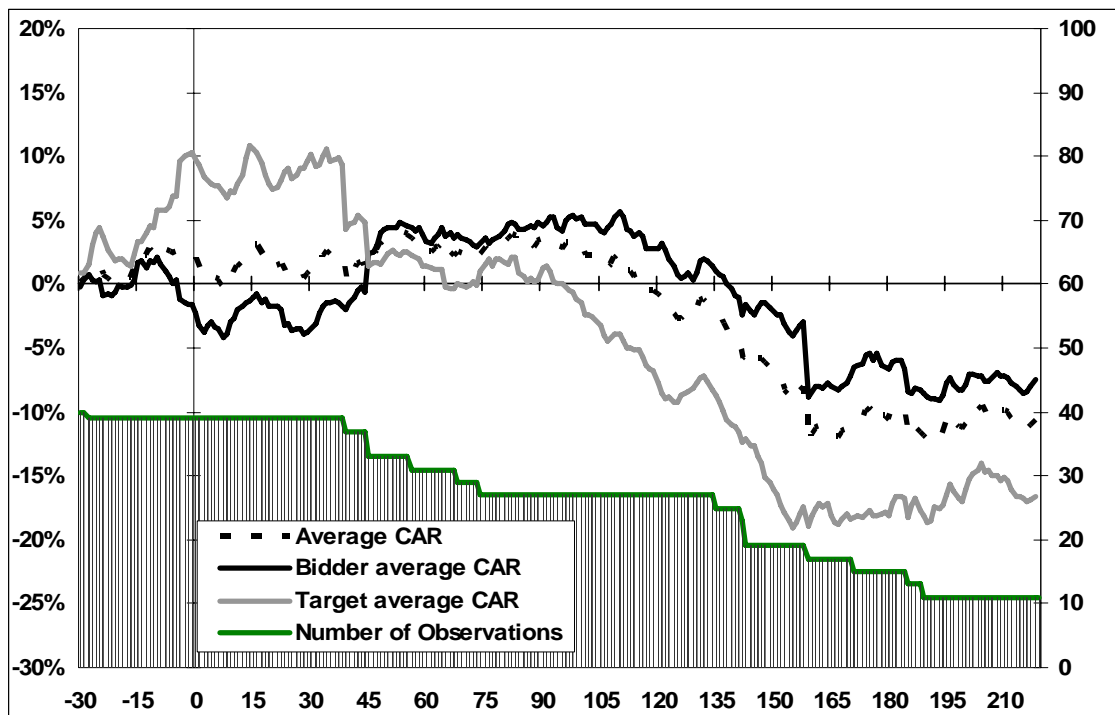
firms; in any case, given the presence of acquired banks with negative CARs and of acquiring banks with positive CARs, it seems necessary to investigate more the determinants of positive and negative results of the single operations, analysing for example the constituted dataset for subsamples (as we will do later).

5.2 The market reaction to rumors, announcement and conclusion of the M&A operations

The CARs of the banks in our sample are calculated starting from $t(0)-30$ of each operation, as defined above. Before analysing the CARs organized in the various chosen event windows, it is interesting to see graphically (see Fig. 1) how these behave as a whole starting from $t(1)-30$ ³⁰ for a period of one year, distinguishing by acquiring and acquired banks.

Figure 1

On the left hand scale are reported the CARs (Value Weighted³¹) of Voting Shares from the market model with market index (methodology [3]), in the window $t(1)-30 \rightarrow t(1)+220$. On the right hand scale are reported the number of banks of which we still have observations, in time.



³⁰ That is, as we have seen, the mostly preferred event date in previous literature.

³¹ As we will see again later, banks' market capitalisations in the day before $t(1)-30$ have been used as weights to calculate the Value Weighted CARs.

Looking at the first part of the period considered (say from $t(1)-30$ to $t(1)+30$), it is evident that the performances of acquiring and acquired banks are quite different: while the first ones obtained CARs not different from zero and more often negative, the acquired banks show positive and apparently significant CARs.

Moreover, these CARs are observable almost completely before the announcement day of the operations, $t(1)$, and they remain as described above and not much intensify in the direction identified in the 30 days after $t(1)$. This result is in line with what we have seen in the previous paragraph, which is that the announcement date is far after the date of the first rumors: if we want to capture all the “announcement effect” of an M&A on the market, we should analyse also the period preceding the announcement itself. All previous studies, in fact, move in this direction, using several event windows starting before $t(1)$. However, what has been outlined in the previous paragraph is that very often the window $t(1)-30$ is not large enough to include $t(0)$ and is not able to fully capture the market reaction to the rumors.

At this point is possible to argue that previous studies did not fully capture the market reaction (and then the valuation) to an M&A operation. On the other hand, we should also notice that the peculiarity of the Italian market could influence the anticipation of the rumors with respect to the announcement: in particular, potential reasons can be the information leakage due to the poor enforcement level of insider trading rules, and the peculiarity of the bank sector itself, where is frequent to observe that the M&A are somewhat driven by the Bank of Italy³² (making more difficult to keep the secretness about the operation before the announcement, and also, as we will see, giving a signal on the economic situation of the acquired bank).

Observing the behaviour of the CARs after the window $[t(1)-30; t(1)+30]$, we see that the performance of the acquiring banks worsen (not immediately), but much more does that of acquired banks; this shows that first the shareholders of the target cash in the controlling premium, but after that, when the operation has been completed, the stocks' value bounce back to their previous value and eventually even below. We will

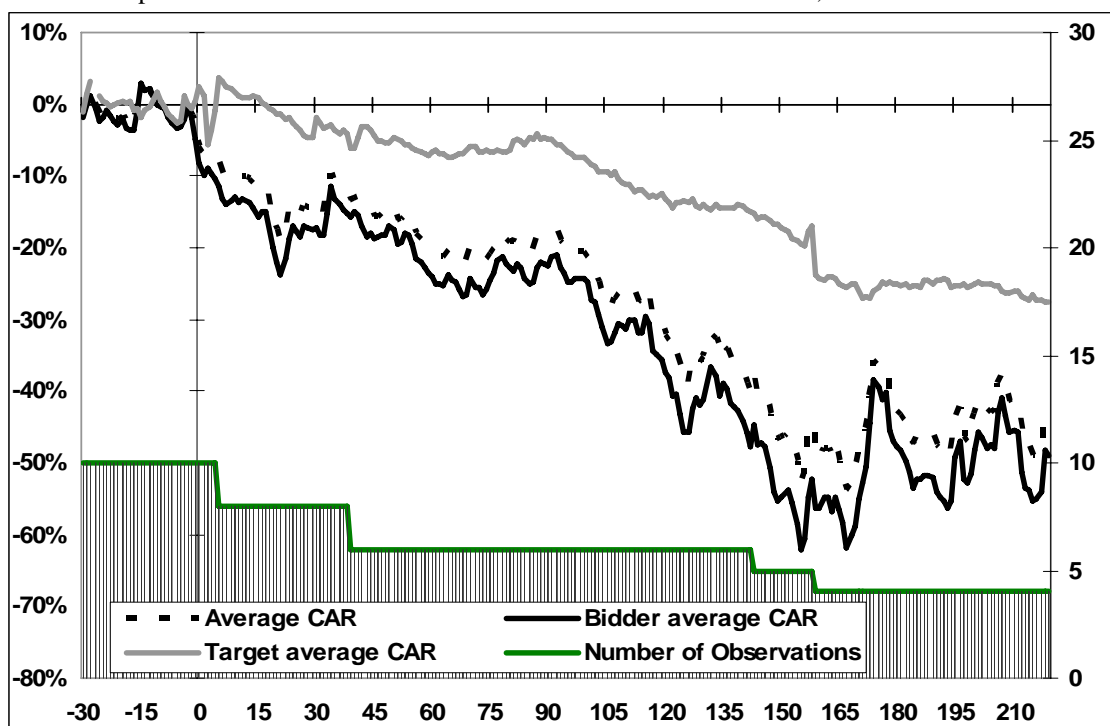
³² In the following analysis we will investigate the effect that the Bank of Italy's intervention had in deciding some of the operations in our sample.

come back to analyse this last issue when we will examine the overall value creation of the single operations, in the short as in the long run with respect of the last event date we consider, that is $t(2)$. Notice, however, that the number of banks of which we have the time series decreases³³ in the second half of the period considered, meaning that the commented results are less representative of the whole sample as the period of observation lengthen.

A second important aspect that we want to investigate is the different effect that the M&A operations can have on the voting or on the non voting (Rnc) shares. Figure 2 represents the same CARs of the Figure 1 but referred to the Rnc shares, again distinguishing by acquiring and acquired banks.

Figure 2

On the left hand scale are reported the CARs (Value Weighted) of Non Voting Shares from the market model with market index (methodology [3]), in the window $t(1)-30 \rightarrow t(1)+220$. On the right hand scale are reported the number of banks of which we still have observations, in time.



³³ Several banks in our sample, in fact, have no records after a certain period of time in the event window considered, because they have been incorporated, or simply delisted because of their insufficient amount of floating shares.

What is immediately clear is that the results on average are worse than those referred to the voting shares (Fig. 1) and with a clear negative trend following all the period considered. The Rnc shares of the acquired banks obtain a negative performance probably because often they are excluded from the public offerings on the voting shares, and after the completion of the operation they probably suffer the same lack of interest by the market of the voting shares; for what concerns the Rnc of the acquiring banks, they obtained a more negative result, and the reason this time must be found elsewhere: a possible explanation is that the market believes that the real motivation for the acquisition is related to the private benefits rather than to the value creation³⁴.

A last interesting remark is that, while in Figure 1 we have seen the CARs' direction clearly before the event date, $t(1)$, in the case of Rnc the negative direction of the CARs is visible only after that same date; there may be several possible explanations: on one hand, it is possible that sometimes is difficult to infer if the Rnc are going to be included in the public offering or not, due to the fact that this is not mandatory; on the other hand, maybe the market needs more time to value the details of the acquisition to understand if and how important is the presence of private benefits among the determinants of the operation, and how much important is the effective value creation goal; a third simple explanation could be the illiquidity of these shares, that delays the market valuation's reflection on prices.

Turning back to the examination of the voting shares, in Table 4 are reported the simple CARs' mean of the operations (those reported are calculated with the methodology [3] described above), again distinguishing by acquiring and acquired bank, with different event windows and different event dates; on the right hand side of the same Table 4, we have reported the Value Weighted (VW) CARs.

We would like to start our analysis by looking at the results with respect to $t(1)$, that is the event date used by the majority of the previous empirical researches: first, we can see that, as we recognized qualitatively examining the Figures 1 and 2, the CARs

³⁴ Following Zingales (1994), the announcement of an M&A that creates value should be beneficial both to the ordinary than to the Rnc shares of the acquiring bank; on the contrary, if the reason is more related to the private benefits of control, only the ordinary shares gain, impacting on the voting segment of the voting shares, while the Rnc could lose as a result of an overbidding. For what concerns the acquired bank, instead, the cashing in of the voting premium occurs only, as we said, if the Rnc are included in the public offering.

define their direction in the windows before the event date, and are then confirmed in the following period; this is particularly true for the window $[t(1)-30, 0]$, that is then used as the reference point for the analysis that follows.

Table 4

CARs' Average (Simple and Value Weighted) of Voting Shares of the 40 banks of the sample, for different event window. The methodology used to calculate the CARs is the [3] described above, that is using the AR calculated with the market model with the market index. For the Value Weighted CARs, market capitalisations in the day before $t(1)-30$ are used as weights.

Average CAR	Bidder Average CAR	Target Average CAR	Window	Average VW CAR	Bidder Average VW CAR	Target Average VW CAR
0.43%	-2.26%	3.26%	t(0): [-30, 0]	0.07%	-1.32%	2.70%
2.11%	0.45%	3.86%	t(0): [-15, 0]	0.86%	-0.39%	3.24%
2.85%	1.08%	4.71%	t(0): [-5, 0]	-0.06%	-1.61%	2.90%
2.43%	1.15%	3.78%	t(0): [-3, 0]	0.68%	-0.45%	2.83%
-3.40%	-8.32%	1.77%	t(0): [-30, 30]	-4.12%	-9.74%	6.55%
0.67%	-1.70%	3.18%	t(0): [-15, 15]	0.27%	-2.92%	6.34%
1.94%	-0.69%	4.72%	t(0): [-5, 5]	-0.65%	-3.94%	5.60%
2.72%	0.26%	5.30%	t(0): [-3, 3]	0.46%	-2.68%	6.41%
2.54%	-2.08%	7.40%	t(1): [-30, 0]	1.74%	-2.69%	10.14%
2.27%	-1.65%	6.40%	t(1): [-15, 0]	-0.52%	-4.43%	6.89%
1.58%	-0.54%	3.82%	t(1): [-5, 0]	-0.75%	-2.77%	3.09%
0.87%	-0.79%	2.60%	t(1): [-3, 0]	-0.66%	-0.98%	-0.05%
2.54%	-3.06%	8.44%	t(1): [-30, 30]	0.97%	-4.13%	10.63%
3.28%	-1.86%	8.69%	t(1): [-15, 15]	0.51%	-3.33%	7.80%
-0.37%	-2.90%	2.29%	t(1): [-5, 5]	-2.25%	-3.98%	1.05%
-1.02%	-3.71%	1.81%	t(1): [-3, 3]	-1.96%	-2.16%	-1.59%
2.22%	1.27%	3.22%	t(2): [-30, 0]	-0.46%	-1.34%	1.20%
0.80%	0.47%	1.15%	t(2): [-15, 0]	0.20%	-0.16%	0.88%
-1.48%	-0.54%	-2.46%	t(2): [-5, 0]	0.15%	1.20%	-1.84%
-1.02%	-0.26%	-1.82%	t(2): [-3, 0]	0.46%	1.05%	-0.67%
-0.36%	0.27%	-1.03%	t(2): [-30, 30]	-3.75%	-1.90%	-7.27%
0.09%	2.03%	-1.94%	t(2): [-15, 15]	1.83%	3.88%	-2.05%
-2.46%	-0.31%	-4.72%	t(2): [-5, 5]	0.42%	2.56%	-3.63%
-2.13%	-0.95%	-3.37%	t(2): [-3, 3]	-0.51%	-0.22%	-1.08%

Examining more deeply the results in Table 4, we first recognize that a common conclusion present in the literature is confirmed, that is that the M&A operations have an overall CAR not significantly different from zero; distinguishing by acquiring and acquired banks, again we find confirmation of another important general result present in the literature, that is that buyer banks obtain negative performances on average,

whereas target banks obtain positive ones. Moreover, it is possible to notice that these results are more evident when the event windows is longer, showing how difficult is to correctly determine the moment in which the market react to the news (a moment that usually occurs substantially before the announcement day).

An important thing we can observe in Table 4 is that the above results remain true if we change event date and compute the CARs with respect to $t(0)$, the day we have identified as that of the first rumors on the operations. Also in this case, in fact, the overall result is not clear and while the acquiring banks lose market value, the acquired ones gain. The results with respect to $t(0)$ are more unambiguous if we consider longer windows and if we include the second half of the windows themselves³⁵; this proves also that the identification of the rumors' dates was quite accurate, in that most of times we can observe abnormal returns only after those dates (clearly related, then, to the operation that is about to be announced).

Summing up we have results in the same direction but referring to two different event dates, $t(0)$ and $t(1)$, and we have shown in Table 2 they can be quite distant from each other. We must then conclude that the overall market value creation (or destruction) of an M&A is not observable because is reflected in prices in different moments in time. Even if we assume that these moments are in fact $t(0)$ and $t(1)$, we can not measure the value creation just summing the two market reaction because of two reasons: $t(1)$ follows $t(0)$ of a period that is different for every observation, and the two moments can be very far-off from each other, making likely that other information are in the meantime incorporated into prices. Anyway, we proved an important result: previous studies did not capture the overall effect, and actually they probably did not even choose the most correct event date. The results with respect to $t(1)$ are partial, and could even be misleading, because they can represent a bouncing back of abnormal returns following an overshooting subsequent to $t(0)$. Finally, we have to conclude, given our results, that if we have to choose between $t(0)$ and $t(1)$, we should go for the first one, giving us stronger results.

A last group of results offered in Table 4 are those related to the case in which we use $t(2)$ as event date, that is the moment when the final outcomes of the operations become clear (note that here are included also the operations that have a negative final outcome, that is that never took place): in this case, the acquiring banks do not seem to register particular effects, while the acquired ones show negative CARs, particularly if we consider windows including the “post event” period. This result follows what we have said before, in that the acquired banks register positive CAR until the shareholders still have to cash in the controlling premium offered with the public offering, while when that premium has been paid³⁶ the shares of the target quote without vote segment³⁷.

Then, for what concerns the analysis on the market’s judgement of value creation, we can exclude in the following the analysis of the event windows referred to $t(2)$, because they are not comparable anymore with the situation preceding the announcement.

Eventually, we would like to draw the attention to the fact that the Value Weighted data have been computed and reported mainly in order to control for the possible distortion from outliers coming from small operations; at this regard, we can conclude that there are not substantial differences between the two types of CARs, and that the comment remain basically the same; even better, the differences between buyers and targets are more evident considering the VW CARs.

5.3 The sensitivity of results to different methodologies

Table 5 shows another important issue the present work wants to investigate, that is the different results we would obtain by using different methodologies in calculating the CARs. The methodologies that we take into account here for comparison are four³⁸, while the event windows are only two, $[t-30, t]$ and $[t-30, t+30]$, that are those which

³⁵ So $[t(0)-30, t(0)+30]$ rather than $[t(0)-30, t(0)]$ and $[t(0)-15, t(0)+15]$ rather than $[t(0)-15, t(0)]$; moreover, for all the window considered, the comments we made are more evident in VW CAR, reported on the right hand side of the table.

³⁶ Or it has been identified who is eligible to sell its stocks at a price including that premium, if in $t(2)$ remains only the final payment, in cash (acquisition) or in stocks (merger).

³⁷ As explained by Zingales (1994) and as it is observable in Table A.1 in the Appendix, referring to the Rnc shares.

proved to best capture all the market reaction with respect to the announcement, to the rumors and to the operations' final outcome.

The first thing we note, examining the data in Table 5, is that the choice of methodology does not affect substantially the results we have seen and commented so far: if the sign of CARs was not clear before, it is not clearer now observing the results of the alternative methodologies; even the performance (positive) of acquired and (negative) acquiring firms maintain the signs by changing the model used.

Table 5

CARs' comparison of Voting Shares using different methodologies (those described in the text and referred to as [1], [2], [3], [4]). Windows: $t(0)$: [-30, 0], $t(1)$: [-30, 0], $t(2)$: [-30, 0]; $t(0)$: [-30, 30], $t(1)$: [-30, 30], $t(2)$: [-30, 30].

Methodology	Average CAR	Bidder Average CAR	Target Average CAR	Window	Average VW CAR	Bidder Average VW CAR	Target Average VW CAR
1	2.40%	0.48%	4.32%	$t(0)$: [-30, 0]	0.87%	0.28%	1.99%
2	2.73%	0.77%	4.69%	$t(0)$: [-30, 0]	0.32%	-0.61%	2.08%
3	0.43%	-2.26%	3.26%	$t(0)$: [-30, 0]	0.07%	-1.32%	2.70%
4	0.79%	-1.66%	3.38%	$t(0)$: [-30, 0]	-0.77%	-2.64%	2.76%
1	-2.06%	-5.94%	1.83%	$t(0)$: [-30, 30]	-3.98%	-8.14%	3.93%
2	-3.77%	-7.70%	0.16%	$t(0)$: [-30, 30]	-3.26%	-7.17%	4.17%
3	-3.40%	-8.32%	1.77%	$t(0)$: [-30, 30]	-4.12%	-9.74%	6.55%
4	-4.45%	-9.63%	0.99%	$t(0)$: [-30, 30]	-4.29%	-10.09%	6.72%
1	3.85%	-0.65%	8.36%	$t(1)$: [-30, 0]	2.18%	-1.57%	9.29%
2	2.28%	-2.18%	6.75%	$t(1)$: [-30, 0]	0.73%	-3.07%	7.93%
3	2.54%	-2.08%	7.40%	$t(1)$: [-30, 0]	1.74%	-2.69%	10.14%
4	1.08%	-4.03%	6.46%	$t(1)$: [-30, 0]	-0.88%	-5.90%	8.64%
1	2.69%	-2.09%	7.48%	$t(1)$: [-30, 30]	1.07%	-2.63%	8.09%
2	0.17%	-4.59%	4.93%	$t(1)$: [-30, 30]	0.22%	-3.65%	7.58%
3	2.54%	-3.06%	8.44%	$t(1)$: [-30, 30]	0.97%	-4.13%	10.63%
4	0.54%	-5.88%	7.30%	$t(1)$: [-30, 30]	-1.36%	-7.58%	10.43%
1	2.46%	1.90%	3.03%	$t(2)$: [-30, 0]	-1.39%	-1.54%	-1.10%
2	1.09%	0.55%	1.64%	$t(2)$: [-30, 0]	-1.50%	-1.36%	-1.77%
3	2.22%	1.27%	3.22%	$t(2)$: [-30, 0]	-0.46%	-1.34%	1.20%
4	0.86%	-0.30%	2.08%	$t(2)$: [-30, 0]	-1.60%	-2.59%	0.28%
1	-0.81%	0.69%	-2.32%	$t(2)$: [-30, 30]	-4.88%	-2.50%	-9.38%
2	-1.27%	0.26%	-2.79%	$t(2)$: [-30, 30]	-3.46%	-1.44%	-7.30%
3	-0.36%	0.27%	-1.03%	$t(2)$: [-30, 30]	-3.75%	-1.90%	-7.27%
4	-0.55%	0.01%	-1.14%	$t(2)$: [-30, 30]	-2.86%	-1.92%	-4.65%

However, we can note a small but observable difference among the results of the four methodologies: when the sector index is used in place of the market one, the extra-

³⁸The four methodologies are those presented and explained above (see paragraph 4).

performances of banks worsen, and this is more evident in the event windows computed with respect to the announcement, $t(1)$, but it is still observable in those with respect to the rumors, $t(0)$. The most likely explanation³⁹, in our opinion, is based on the characteristics of the Italian market; due to the fact that this market was, in the years considered, relatively small and illiquid, and considering that the bank sector did not experience much M&A activity before the nineties, the announcement, but also the rumor, of such an operation was able to excite all the banking sector, then influencing the representative sector index; in this setting, the CARs of the banks involved in the operations end up to be “less abnormal”, because they are compared with a normal return that is higher (the banking sector index return).

The same results but referred to the non voting shares are reported in Table A.1 in the Appendix; this results confirm what we said commenting Figure 2, in particular that the market does not believe in the value creation outcome of the operations of concentration in our sample. The Rnc shares, in fact, perform systematically worse than the ordinary ones, both on average and distinguishing between bidder and target banks. We remember that the value of non voting shares is a good indicator in M&A because they do not incorporate the voting premium, neither before nor after the operation.

5.4 Bivariate analysis of M&A characteristics and regressions

Table 6 illustrates the extra-performances (measured by the mean and the median of CARs) of the banks in our sample, divided in the subsamples described above. The presentation of both VW CAR and median CAR should represent two alternative methods to control for outliers values.

First of all, as we have seen more than once so far, it is evident the difference between acquiring and acquired banks, where the first ones register on average negative CARs, while the second ones show, on average, positive CARs. The difference, regarding the means, is also significantly different in the two subsamples, while the medians' difference is smaller⁴⁰; this difference, anyway, is always economically

³⁹ Explanation also proposed by Cybo-Ottone, Murgia (2000).

⁴⁰ With a *p-value* of about 1% for the means and of about 10% for the medians.

significant and confirmed by the Value Weighted results showing a clear difference in the CARs' averages.

Turning to the comparison of the Ordinary with the Rnc shares, the results are ambiguous, given that the normal CARs show a better result for the Rnc (contrary to what we said so far), while the contrary is true for VW CARs; this contradiction, however, disappears in the following line where we compare the voting and the non voting shares only of the same banks (that is dropping the observation of which we do not have Rnc shares). At this regard, it will be possible to improve our understanding when we will break down the problem distinguishing between buyers and targets banks.

Table 6

CAR from the Market Model with market index, in the window $t(1)$: [-30 , 0]; sample divided by characteristics. The first value in each box represents the mean of the CARs, the second one, in parenthesis, represents the median of the CARs.

Subsamples	CAR	CAR VW	Subsamples	CAR	CAR VW
Buyers	-2.00% (-0.62%)	-3.83%	Targets	6.65% (5.64%)	6.62%
Voting shares	2.33% (1.35%)	2.13%	Non Voting shares	3.18% (0.84%)	-0.48%
Voting shares (matched*)	7.34% (6.18%)	0.61%	Non Vot. shares (matched*)	4.46% (7.28%)	-0.63%
With Bank of Italy	-0.94% (-2.78%)	0.71%	Without Bank of Italy	3.97% (1.49%)	1.99%
In the Market	2.98% (2.97%)	1.36	Out of the Market	-1.40% (-4.13%)	-2.09
Pre TUIF	2.55% (3.97%)	2.07	Post TUIF	2.46% (-0.73%)	1.25%
Positive Outcome	1.42% (1.21%)	0.14%	Negative Outcome	4.25% (1.49%)	4.01%
Small Size	1.79% (1.21%)	-0.10%	Big Size	2.61% (0.11%)	2.70%
Mergers	-2.89% (-2.49%)	-3.57%	Acquisitions	4.15% (3.32%)	2.48%

* Matched voting shares refer to the subsample of stocks who have a class of non voting shares.

The subsample of operations with the intervention of the Bank of Italy does not seem to show a positive effect of the Central Bank intervention itself, and actually is possible to observe a negative effect, particularly when we deal with small banks (as we

can deduce from the VW CARs, showing an effect not as negative as that of normal CAR); a possible explanation, beyond the judgement of the Bank of Italy's ability to choose the right partners for banks, could be the fact that the Central Bank more likely intervenes when the target bank is in a difficult situation, then releasing a strong signal that affects the market's previous valuation on the target bank⁴¹. This result as well will be revisited in the following by distinguishing between buyers and targets banks.

The same additional analysis will be required for the following subsample reported in Table 6, that is that of the operations concluded with the transfer of the majority stake inside or outside the market; here, we can say that the first ones registered positive CARs, while the contrary is true for the second type of operations, then showing that in the first case the outsiders cashed in the controlling premium, while in the second case not (registering even negative CARs for the deceived expectations).

The subsamples Pre/Post Tuif does not seem to register any significant difference in performances, while those of the operations with a positive/negative final outcome seem to have better results for the last ones; a possible explanation here is that the failed operations were *ex-ante* judged unlikely, and so reacted more at the announcement (bouncing back to the starting point at t(2), when the final negative outcome has come out).

Looking then at the subsamples of small/big size banks, we notice that the results are similar, but it will be interesting, again, to see if and how this results will change if we distinguish between acquiring and acquired banks; this, as we are going to see in Table 7, will let us understand which acquiring banks spend their money better, and which acquired banks present more potential to create value.

Finally, the subsamples of mergers/acquisitions show that the second ones, contrary to the first ones, create value on average; this result is in line with other previous works in the literature (Jensen and Ruback, 1983, and Berkovitch and Narayanan, 1993, but not specifically referring to the banking sector) and demonstrate that: the firms buying with cash spend better their money, correctly valuing more than

⁴¹ Another explanation could be based on the consideration that when the Bank of Italy intervenes in the negotiations, the agreements are concluded often outside the market, implying that the controlling

what they paid the firms they are acquiring, while the firms paying in stocks (as basically is the case of mergers) are sure to share the possible losses deriving from the operation. In the second case, then, it is more likely that the management is interested in private benefits rather than on the value creation from the merger.

Table 7, eventually, gives us the possibility to go deeper in the analysis with respect of what we did with Table 6; in Table 7, in fact, they had reported the effects of the operations in the subsamples we have just seen, but contemporaneously distinguishing between acquiring and acquired banks. The way we did this was, as in Cybo-Ottone and Murgia (2000), by using two dummies at the same time for every single proposed regression: one for the acquiring/acquired bank, and the second representing one at the time the subsamples of Table 6.

Table 7

Regressions with two dummies to control for the subsamples and also for the Buyer/Target dummy. Dependent Variable: CAR (VW) of Market Model with market index [2], in the window $t(1)$: [-30, 0].

Variable	Coefficient	Variable	Coefficient	Obs.
-	-	Dummy Buyer/Target	0.066***	50
Dummy Bank of Italy	-0.050*	Dummy Buyer/Target	0.081***	50
Dummy Oper. Outcome	-0.036	Dummy Buyer/Target	0.088***	50
Dummy TUIF	-0.027	Dummy Buyer/Target	0.082***	50
Dummy RNC	-0.032	Dummy Buyer/Target	0.073***	50
Dummy Size ⁴²	-0.012	Dummy Buyer/Target	0.073***	50
Dummy In/Out Market	-0.001	Dummy Buyer/Target	0.052*	31
Dummy M. or A.	-0.080***	Dummy Buyer/Target	0.082***	31

Dummy Buyer/Target: 1 = Target; Dummy Bank of Italy: 1 = With B.I.; Dummy Outcome: 1 = Positive; Dummy TUIF: 1 = After; Dummy RNC: 1 = Rnc; Dummy Size: 1 = Big; Dummy In/Out Market: 1 = In; Dummy Merger or Acquisition: 1 = Merger.

** = significant at a confidence interval of 10%; ** = 5%; *** = 1%.*

At this point we are able to make some additional remarks commenting the results in Table 7. First, in all the regressions we ran it is clear that the acquired banks register better performances than the acquiring ones (as we noticed more than once above), and almost always this difference is statistically and economically significant (looking at the

premium is not paid to the outsider shareholders.

⁴² The significance of the dummy “size” does not increase if we use the simple CARs in place of the VW CARs, which could somewhat hide the size-effect.

coefficient, in fact, we can see that the buyer/target dummy captures on average about 7-8% of the difference in performances).

Beyond this general comment, it is possible to see the effects of the single subsamples, starting from the operations in which the Bank of Italy intervened as “*deus ex machina*”: in this case it seems that, even controlling for buyer/target, the effect has been negative on market returns, to some extent both statistically and economically significant⁴³.

For what concerns the subsamples of operations with positive/negative outcome and those occurred in/out the market, the results reflect and confirm those we have seen above (Table 6), even if not statistically significant (particularly for the second case). In the case of merger/acquisition operations, instead, the results strongly confirm that only the last ones create value; in this case, in fact, the result is statistically significant.

As for the dummy “Rnc” and “post Tuif”, we observe that in the first case the Rnc shares register worse CARs than the voting shares, while in the second case the operations after Tuif introduction⁴⁴ seem to register worsened performances; in both case, however, the dummy coefficients are not statistically significant. For the case of Rnc, it is confirmed the result we have found before, while for the Tuif result, we can conclude that, net of the controlling premium (captured away by the buyer/target dummy) paid to the shareholders of the acquired firm, the buyer loses now more value than before the Tuif; the last consideration could let us think that the outsiders are more protected with the new rules, because the bidder is forced to pay more to obtain the control of the target bank.

The dummy “size” seems to show that when big banks are involved is more difficult to create value; otherwise, we could conjecture that smaller banks are more careful in pursuing the value creation purpose when they decide on M&A activities, while for bigger banks concur and are relevant motivations like private benefits or other managements’ personal goals. Anyway, the size effect described is neither statistically

⁴³For the possible explanations refer to those offered in commenting Table 6, where the result was qualitatively the same.

⁴⁴ We would like to recall and stress the fact that the Tuif introduced new rules protecting outsider shareholder in case of mergers or acquisitions.

nor economically significant, so that the proposed explanations can be viewed just as hypotheses, but confirmed by previous works, like Moeller et al. (2004).

In conclusion, it is worth to remember that the impossibility to give definitive answers to some of the questions coming out when studying the M&A operations in our dataset (particularly those from the results in Table 7) is mainly due to the limited sample size that casts doubts on the significance of the regressions' estimates we obtained. It is not possible to overcome this limitation regarding the Italian market, because of the restricted number of operations between listed banks; however, it would be very interesting to apply the analysis we have conducted to a larger market, like the European one, or to an also more developed market like the American one; this possibility is here left open, but we believe that the methodological choices we have done in the present work could be an useful reference for future research.

6 Conclusions

In this paper we analysed the effects on banks' market value relating to operations of concentration in Italy in the last decade. The small sample size (42 banks) limitations, shared with similar studies analysing the Italian or other European markets, have been somewhat counterbalanced by the deeper analysis of the single cases' details; in particular we analysed the different results deriving from different methodological choices, like the three possible definitions of event date, the inclusion of Rnc shares in the analysis, or like the effects of several characteristics we identified.

First, our results show that the choice of the event date is important in determining the results we are actually measuring: we have shown, in fact, that the event windows' size commonly used in the event studies with respect to the chosen event date, would not even comprehend in many cases the alternative event dates proposed in the present research. In particular, we have seen that the results with respect to the announcement date are qualitatively the same than those with respect to the rumors, but these reinforce each other, because they are not the same ones; our claim then is that, if we have to

choose between the rumors and the announcement as event date, we should choose, contrary to previous studies, the first one.

Turning to the effective results, we have seen that, using the announcement as the event date like most of previous works, overall the M&As did not show a significant value creation. However, confirming the frequent result in the literature of M&A, we have shown that the acquired banks register a positive performance, while the acquiring banks seem to register a negative performance; this result shows that there is a redistribution of value between acquiring banks and shareholders of the acquired banks.

The analysis of the Rnc shares let us check for the presence of private benefits of control among the motivations of the bids. The results have shown an overall negative reaction in market values for both the buyers' and the targets' Rnc shares, and this can be interpreted, following our argumentation, as acquiring banks' managements looking (also) at private benefits from control.

Finally, we broken down the analysis for subsamples and we got additional results, the most important of which are the following: the Central Bank's intervention does not seem to have a positive impact on the market; the operations "inside" the market registered positive CARs, and the contrary turned out to be for the "outside" ones (indicating that in the first case the outsiders cashed in the premium of control); the operations with a negative final outcome ended up with better results than those that effectively occurred. Finally, distinguishing between mergers and acquisitions, we observed that the second ones create on average value, while the first ones does not, a common result in the literature on M&A, but not always verified for the banking sector in particular.

From what we have seen, we can eventually conclude that the market believe in the possible value creation from M&A operations in the banking sector, but the presence of private benefits results in the bids' prices being too high; the consequence is that the value creation, if any, is beneficial to the targets' shareholders and for the buyers' managements. This claim is confirmed, as we have seen, by the results of the Rnc shares and by the subsample of mergers confronted with that of acquisitions.

In conclusion, the choice of enriching the analysis with the proposed extensions turned out to be useful and fruitful, because it has made it possible on one hand to

capture the presence of a part of the market reaction the previous works was not able to do, and on the other hand to better appreciate the characteristics of the operations that can create value; we believe, then, that the methodological choices made in the present research could of some help and applicable for future researches studying the M&As, relating to any sector and to any international market.

Bibliography:

- Allen L., Cebenoyan A.S. – “Bank Acquisitions and Ownership Structure: Theory and Evidence”, *Journal of Banking & Finance*, Vol. 15, N.2, pp. 425-448, 1991.
- Amel D., Barnes C., Panetta F., Salleo C. – “Consolidation and efficiency in the financial sector: A review of the international evidence”, *Journal of Banking & Finance*, Vol. 28, N.10, pp. 2493–2519, October 2004.
- Asquith P. – “Merger Bids, Uncertainty, and Stockholder Returns”, *Journal of Financial Economics*, 11, pp.51-83, April 1983.
- Banca d’Italia – “Relazione annuale sul 2003”, Roma, May 2004.
- Banca d’Italia – “Bollettino di vigilanza”, Roma, various years.
- Baradwaj B.G., Fraser D.R., Furtado P.H. – “Hostile Bank Takeover Offers: Analysis and Implications”, *Journal of Banking and Finance*, Vol. 4, N.6, pp. 1229-1242, 1990.
- Berkovitch E., Narayanan P. – “Motives for Takeovers: an Empirical Investigation”, *The Journal of Financial and Quantitative Analysis*, Vol. 28, N.3, pp.347-362, 1993.
- Bigelli M. – “Le azioni di risparmio - Un’analisi economica e gli effetti sulla governance dell’impresa”, *Collana Ricerche*, Il Mulino, Bologna, pp. 1-294, 2003.
- Boot A.W.A. – “Restructuring in the Banking Industry with Implications for Europe”, *EIB Papers*, Vol. 8, N.1, pp. 109-129, 2003.
- Bradley M., Desai A., Kim E.H. – “Synergistic Gains from Corporate Acquisitions and Their Divisions between the Stockholders of Target and Acquiring Firms”, *Journal of Financial Economics*, Vol. 21, N.1, pp.3-40, 1988.
- Brown S., Warner J. – “Measuring security price performance”, *Journal of Financial Economics*, Vol. 8, pp. 205-258, September 1980.
- Cavallo L., Rossi S.P. – “Scale and scope economies in the European banking systems”, *Journal of Multinational Financial Management*, Vol. 11, N.4, pp. 515-531, 2001.
- Comana M. – “Crescita esterna e performance bancarie: analisi di 34 casi recenti”, *Materiali AssBank*, Milano, December 1995.
- Comana M., Ratini A. – “Profili evolutivi del processo di concentrazione bancaria in Italia (parte prima)”, *Banche e Banchieri*, Vol. 28, N.1, pp.25-34, 2001.
- Comana M., Ratini A. – “Profili evolutivi del processo di concentrazione bancaria in Italia (parte seconda)”, *Banche e Banchieri*, Vol.28, N.2, pp.105-117, 2001.

- Comana M. – “La concentrazione del sistema bancario italiano” (a cura di), Cacucci, Bari, 2004.
- Cornett M., De S. – “Common stock returns in corporate takeover bids: Evidence from interstate bank mergers”, *Journal of Banking & Finance*, Vol. 15, N.2, pp. 273-295, 1991.
- Cybo-Ottone A., Murgia M. – “Mergers and shareholders wealth in European banking”, *Journal of Banking & Finance*, Vol. 24, N.6, pp. 831-859, 2000.
- Dick A., Zingales L. – “Private Benefits of Control: An International Comparison”, *Journal of Finance*, 59 (2), 2004.
- Dodd P., Warner J.– “On Corporate Governance: A Study of Proxy Contests”, *Journal of Financial Economics*, Vol. 11, pp. 401-39, April 1983.
- Ferretti R. – “Le acquisizioni bancarie e la reazione del mercato borsistico: le analisi in Usa, Europa e Italia”, *Bancaria*, Vol. 56, N.10, pp. 26-33, 2000.
- Ferretti R., Vezzani P. – “I processi di crescita e la struttura organizzativa”, in “La Banca come impresa”, M. Onado (a cura di), Il Mulino, Bologna, 2004.
- Focarelli D., Panetta F., Salleo C. – “Why Do Banks Merge?”, *Journal of Money, Credit and Banking*, Vol. 34, N.4, pp. 1047-1066, November 2002.
- Gandolfi, G. – “La concorrenza nel settore bancario italiano. Le banche tra competizione, concentrazione e norme antitrust”, *Bancaria Editrice*, Roma, 2002.
- Grossman S., Hart O. – “Takeover bids, the free-rider problem, and the theory of the corporation”, *The Bell Journal of Economics*, Vol. 11, N.1, pp. 42-64, 1980.
- Gugler K., Mueller D.C., Yurtoglu B., Zulehner C. – “The effects of mergers: an international comparison” , *International Journal of Industrial Organization*, Vol. 21, N.5, pp. 625-653, 2003.
- Hawawini G.A., Swary I. – “Mergers and Acquisitions in the U.S. Banking Industry. Evidence from the Capital Markets”, North Olland, 1990.
- Houston J.F., Ryngaert M.D. – “The overall gains from large mergers”, *Journal of Banking & Finance*, Vol. 18, N.6, pp.1155-1176, 1994.
- Hsu J., Chen C. – “The Intervaling Effect of Individual Firm's Beta”, *working paper*, March, 2003.
- Jensen M., Ruback R. – “The Market for Corporate Control: The Scientific Evidence”, *Journal of Financial Economics*, Vol. 11, N.1, pp. 5-50, 1983.
- Moeller S.B., Schlingermann F.P., Stulz R.M. – “Firm size and the gains from acquisitions”, *Journal of Financial Economics*, Vol. 73, N.2, pp. 201-228, 2004.
- Nenova T. – “The Value of Corporate Votes and Control Benefits: a Cross-country Analysis”, *working paper*, Harvard University, 2000.

- Nomisma – “Acquisizioni fusioni concorrenza” (and supplements), Bologna, various years.
- Panetta F. – “La trasformazione del sistema bancario e i suoi effetti sull’economia italiana”, in “Il sistema bancario italiano negli anni novanta. Gli effetti di una trasformazione”, di Fabio Panetta (a cura di), Bologna, Il Mulino, 2004.
- Pesic V. – “L’efficacia delle aggregazioni bancarie in Italia. Riflessioni ed evidenza empiriche”, *Banche e Banchieri*, Vol. 30, N.6, pp. 517-544, 2003.
- Resti A. – “Fusioni tra banche ed efficienza. I risultati di un’analisi empirica”, *Banche e Banchieri*, Vol. 24, N.5, pp. 399-408, 1997.
- Resti A., Siciliano G. – “Le acquisizioni di banche quotate creano valore per gli azionisti? Un confronto tra i prezzi di borsa ed i dati fondamentali di alcune banche italiane”, *Banca Impresa Società*, N.1, pp. 93-124, Aprile 1999.
- Rhoades S.A. – “A summary of Merger Performance Studies in Banking, 1980-93, and an Assessment of the “Operating Performances” and “Event Study” Methodologies”, *Staff Studies*, Federal Reserve Board, pp. 167-37, July 1994.
- Rhoades S.A. – “The efficiency effect of bank mergers: An overview of case studies of nine mergers”, *Journal of Banking & Finance*, Vol. 22, N.3, pp. 273-291, 1998.
- Savona R. – “Fusioni e acquisizioni bancarie in Italia, 1989-1997: un’analisi empirica sulla reattività dei prezzi azionari”, *Bancaria*, N.1, pp. 31-52, 2002.
- Vander Vennet R. – “The effect of mergers and acquisition on the efficiency and profitability of EC credit institutions”, *Journal of Banking & Finance*, Vol. 20, N.9, pp. 1531-1558, 1996.
- Zingales L. – “The Value of the Voting Right: a Study of the Milan Stock Exchange Experience”, *The Review of Financial Studies*, Vol.7, N.1, pp. 125-148, 1994.

Appendix

Figure A.1

Buyers' and targets' CARs in the window $t(1) [-30, 0]$, using the market model with market index; the absolute value creation of the single operations are represented by the size of the balls. Black balls represent positive value creation (above the diagonal line); grey balls represent negative value creation.

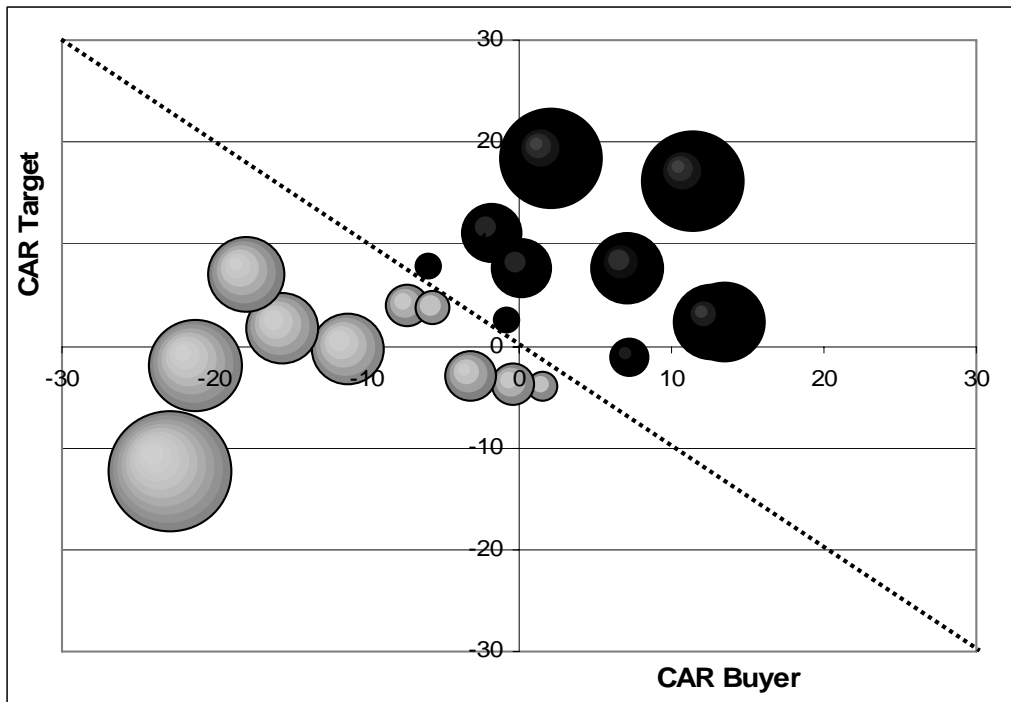


Tabella A.1

CARs' comparison of Non Voting Shares using different methodologies (those described in the text and referred to as [1], [2], [3], [4]). Windows: $t(0)$: [-30, 0], $t(1)$: [-30, 0], $t(2)$: [-30, 0]; $t(0)$: [-30, 30], $t(1)$: [-30, 30], $t(2)$: [-30, 30].

Methodology	Average CAR	Bidder Average CAR	Target Average CAR	Window	Average VW CAR	Bidder Average VW CAR	Target Average VW CAR
1	-4,13%	-2,34%	-5,33%	$t(0)$: [-30, 0]	-11,18%	-12,24%	-7,43%
2	-3,15%	-3,29%	-3,05%	$t(0)$: [-30, 0]	-7,05%	-7,84%	-4,27%
3	-10,15%	-5,57%	-13,20%	$t(0)$: [-30, 0]	-14,87%	-14,85%	-14,95%
4	-9,57%	-5,72%	-12,13%	$t(0)$: [-30, 0]	-11,03%	-10,39%	-13,27%
1	-7,77%	-3,25%	-10,79%	$t(0)$: [-30, 30]	-20,10%	-20,71%	-17,94%
2	-5,03%	-4,62%	-5,30%	$t(0)$: [-30, 30]	-12,77%	-13,35%	-10,71%
3	-17,72%	-8,01%	-24,19%	$t(0)$: [-30, 30]	-26,89%	-25,96%	-30,20%
4	-16,13%	-8,99%	-20,90%	$t(0)$: [-30, 30]	-19,96%	-18,40%	-25,48%
1	7,96%	0,20%	13,13%	$t(1)$: [-30, 0]	-2,11%	-5,36%	9,37%
2	6,74%	-0,68%	11,69%	$t(1)$: [-30, 0]	-1,26%	-3,83%	7,80%
3	3,18%	-1,62%	6,38%	$t(1)$: [-30, 0]	-5,79%	-8,12%	2,44%
4	1,42%	-2,56%	4,08%	$t(1)$: [-30, 0]	-4,97%	-6,40%	0,06%
1	2,38%	-2,55%	5,66%	$t(1)$: [-30, 30]	-9,19%	-12,39%	2,10%
2	2,05%	-2,92%	5,37%	$t(1)$: [-30, 30]	-5,18%	-6,93%	1,00%
3	-4,68%	-5,71%	-3,99%	$t(1)$: [-30, 30]	-15,09%	-17,23%	-7,56%
4	-6,03%	-6,95%	-5,42%	$t(1)$: [-30, 30]	-11,40%	-11,93%	-9,55%
1	-3,11%	-0,42%	-4,91%	$t(2)$: [-30, 0]	-3,02%	-2,47%	-4,97%
2	-3,24%	-0,19%	-5,28%	$t(2)$: [-30, 0]	-4,51%	-4,18%	-5,66%
3	-7,27%	-1,83%	-10,90%	$t(2)$: [-30, 0]	-6,21%	-4,90%	-10,80%
4	-8,23%	-2,34%	-12,16%	$t(2)$: [-30, 0]	-7,95%	-6,77%	-12,10%
1	-7,10%	-2,60%	-10,10%	$t(2)$: [-30, 30]	-8,64%	-8,68%	-8,51%
2	-6,21%	0,43%	-10,63%	$t(2)$: [-30, 30]	-4,99%	-3,47%	-10,34%
3	-13,62%	-5,16%	-19,26%	$t(2)$: [-30, 30]	-14,98%	-14,25%	-17,56%
4	-13,47%	-2,80%	-20,58%	$t(2)$: [-30, 30]	-11,00%	-8,50%	-19,82%