

BANCA D'ITALIA

Temi di discussione

del Servizio Studi

**Are mergers beneficial to consumers?
Evidence from the market for bank deposits**

by Dario Focarelli and Fabio Panetta



Number 448 - July 2002

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ARE MERGERS BENEFICIAL TO CONSUMERS? EVIDENCE FROM THE MARKET FOR BANK DEPOSITS

by Dario Focarelli* and Fabio Panetta*

Abstract

The general conclusion of the empirical literature is that in-market consolidation generates adverse price changes, harming consumers. Previous studies, however, look only at the short-run pricing impact of consolidation, ignoring all effects that take longer to materialize. Using a database that includes detailed information on the deposit rates of individual banks in local markets for different categories of depositors, we investigate the long-run price effects of M&As for the first time. We find strong evidence that, although consolidation does generate adverse price changes, these are temporary. In the long run efficiency gains dominate over the market power effect, leading to more favorable prices for consumers.

Keywords: mergers, efficiency, market power, bank mergers.

JEL classification : G21, G34, L1.

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1. Introduction¹

The last fifteen years have witnessed unprecedented numbers of mergers and acquisitions (M&As) in most countries, in mature and innovative sectors alike, from retailing to telecommunications. In the last five years alone (1996-2000), there were 11,333 M&As operations in the U.S. and 7,423 in Europe, with total value equal to 3,684 and 1,541 billion dollars, respectively.²

One of the consequences of the wave of consolidations has been heightened concern over possible anti-competitive effects (witness the recent European Commission's decision to block General Electric's \$43bn takeover of Honeywell). Actually, the effect of consolidation on market prices is, *a priori*, ambiguous. On the one hand, M&As may improve efficiency, allowing economies of scale, synergies and better management of assets. On the other hand, if the merging companies have significant local market overlap, their market power might increase. If the efficiency effect dominates, mergers will lower costs and lead to lower prices for consumers; if the increase in market power is dominant, the deals will result in higher prices.

This paper examines the pricing effects of M&As in the market for bank deposits. The deposit market constitutes a natural laboratory for studying these effects for three reasons. First, competition is at the local level, allowing an examination of the pricing effects of M&As in markets with different characteristics, while holding industry constant. Second, the presence of large local players and the existence of barriers to entry into local deposit markets (the cost of opening branches) imply that M&As can alter competitive conditions. Third, bank deposits are a highly standardized product (some key characteristics are set by law), so that they can be meaningfully compared over time and between different banks.

We depart from the previous literature in considering a longer period after the merger, separating the short-run from the long-run impact. This enables us to examine pricing effects that may have been overlooked to date.

Previous studies have generally found that consolidation leads to less competitive pricing, harming consumers (see Kim and Singal, 1993) for an analysis of the airline industry and Prager and Hannan (1998) for an analysis of the banking industry. But these

¹ We would like to thank Dean Amel, Paolo Angelini, Allen Berger, Emilia Bonaccorsi di Patti, Francesco Cesarini, Jean Dermine, Giorgio Gobbi, Luigi Guiso, Stefano Micossi, Marco Pagano, Ariel Pakes Alberto Pozzolo, Robin Prager, Alessandro Roncaglia, Carmelo Salleo, Piero Sabbatini, Mario Sarcinelli, Fabiano Schivardi and Xavier Vives for useful suggestions and comments. We also thank the participants of the 10th Tor Vergata Financial Conference "Competition, Financial Integration and Risks in the Global Economy" (November 2001), of the XXXIII Chicago Fed Conference on Bank Structure, Chicago, May 2002 and seminar participants at Banca d'Italia, Università Cattolica di Milano, Università di Roma La Sapienza, Autorità Garante per la Concorrenza e il Mercato. Roberto Felici provided outstanding research assistance. All remaining errors are our own. The opinions expressed do not necessarily reflect those of the Banca d'Italia. E-mail: panetta.fabio@insedia.interbusiness.it; focarelli.dario@insedia.interbusiness.it.

² Source: Thomson Financial, Security Data Company.

works only consider the short run and may well have missed effects that take longer to become manifest. In fact, while firms can exercise the increased market power associated with larger market share almost immediately, the improvements in efficiency may emerge only after some time. This means that although consolidation may temporarily lead to adverse price changes, it may turn out to be beneficial to consumers in the long run.

The efficiency gains from mergers may be delayed by several factors. First, cost-cutting takes time. In fact, the managers of merged firms may want to restructure (e.g. consolidating headquarters, closing overlapping branches) gradually, in order to minimize adjustment costs and allow time to assess the results as plans are implemented. Cost reductions may also be delayed by reluctance to lay off staff – especially in businesses where human capital is important, such as financial services and hi-tech industries – or by difficulties in selling redundant capital goods (see Pulvino, 1998 on the airline industry).

Second, merging disparate workforces is no easy task (see Kole and Lehn, 2000) and may thus be a lengthy process. Practitioners indicate that in all the major industrial countries differences in corporate attitudes represent one of the main obstacles to the mergers (see Group of Ten, 2001). Differences in communication styles, customer needs and distribution channels, for example, could hamper exchange of information and even impede the development of a coherent corporate identity, thus aggravating the difficulty of getting two firms to work as one. Therefore, the reorganization of the merged firms can hardly be completed overnight.

For bank mergers, the long lags that are likely between the completion of the merger and the value gains are well documented (see Rhoades 1998, Calomiris and Karceski, 2000 and Houston, James and Ryngaert, 2001). Such lags have been taken into consideration in studying the effects of M&As on small business lending (Berger, Saunders, Scalise and Udell, 1998), stock market reactions to merger announcements (Madura and Wiant, 1994) and the importance of the various sources of value gains from mergers (Houston, James and Ryngaert, 2001). However, they have not been considered in previous analyses of pricing effects.

This discussion suggests that a comprehensive assessment of the competitive effects of M&As requires an analysis of the price changes generated by mergers in the long run. The data needed to perform such investigation are not generally available, but they turn out to be available for Italy. For this country, we have access to a unique dataset with detailed information on the deposit rates of individual banks in local markets over nearly a decade (1990-98). We observe interest rates for different categories of deposits (small and large deposits, households and firms deposits, etc.), so that we can examine the effect of M&As on each category. We also have data on the characteristics of the local markets. Thus, our sample allows for an in-depth analysis of the relation between market structure (e.g. concentration) and the pricing effects of M&As. The availability of this dataset has prompted us to focus on Italy to analyze the short-run as well as the long-run effects of M&As on prices. To our knowledge this is the first such study for any market.

We examine whether the deposit rates of the consolidated banks diverge from those of the control sample, distinguishing temporary from permanent changes. Consistent with previous research, we find that in the short run consolidation increases market power, and lowers the deposit rate by about 16.6 basis points (3.3 percent of market rates) in the year of

the merger. In the long run, however, the deposit rate of merged banks rises, eventually reaching 13 basis points above its pre-merger level. This finding is consistent with the notion that in the long run mergers benefit consumers.

One objection to the significance of these results is that the mergers examined may not actually generate substantial market power, possibly because they are too small to affect competitive conditions. To address this issue, we examine sub-samples that are highly vulnerable to an increase in market power, where the short-run fall in the deposit rates of the merged banks should be larger. According to our hypothesis, however, in the long run the deposit rates of the merged banks should nonetheless increase relative to the control sample. We find that for the sub-samples that are sensitive to market power in the short-run the deposit rate falls more than average, but in the long run it rises relative to the control group.

We also compare the price changes induced by in-market mergers with those induced by out-of-market mergers, which do not modify local market shares and thus only affect banks' efficiency, not their market power. According to our hypothesis, in the short run out-of-market mergers should have no effect on the deposit rates but in the long run should improve efficiency and lead to higher rates relative to the control sample. And this is indeed what we find, with no short-term change and a long term increase equal to 11 basis points.

Finally, we explore the alternative hypothesis that the long-run rise in the deposit rates of the merged banks does not reflect efficiency gains but a deterioration in quality. Difficulties in integrating the merging parties could result in poorer quality of services, inducing the merged banks to compensate dissatisfied depositors with higher rates. However, the post-merger rate changes are not explained by proxies for service quality. Instead, deposit rates rise only for banks that are successful in reducing costs after the merger. These findings lend empirical support to the hypothesis that in the long run mergers improve efficiency.

Our results carry important implications for the debate on the wealth transfers associated with consolidation, providing support for the view that the value gains from mergers represent gains in economic efficiency (see Jensen, 1988), not simply redistributions from consumers to other stakeholders. Our findings complement those of previous studies that suggest that mergers are complex events, whose economic consequences must be evaluated considering important characteristics of the deals, such as the market share of the target firm (see Sapienza, 2002) or the product lines involved in the transaction (see Kahn, Pennacchi and Soprancetti, 2000). To assess the welfare implications of consolidation properly, the effects of mergers must be analyzed over a period long enough to let the efficiency gains emerge; the findings of investigations that look only at a short post-merger period may be reversed when a longer horizon is considered.

The paper is organized as follows. In section 2 we review the literature. In section 3 we describe the data and the econometric tests. In section 4 we investigate the effects of M&As for the entire sample. Section 5 presents the sub-sample analysis. Section 6 examines the competing explanations of the rate changes. Section 7 concludes.

2. Market power and efficiency effects

There are several ways in which M&As can increase efficiency. First, the larger firms that result from consolidation may gain access to cost-saving technologies or spread their fixed costs over a larger base, thus reducing average costs. The efficiency gains may also derive from the exploitation of economies of scope: the deal may allow the merging parties to enter new markets and cross-sell their products to a wider customer base. Finally, consolidation may improve managerial efficiency.³

However, the fact that merged firms may become more efficient does not necessarily mean efficiency gains will be passed on to consumers via lower prices. In fact, consolidation may increase market power, thus leading to higher prices and lower levels of activity. The effect of M&As on prices depends on several factors, such as the characteristics of the deal (e.g. in-market or out-of-market), the ease of market entry by potential competitors, the geographical scope of the markets involved (local, national, possibly international). The direction of the changes in market prices induced by consolidation is therefore ambiguous, as depends on whether the market power or the efficiency effect prevails.

Several papers have examined firms' ability to exercise market power in a static framework, investigating the relationship between market concentration and prices (see, for example, Hannan 1991 for loan rates and Berger and Hannan 1989 for deposit rates) or between market concentration and profits (see for example Berger, 1995). However, drawing inferences on the pricing effects of M&As on the basis of the static literature may be problematic for two reasons. First, it requires assuming that the consolidating firms are comparable to the others. But the fact that they are involved in a merger while the others are not is an indication that they are different in (possibly unobservable) ways that might influence their pricing policies. Second, the relationship between market concentration and prices may differ according to the reasons for the increase in concentration. For example, concentration might increase because of the expansion of the most efficient firms, with favorable effects on prices.

Dynamic analyses — focusing on the pricing strategies of the merged firms as compared with the behavior of the others — provide direct evidence on the effects of M&As on market prices. However, because of lack of data, few studies have directly investigated the pricing effects of M&As.

The general conclusion of the dynamic studies is that in-market consolidation generates substantial market power. In an insightful analysis of the price effect of mergers in the U.S. airline industry, Kim and Singal (1993) find that the merging firms raised airfares by 9.44 percent relative to the routes unaffected by the merger. Prager and Hannan (1998) find that M&As that violate the U.S. Department of Justice (DOJ) bank merger guidelines⁴ substantially reduce the deposit rates paid by the merged banks. Using a data set on

³ For a comprehensive review of studies on scale and scope economies and managerial x-efficiency in the banking industry see Berger, Demsetz and Strahan (1999).

⁴ Under the DOJ guidelines, a bank merger has the potential to reduce competition if it raises the Herfindhal-Hirschman index (HHI) by 200 points or more to a level greater than 1,800.

individual loan contracts, Sapienza (2002) finds that loan rates increase when the target has a large local market share. Kahn, Pennacchi and Sopranzetti (2000) find that large in-market mergers lead to greater market power in the pricing of personal loans but reduce automobile loan rates.⁵

One problem with these results is that the post-merger period examined in the previous studies may be too short to capture the full effect on market prices.⁶ In fact, while market power can be exercised immediately after the deal, since it only requires that the local manager of the merged firm modify his pricing strategy to exploit the larger market share, the value gains are likely to take a long time to become manifest. This means that studies restricted to a short post-merger period might fail to account for the efficiency gains and thus overestimate the adverse price changes.

For bank mergers, long lags in the improvement of performance may reflect difficulties in refocusing lending policies, rationalizing branches, integrating data processing systems and operations, training the personnel of the target to market the new owner's products. Moreover, culture clashes may be especially harmful in banking, as the relationships with customers depend heavily on soft information, which is more difficult to transfer than such objective information as balance sheet data (Rajan, 1992). The resignation of key executives or the emergence of morale problems due to reassignments or employee turnover may cause the loss of information, especially when the new management has little time to develop customer information.

Berger, Saunders, Scalise and Udell (1998) and Calomiris and Karceski (2000) mention three years as the gestation period needed to restructure the merged bank. This squares with the results of the interviews conducted by the Federal Reserve Board staff with officials of banks involved in mergers (see Rhoades, 1998): "Most of the firms projected that the cost savings would be fully achieved within three years after the merger, with the majority of savings being achieved after two years". In a study of large bank mergers in the U.S., Houston, James and Ryngaert (2001) analyze management projections on the timing of cost savings and revenue enhancements. They find that cost savings and revenue gains take two to four years. These indications are in line with the experience of bank managers in Italy (see for example Bizzocchi, 1999).

In this paper we investigate the pricing effects of M&As over nine years (1990-98), separating the short-run from the long-run consequences. We analyze the Italian market for retail deposits. This provides an ideal framework for our study for several reasons. First, technological innovation and thorough-going deregulation prompted an unprecedented wave of M&As that cut the number of banks in Italy by nearly 25 percent, from 1,176 in 1989 to 867 in 1998. Second, the market for retail deposits is fragmented into a large number of local

⁵ Akhavein, Berger and Humphrey (1997) find that mergers between large banks result in small price changes and large efficiency gains; however, as they note, their proxies of the loan and deposit rates (obtained from banks' balance sheets) might be an inaccurate approximation of the true market rates.

⁶ Kim and Singal (1993) analyze the price changes between the announcement of the merger and one quarter after its completion. Prager and Hannan (1998) focus on the 12 months following the consolidation. Sapienza (2002) analyzes a longer period, but for most of the M&As in her sample she can observe the loan rates only for the two years that follow the merger.

markets (the Italian provinces):⁷ banks design their strategies and set their deposit rates primarily in response to supply and demand in each province, not in response to conditions prevailing in the neighboring areas.⁸ This means that we can compare banks' pricing strategies in different local markets within the same industry, taking local market structure into consideration. Third, the characteristics of bank deposits are highly homogeneous over time and across banks, largely because some of the key elements of the deposit contract are defined by law. The Civil Code defines the basic obligations of the parties involved in a deposit contract (Articles 1834, 1835 and 1836) and the minimum requirements for contract content (Articles 1341 and 1342), while contract disclosure is regulated by the 1993 Banking Law.⁹ Moreover, unlike other bank products (e.g. loans), deposits are virtually unaffected by asymmetric information. Therefore, by focusing on the effect of M&As on deposit rates we prevent the estimates of the market power and efficiency effects from being blurred by changes in product characteristics or inadequate control for borrower risk.

3. Methodology and data

3.1 Sources

We have three main sources of data. Interest rates and the value of outstanding deposits come from the Central Credit Register. Banks' balance sheet and income statement information come from the Banking Supervision Register at the Bank of Italy. Data on the mergers and acquisitions are drawn from the Census of Banks.

The Central Credit Register is a department of the Bank of Italy that collects data on the interest rates on deposits above €10,300 (\$9,000). The banks that report deposit rates have agreed to file detailed information with a breakdown by size of deposit (below or above €25,000),¹⁰ type of depositor (households, financial firms and non-financial firms) and branch location (province).¹¹ The deposit rate is the ratio of the payment made in each period by the bank to the account holder to the average balance of the deposit. The interest payment is net of the expenses charged by the bank to the account holder (e.g., the cost of mailing the account statement).

The Banking Supervision Register also provides the data on the deposits of individual banks in each province, with a breakdown by size of the deposit and type of depositor, which

⁷ Italy is divided into 103 provinces that by and large correspond to U.S. counties.

⁸ As far as consolidation is concerned, the Bank of Italy (which is also the antitrust authority for banking) refers to the provinces as the relevant market for bank deposits (see Bank of Italy, 1992). In previous research, local markets have been identified with the provinces by Sapienza (2002) and Attanasio et al. (2002).

⁹ See Carriero (1997).

¹⁰ There is no difference in type between deposits above and below €25,000. Banks simply divide them according to average balance for purposes of reporting.

¹¹ For a detailed description of the Central Credit Register see Pagano, Panetta and Zingales (1998).

we use to calculate the Herfindhal-Hirschman index (HHI) for the local deposit markets.¹² Finally, we supplement these data with several province-specific indicators, such as the number of new banks entering each local market and per capita GDP.

3.2 Sample

We restrict our attention to households' deposits. Firms are excluded because they use their banks not only for transaction accounts, but mainly for other key financial products (lending, underwriting, etc.), so that interest rates on firms' deposits may be strongly influenced by factors that are unrelated to developments in the deposit market. The remuneration of a firm's deposit is likely to be affected by the conditions that are agreed upon on the lending side of the relationship or by other firm-specific factors, and estimates of the pricing effects of M&As including firms' deposits may accordingly be unreliable.

We focus on current accounts, which are highly homogeneous deposit products^{13,14} and therefore have ideal features for our analysis. First, the bank can change the remuneration of the account at any point in time; the account holder, in turn, can close the account without notice. This means that (i) differences in the deposit rates are not influenced by differences in maturity; (ii) changes in efficiency or market power that modify banks' pricing policy can have almost immediate repercussions on the remuneration of current accounts. Second, current accounts do not include overdraft facilities or minimum balance requirements. Therefore their interest rates are not influenced by differences in the characteristics of the accounts and can be meaningfully compared across banks.

The banks reporting detailed deposit rate data decreased from 78 in 1990 to 56 in 1998 (Table 1). These reporting banks are larger than average, and they account for two-thirds of total banking industry deposits. The number of bank-province observations ranges from 1,164 in 1990 to 1,374 in 1996; the branch network of the reporting banks covers an average of 19 provinces.

We concentrate on the provinces affected by in-market mergers, i.e. those that before the consolidation were served by both merger participants (the bidder *and* the target bank). Here, mergers have the potential to influence both efficiency and market power; controlling the same market share with one bank instead of two may increase the market power of the local manager. In our sample 39 banks were involved in in-market deals and we find 193 bank-province observations of in-market deals (1.6 percent of the total number of bank-province observations).

¹² The HHI is the sum of the squared market shares of all active banks.

¹³ Current accounts are interest-bearing deposits that allow unlimited checking. This type of deposit is the most common one among Italian households (according to the Survey of Household Income and Wealth, about 85 percent of households have a current account) and represents about 70 percent of total bank deposits.

¹⁴ Other products included in the original data set (CDs and term deposits) were excluded from the analysis since detailed information on their maturity is not available.

Table 1

MERGERS INVOLVING THE BANKS THAT REPORT DEPOSIT RATES

The data refer to the Italian banks that report the interest rate paid on current accounts held by households (the “reporting banks”). Percentage of industry deposits is the ratio of the deposits of the reporting banks to the deposits of all Italian banks. Number of bank local-market observations is the sum (over banks) of the Italian provinces served by the reporting banks. Number of banks involved in mergers is the number of reporting banks that were involved in at least one in-market consolidation during the year. Number of bank local-market observations affected by mergers is the number of provinces that before the mergers were served by both the bidder and target banks.

Year	No. of banks that report deposit rates	Percentage of industry deposits	No. of bank local-market observations	No. of banks involved in mergers	No. of bank local-market observations affected by mergers
1990	78	65.5	1,164	4	15
1991	75	65.7	1,219	6	27
1992	72	66.9	1,302	6	41
1993	72	66.2	1,336	2	18
1994	67	66.1	1,326	5	20
1995	65	66.6	1,288	9	55
1996	63	66.1	1,374	3	9
1997	59	65.2	1,359	1	1
1998	56	65.5	1,293	3	7
Average	67	66.0	1,296	4	21

Summary statistics on the deposit rates for the bank-province pairs are reported in Table 2. In Panel A we report the interest rates on deposits below €25,000 (\$23,000, which we designate as small deposits), while in Panel B we report the interest rates on deposits larger than €25,000 (large deposits). For small deposits, the average rate declined from 6.9 per cent in 1990 to under 3 per cent in 1998. The rates exhibit substantial variability between provinces: for example the figures for 1992 range from a minimum of 3.96 per cent to a maximum of 10.92 per cent. The interest rate on large deposits exhibits similar characteristics, with a decline from 7.34 per cent in 1990 to 3.06 per cent in 1998.

Panel C shows summary statistics on the reporting banks. The median size is €2.8 billion (\$20 billion). The ratio of bad loans to total lending (a proxy for riskiness) is equal to 6.3 percent, while the ratio of operating costs to gross revenues (a standard indicator of efficiency) is 69.4 percent. Panel D contains summary statistics on the local markets. The median value of the provincial HHI of the deposit market is 1,610, ranging from a low of 520 to a high of 5,680. For each province we construct a dummy that is set equal to 1 when a new bank enters the market (we exclude entry due to M&As). The figures in Panel D indicate that each year 3.2 percent of Italian provinces show an increase in the number of banks. Finally, we report data on per capita GDP and the growth rate.

Table 2

SUMMARY STATISTICS

The summary statistics of Panel A and Panel B refer to the province-specific interest rates on households' deposits paid by a sample of large banks (the "reporting banks"). The mean, median and standard deviation are calculated across provinces for each year in the sample. The summary statistics of Panel C refer to the reporting banks. Size is the bank's total assets in millions of euros. Bad loans is a percentage of total loans. Cost-income ratio is the ratio of overhead to gross income. The summary statistics of Panel D refer to the Italian provinces. Market concentration is the Herfindahl-Hirschman index of the deposit market, calculated for each province as the sum of the squared market shares of all active banks. New banks is a dummy equal to 1 when a new bank enters the local market. GDP per capita is in euros. GDP growth is the annual growth of GDP in real terms. The number of observations is the number of bank-province pairs.

	No. of Obs.	Median	Mean	Std. Dev.	Min.	Max.
Panel A: Interest rate on small deposits (below €25,000)						
Year:						
1990	1,164	6.90	6.87	0.70	3.00	9.50
1991	1,219	6.87	6.84	0.73	2.50	9.16
1992	1,302	7.39	7.29	0.96	3.96	10.92
1993	1,336	5.53	5.55	0.77	2.77	8.02
1994	1,326	4.85	4.80	0.61	2.83	6.69
1995	1,288	5.53	5.52	0.57	2.81	7.33
1996	1,374	4.46	4.48	0.63	1.85	6.35
1997	1,359	3.19	3.21	0.55	0.89	5.05
1998	1,293	2.66	2.69	0.40	0.79	4.19
Panel B: Interest rate on large deposits (above €25,000)						
Year:						
1990	1,158	7.39	7.34	0.80	2.89	10.76
1991	1,215	7.32	7.27	0.77	2.53	9.62
1992	1,302	7.93	7.81	1.10	2.32	11.58
1993	1,332	5.92	5.89	0.79	2.25	8.96
1994	1,322	5.23	5.14	0.70	2.38	7.35
1995	1,288	5.97	5.95	0.70	2.07	9.67
1996	1,370	4.85	4.83	0.69	2.04	7.46
1997	1,357	3.59	3.59	0.61	1.17	5.70
1998	1,292	3.04	3.06	0.45	1.05	5.05
Panel C: The reporting banks						
Variables:						
Size	11,661	22,782	29,131	22,530	576	91,697
Bad loans	11,661	6.30	7.32	5.23	0.07	59.52
Cost-income ratio	11,661	69.44	69.87	14.08	44.74	333.33
Panel D: The local markets						
Variables:						
Market concentration	11,661	1,610	1,771	807	519	5,685
New banks	11,661	0	0.033	0.178	0	1
GDP per capita	11,661	14,874	14,914	3,983	6,065	26,518
GDP growth	11,661	1.94	1.47	2.44	-9.72	10.07

3.3 Test design

In this section we describe the econometric methodology used in the empirical study and our basic tests. We investigate whether in-market mergers produce an increase or a decrease in the deposit rate of the merging banks relative to the control sample. If a deal improves efficiency, it should allow the merging bank to raise its deposit rates, whereas if it only increases the bank's local market power, the deposit rate should fall. Of course, mergers could influence both efficiency and market power. Thus a reduction of the deposit rate of the merging banks relative to the non-merging ones would indicate that the market power effect dominates the efficiency gains; on the contrary, a positive rate change would be consistent with the hypothesis that the efficiency gains prevail over the market power effect.

We separate the transitory from the permanent effects of M&As. Following Kim and Singal (1993), we analyze two sub-periods: transition and completion. The transition period covers the year of the merger and the next two.¹⁵ The completion period includes all subsequent years. We assume that the deals increase market power beginning in the transition period, and thus we expect a decline in the deposit rate of merged banks relative to non-merged ones. During the completion period the restructuring should produce its effects, presumably leading to a rise in the deposit rates relative to the control group.

We estimate the following fixed-effects regression:

$$(1) \quad r_{i,k,t} = \mathbf{a} + \mathbf{b}_{0-2} INMERGE_{i,k,t}^{0-2} + \mathbf{b}_{3+} INMERGE_{i,k,t}^{3+} + JBANK_{i,t} + IPROV_{k,t} + u_k + d_t + \mathbf{e}_{i,k,t}$$

where $r_{i,k,t}$ is the relative interest rate paid in year t by bank i on the deposits held by households in province k , measured by the difference between the bank's deposit rate and the 3-month interbank interest rate. $INMERGE_{i,k,t}^{0-2}$ is a dummy that is equal to 1 if in year t or in the previous two years (the transition period) bank i merged with a target that before the consolidation was already operating in province k , i.e. if it was involved in a deal that increased its local market share. $INMERGE_{i,k,t}^{3+}$ is a dummy that is equal to 1 if the merger took place three or more years before (that is, it stands for the completion period).¹⁶ $PROV_{k,t}$ and $BANK_{i,t}$ are, respectively, a set of time varying province- and bank-specific control variables. u_k is a province-specific fixed effect and d_t is a time dummy. Finally, we include a zero-mean random error $e_{i,k,t}$.

¹⁵ We make this choice for two reasons. First, we want to make our results comparable with those of the previous studies, which cover at most two years after the merger. Second, this is the period that practitioners consider necessary to achieve most of the cost savings. We check the robustness of our results to this choice.

¹⁶ Throughout the paper we report the estimates obtained by setting $INMERGE_{i,k,t}^{3+}$ equal to 1 at $t=3, 4, 5$. We check that all results are unchanged by the inclusion of all years with $t>5$.

Within the framework of equation (1), our hypotheses translate into testable predictions on the coefficients. The hypothesis that in the short run mergers increase the market power would imply $\beta_{0-2} < 0$. The hypothesis that in the completion period the efficiency gains prevail over the increase in market power implies $\beta_{3+} > 0$, while a negative value for β_{3+} would indicate that the market power effect outweighs the efficiency gains.

We include a full set of province dummies in consideration of the significant differences among the deposit rates between different geographic areas in Italy (see Attanasio et al., 2002). These dummies account for province-specific characteristics such as, for example, whether the province is located in the North or in the South. By including a calendar-year fixed effect we control for cyclical patterns common to all banks and provinces. The bank variables capture the relation between the deposit rates and the banks' characteristics (to avoid simultaneity, all variables are lagged one year). We include size (the log of total assets) and proxies for risk (the ratio of bad loans to total lending) and efficiency (the cost-income ratio). We also control for province-specific variables. First, we include the HHI of the deposit market, a standard proxy of the degree of market power. To capture the increase in competition prompted by the geographical expansion of Italian banks in the nineties (see Angelini and Cetorelli, 2002), we include a dummy to control for bank entry into local markets. Finally, we include the provincial *per capita* GDP. To check whether our results are sensitive to the chosen specification, we have also estimated models including other bank and province characteristics (see below).

4. Results for the entire sample

4.1 The merging banks

Table 3 reports the estimates of equation (1).¹⁷ Panel A shows that in the transition period the deposit rate of the consolidating banks decreases by 13.5 basis points relative to non-merging banks, while in the completion period it increases by 12.6 basis points (both effects are strongly significant). This pattern is consistent with the hypothesis that in the short run mergers cause consumer-adverse price changes but that their long run effect is beneficial.

¹⁷ The table contains the regression coefficients and standard errors in parenthesis, and the R-square of each regression. The standard errors are corrected for general heteroskedasticity.

Table 3

EFFECT OF M&AS ON HOUSEHOLDS' DEPOSIT RATES

In the basic regression (Panel A) we estimate the following specification:

$$r_{i,k,t} = \mathbf{a} + \mathbf{b}_{0-2} INMERGE_{i,k,t}^{0-2} + \mathbf{b}_{3+} INMERGE_{i,k,t}^{3+} + \mathbf{JBANK}_{i,t} + \mathbf{IPROV}_{k,t} + u_k + d_t + \mathbf{e}_{i,k,t}$$

where $r_{i,k,t}$ is the relative interest rate paid in year t by bank i on deposits held by households in province k (measured by the difference between the bank's deposit rate and the 3-month interbank rate), $INMERGE_{i,k,t}^{0-2}$ is a dummy variable equal to 1 if in year t or in the previous two years (the transition period) bank i merged with a target that before the consolidation was already operating in the province, $INMERGE_{i,k,t}^{3+}$ is a dummy equal to 1 if the deal took place three or more years earlier (the completion period), $PROV_{k,t}$ and $BANK_{i,t}$ are, respectively, province- and bank-specific variables, u_k is a province-specific fixed effect and d_t is a calendar year-specific effect, $\mathbf{e}_{i,k,t}$ is a zero-mean random error. In Panel B we report the results of estimating the rate changes determined by mergers for each year separately. In Panel C we report the results of estimating the rate changes determined by mergers on the *pro forma* deposit rates of the consolidating banks. Size is the banks' total assets. Bad loans are a percentage of total loans. Cost-Income ratio is overhead divided by gross income. Market concentration is the Herfindahl-Hirschman index of the provincial deposit market (the coefficient is multiplied by 100). New banks is a dummy equal to 1 when a new bank enters the local market. GDP *per capita* is in euros. Heteroskedasticity robust standard errors are reported in parentheses. The symbol *** indicates a significance level of 1 per cent or less; ** between 1 and 5 per cent; * between 5 and 10 per cent.

Variables	Panel A:	Panel B:	Panel C:
	Short-run and long-run effect	Year by year effect	<i>Pro-forma</i> deposit rates
Transition period (years 0-2)	-0.135 *** (0.019)		-0.146 *** (0.019)
Year 0		-0.166 *** (0.034)	
Year 1		-0.123 *** (0.027)	
Year 2		-0.072 ** (0.028)	
Completion period (years 3+)	0.126 *** (0.019)		0.096 *** (0.019)
Year 3		0.036 (0.027)	
Year 4		0.097 *** (0.028)	
Year 5		0.245 *** (0.038)	
Size (log value)	-0.051 *** (0.005)	-0.051 *** (0.005)	-0.045 *** (0.005)
Bad loans	0.031 *** (0.001)	0.031 *** (0.001)	0.038 *** (0.001)
Cost-income ratio	-0.006 *** (0.001)	-0.006 *** (0.001)	-0.012 *** (0.001)
Market concentration	-0.011 *** (0.002)	-0.011 *** (0.002)	-0.011 *** (0.002)
New banks	0.190 *** (0.040)	0.192 *** (0.040)	0.160 *** (0.040)
GDP <i>per capita</i> (log value)	-0.728 *** (0.118)	-0.729 *** (0.118)	-0.700 *** (0.118)
No. of observations	23,297	23,297	23,027
R-Square	0.878	0.878	0.880

The price changes are not huge, but the gains for consumers are not trivial. These gains, to put them in perspective, come to approximately 252 dollars for a consumer holding a deposit of \$10,000.¹⁸

To check that our result does not depend on our definition of the transition and completion periods, we re-estimate the model including a separate dummy for each of the years following the merger. The coefficients of these dummies, reported in Panel B of Table 3, confirm that our results are not driven by any single year. In particular, the coefficients are negative and statistically significant for all years in the transition period. In contrast, for $t=3$, 4 and 5 the effect is positive (for $t=3$ the coefficient is not significant). The coefficients for the individual years indicate that in $t=0$ (the merger year) the increase in market power leads to a decline of the deposit rate of 16.6 basis points (3.3 percent of the average deposit rate in our sample period). The deposit rates of merged banks start recovering in $t=1$. From $t=3$ they exceed their pre-merger levels (relative to the control sample).

The reduction of the deposit rate of merged banks in the transition period could reflect differences between the rates of the bidder and target. For example, if before the merger the deposit rates of the target were lower than those of the bidder, afterwards we might find a fall in the deposit rate of the new bank even when the deposit rates remain unchanged. We probe this issue further by considering the effects of mergers on the *pro forma* rates (the average of the local pre-merger rate of the bidder and target banks):¹⁹ if the rate reduction in the transition period is not due to market power but simply to balance-sheet consolidation, the effect should vanish using the *pro forma* rates. The results, reported in Panel C of Table 3, confirm the previous ones.

The coefficients of the bank and province variables are all significant and have the expected sign. Deposit rates are lower for inefficient banks (high ratio of costs to gross income) and for large banks and higher for riskier banks (high ratio of bad loans to total lending). The deposit rates are lower in provinces with high GDP per capita, where the transactional demand for deposits is presumably greater. As expected, the deposit rate is also lower in provinces with high market concentration. Finally, the deposit rate changes favorably to consumers when new competitors enter the local market.

4.2 *The rival banks*

A change in the pricing policy of the merging banks might also influence the pricing policy of rival banks, i.e. other banks operating in the provinces affected by consolidation. Previous research suggests that the rivals' reaction differs according to the effects of the merger. Some studies have found that when the market power effect prevails the rivals adopt a "follower" strategy, changing their prices unfavorably to consumers (see Kim and Singal,

¹⁸ The value of the gain for the depositor has been calculated discounting the permanent yearly gain (\$12.6) at a 5 percent nominal rate. This calculation does not consider the temporary loss suffered by consumers in the transition period.

¹⁹ The results reported in the table are weighted averages, but simple averages are virtually identical.

1993 and Praeger and Hannan, 1998). In contrast, when the efficiency gains dominate, the rivals (which do not benefit from these gains) may leave their prices unchanged, as they would find it unprofitable to follow the pricing policy of the merging banks (see Kahn, Pennacchi and Sopranzetti, 2000).

In the previous analysis we did not distinguish the rival banks from the other non-merging banks. In order to examine whether our results are affected by this choice, we construct a dummy ($RIVAL_{i,k,t}^{0-2}$) that equals 1 if in year t or in the previous two years bank i was exposed in province k to a merger that involved the acquisition of at least 1 percent of the local deposit market.²⁰ We then define a dummy ($RIVAL_{i,k,t}^{3+}$) that refers to a bank that is a rival of a deal that took place three or more years before. We then run the following regression:

$$(2) \quad r_{i,k,t} = \mathbf{a} + \mathbf{b}_{0-2} INMERGE_{i,k,t}^{0-2} + \mathbf{b}_{3+} INMERGE_{i,k,t}^{3+} + \\ \mathbf{f}_{0-2} RIVAL_{i,k,t}^{0-2} + \mathbf{f}_{3+} RIVAL_{i,k,t}^{3+} + \\ JBANK_{i,t} + IPROV_{k,t} + u_k + d_t + \mathbf{e}_{i,k,t}$$

The results of equation (2) are reported in Panel A of Table 4. The rate changes of the merged banks do not differ from those reported in Table 3: after a temporary decrease in the transition period, the deposit rate increases relative to the control sample. The size of the price changes is also similar to that of Table 3.

The rivals change their rates very little: their deposit rates decline by 2.4 basis points in the transition period and by 6 basis points in the completion period (both coefficients are highly significant). An F-test indicates that \mathbf{b}_{0-2} is statistically different from \mathbf{f}_{0-2} : in the transition period the rivals lower their rates less than merged banks. Moreover, the deposit rates of the rivals do not change between the transition and the completion period (an F-test indicates that \mathbf{f}_{0-2} is not statistically different from \mathbf{f}_{3+}). A possible interpretation of these results is that the rivals follow the price changes of the merging banks only in the transition period, when the market power effect prevails; in the completion period, when the merging banks pass gains on to depositors, the rivals leave their deposit rates unchanged.

²⁰ Put another way, when bank j takes over bank h the dummy $RIVAL_{i,k,t}^{0-2}$ (with $j \neq i$ and $h \neq i$) is set to 1 if two conditions hold: (a) both j and h were serving the province before the deal; (b) the market share of bank h in the year before the merger was at least 1 percent.

Table 4

**EFFECT OF M&AS ON HOUSEHOLDS' DEPOSIT RATES:
IN-MARKET (MERGING BANKS AND RIVAL BANKS) AND OUT-OF-MARKET
MERGERS**

Panel A reports the results of estimating equation (2) of the paper. Panel B reports the results of estimating equation (3) of the paper. Size is the banks' total assets. Bad loans is a percentage of total loans. Cost-Income ratio is overhead divided by gross income. Market concentration is the Herfindahl-Hirschman index of the provincial deposit market (the coefficient is multiplied by 100). New banks is a dummy equal to 1 when a new bank enters the local market. GDP *per capita* is in euros. Heteroskedasticity robust standard errors are reported in parentheses. The symbol *** indicates a significance level of 1 per cent or less; ** between 1 and 5 per cent; * between 5 and 10 per cent.

Variables	Panel A:	Panel B:
	In-market mergers: merging banks and rival banks	In-market and out-of-market mergers
In-market mergers:		
Transition period (years 0-2)	-0.146 *** (0.019)	-0.133 *** (0.019)
Completion period (years 3+)	0.115 *** (0.019)	0.139 *** (0.019)
Rivals of in-market mergers		
Transition period (years 0-2)	-0.024 * (0.014)	—
Completion period (years 3+)	-0.057 *** (0.015)	—
Out-of-market mergers		
Transition period (years 0-2)	—	-0.010 (0.010)
Completion period (years 3+)	—	0.112 *** (0.010)
Size (log value)	-0.050 *** (0.005)	-0.057 *** (0.005)
Bad loans	0.031 *** (0.001)	0.031 *** (0.001)
Cost-income ratio	-0.006 *** (0.001)	-0.005 *** (0.001)
Market concentration	-0.010 *** (0.002)	-0.011 *** (0.002)
New banks	0.182 *** (0.040)	0.215 *** (0.040)
GDP per capita (log value)	-0.716 *** (0.118)	-0.720 *** (0.118)
No. of observations	23,297	23,297
R-square	0.878	0.879

4.3 Out-of-market mergers

In this section we analyze the rate changes that occur in provinces affected by out-of-market mergers, i.e. those that before the consolidation were served by only one of the merging banks (the bidder *or* the target). According to our hypothesis, there should be no variation in the deposit rate during the transition period, as market power has not changed (these mergers do not modify local market shares)²¹ while the efficiency gains have not yet been realized. In the completion period, by contrast, the efficiency gains could result in a rise in the merged banks' deposit rate.

We define two dummies: $OUTMERGE_{i,k,t}^{0-2}$ is set to 1 if in year t or in the previous two years bank i merged with a bank that before the deal had no branches in province k . Analogously, $OUTMERGE_{i,k,t}^{3+}$ refers to out-of-market mergers that took place three or more years before. We then estimate the following regression:

$$(3) \quad r_{i,k,t} = \mathbf{a} + \mathbf{b}_{0-2} INMERGE_{i,k,t}^{0-2} + \mathbf{b}_{3+} INMERGE_{i,k,t}^{3+} + \\ \mathbf{d}_{0-2} OUTMERGE_{i,k,t}^{0-2} + \mathbf{d}_{3+} OUTMERGE_{i,k,t}^{3+} + \\ \mathbf{JBANK}_{i,t} + \mathbf{IPROV}_{k,t} + u_k + d_t + \mathbf{e}_{i,k,t}$$

The inclusion of the out-of-market dummies does not affect the size and significance of the pricing effects of in-market mergers (see Panel B of Table 4).²² Regarding out-of-market mergers, in the transition period the deposit rate of the consolidating banks does not change, which is consistent with the hypothesis that these deals do not generate additional market power. In the long run the deposit rate rises by 11.2 basis points, supporting the hypothesis that consolidation benefits consumers.

4.4 Robustness of the estimates

We undertake several analyses to assess the robustness of results to the inclusion of other bank- and firm-specific control variables and the use of alternative estimation methods. They have negligible effects on the results.

²¹ By increasing the number of geographical markets in which firms compete simultaneously, even out-of-market mergers may increase market power, consistent with the multi-market contact hypothesis (MMC): firms that compete with each other in many markets may recognize that aggressive behavior in one market may lead to retaliation elsewhere. As a consequence, they may reduce competition in the affected markets (see Bernheim and Whinston, 1990). Tests of the MMC in the banking industry do not find significant evidence of collusion (see Pilloff, 1999 for the U.S. and De Bonis and Ferrando, 2000 for Italy).

²² We run regressions including both the *RIVAL* and the *OUTMERGE* dummies. The results are similar to those reported in Table 4.

First, we run regressions including banks' profitability (ROA) and deposit-to-assets ratio. We also include the provincial rate of growth of GDP and the rate of inflation. These alternative variables are generally not significant and do not affect the merger dummies.

A potential problem in our estimates is that we do not consider the mergers that took place before 1990: in fact, the provinces affected by a merger before 1990 could be included in our control sample, thereby biasing our results. To examine this issue, we identify mergers that occurred between 1985 and 1989 using the sample of Focarelli, Panetta and Salleo (2002) and modify our merger dummies to take them into account. We then re-estimate equation (1) and obtain results similar to those reported in Table 3.

The merging banks could also modify their pricing policy even before the merger. The mere announcement could prompt local managers to collude in order to exercise market power. If this were so, our analysis might underestimate the market power effect of M&As. We therefore construct a dummy ($INMERGE_{i,k,t}^{-1}$) that identifies the year before the merger ($t=-1$). However, this dummy is not significant²³ and its inclusion in the regression does not affect our results.

We also re-estimate our model (i) including two province-specific fixed effects, one for small deposits and one for large deposits; (ii) including a fixed effect for each bank-province pair, i.e. a dummy that captures potential heterogeneities that might arise within each bank in different provinces; and (iii) using a random effects model. None of our main results are affected by these alternative estimation techniques.

We then specialize the Huber-White standard errors to relax the assumption of independence among the observations that refer to different banks in the same province and to allow for the possibility that banks adopt uniform pricing across provinces within each region.²⁴ These changes affect the significance of the province-specific variables, albeit only marginally, but do not influence the coefficients of the merger dummies.

Another potential concern with our analysis is that deposits are just one of the products banks offer to their customers. This means that the deposit rates used in our regressions could be affected by strategies for marketing other products to households — for example, one bank may offer a high deposit rate but charge a higher rate on loans. Although we mitigate this risk by focusing on homogeneous products and by concentrating on households' deposits (which are much less subject to this problem than firms' deposits), we cannot eliminate it. However, this problem is likely to be negligible for our analysis. In fact, deposits are by far the most important financial product purchased by Italian households from their bank, while only a tiny fraction of households purchase other important financial products: in our sample period only 4 percent of the households holding bank deposits also resorted to bank consumer credit.²⁵

²³ This result differs from previous ones. A possible explanation for this difference is that we do not identify the exact date of the merger, but only the year of the merger. This means that the time period identified by our dummies for the transition period already covers some pre-merger months.

²⁴ Italy has 20 regions, comprising from 1 to 11 provinces.

²⁵ The figures in the text are estimated on the basis of the Survey of Household Income and Wealth for 1991, 1993 and 1995.

Finally, the changes in the deposit rates of merged banks could simply reflect modifications in the quality of services, rather than changes in market power and efficiency. This issue is taken up in section 6.

5. Results for sub-samples

We have seen that while in the short run in-market mergers result in lower deposit rates, in the long run consolidation leads to better rates for consumers. However, there is a possible weakness: the mergers in our sample might not be such as to generate substantial market power. For example, they could be too small to alter the competitive conditions of the local markets, so our results might not be comparable with those of previous studies and might suffer from a lack of generality. To address this concern, we now investigate the effects of M&As on sub-samples of customers and markets that are highly vulnerable to an increase in market power. According to our hypothesis, for these sub-samples too the deposit rate should rise in the completion period, although in the short run the anticompetitive effects could be larger than average.

5.1 Differences between small and large deposits

The market power effects of in-market mergers may differ for deposits of different sizes. In fact, for small deposits the costs of shopping for better conditions could exceed the gains from a rise in the deposit rate;²⁶ this means that the local manager could take advantage of the larger market share and cut the remuneration of these deposits with negligible consequences for the volume of business. On the contrary, an attempt to lower the rate on large deposits could induce the customer to move to a different bank. Therefore, the increase in market power is likely to be greatest with respect to small deposits. Accordingly, in the transition period we expect a larger rate reduction for small deposits than for large deposits. In terms of equation (1), this implies that β_{0-2} should be lower (higher in absolute value) for small deposits than for large deposits.

In order to test this hypothesis, we split our sample into two sub-samples, according to the deposit amounts available in our data set. The first sub-sample includes deposits below €25,000 (\$23,000); the second, those above that threshold. We then estimate equation (1) for each sub-sample. The results, reported in Table 5, indicate that in the transition period the reduction of interest rates is much more pronounced for small deposits than for large deposits (18.0 and 9.1 basis points, respectively; the difference is highly significant). Despite this difference, in the long run both small and large depositors benefit from the merger.

²⁶ We are considering the case of a small change in the deposit rate.

Table 5

EFFECT OF MERGERS ON HOUSEHOLDS' DEPOSIT RATES BY SIZE OF THE DEPOSIT

Panel A reports the results of estimating equation (1) of the paper for small deposits, i.e. deposits below €25,000 (\$23,000). Panel B reports the results of estimating equation (1) of the paper for large deposits (deposits equal to or above €25,000). In Panel C we report the value of an F-test on the significance of the difference between the coefficients for small and large deposits. Size is the banks' total assets. Bad loans is a percentage of total loans. Cost-Income ratio is overhead divided by gross income. Market concentration is the Herfindahl-Hirschman index of the provincial deposit market (the coefficient is multiplied by 100). New banks is a dummy equal to 1 when a new bank enters the local market. GDP *per capita* is in euros. Heteroskedasticity robust standard errors are reported in parentheses. The symbol *** indicates a significance level of 1 per cent or less; ** between 1 and 5 per cent; * between 5 and 10 per cent.

Variables	Panel A:	Panel B:	Panel C:
	Small deposits (Less than €25,000)	Large deposits (More than €25,000)	Difference test (Small vs. large deposits)
Transition period (years 0-2)	-0.180 *** (0.022)	-0.091 *** (0.025)	7.09 ***
Completion period (years 3+)	0.102 *** (0.023)	0.150 *** (0.025)	2.08
Size (log value)	-0.052 *** (0.006)	-0.050 *** (0.007)	0.07
Bad loans	0.031 *** (0.002)	0.031 *** (0.002)	0.02
Cost-income ratio	-0.005 *** (0.001)	-0.006 *** (0.001)	0.02
Market concentration	-0.010 *** (0.003)	-0.013 *** (0.003)	0.49
New banks	0.212 *** (0.053)	0.173 *** (0.058)	0.25
GDP per capita (log value)	-0.799 *** (0.145)	-0.658 *** (0.169)	0.40
No. of observations	11,661	11,636	
R-Square	0.905	0.871	

5.2 *Difference between markets with high and low concentration*

A common indicator of the impact of mergers on competition is the HHI of market concentration.²⁷ A high HHI could make it easier for local managers of the merged bank to restrict the range of opportunities available to consumers — such as by closing some local branches — and lower deposit rates. For further insight, we split our bank-province observations into two sub-samples, one below and one above the median HHI for the local deposit market. In the transition period we expect a larger reduction in the deposit rate in the more highly concentrated markets.

Table 6 gives the results of estimating equation (1) for the low-HHI provinces (Panel A) and for the high-HHI provinces (Panel B). In the transition period the fall in the deposit rate is greater for the high-HHI provinces (19 basis points, as against 10.5 basis points for the low-HHI sample; the difference is highly significant), indicating that the market power effect is indeed greater in highly concentrated markets. In the completion period, the deposit rate rises in both sub-samples.

5.3 *Substantial mergers*

In this section we analyze the pricing effect of substantial mergers, i.e. mergers that have a large impact on the local market. We use two definitions of substantial mergers. One follows Prager and Hannan (1998), who found that bank mergers that violate the U.S. DOJ guidelines result in a significant lowering of deposit rates. In order to identify such mergers, for each deal we compute in year $t-1$ (the year before the merger) the *pro forma* HHI, i.e. the HHI that would have resulted from the combination of the deposits of the bidder and target banks. We then compare this hypothetical value of the HHI with the actual value of the HHI in year $t-1$ and construct dummies that identify the transition and completion periods for the mergers that violate the DOJ guidelines. Finally, we estimate equation (1) distinguishing between mergers that violate the guidelines and those that do not. The results are reported in Panel A of Table 7. Consistent with the previous studies, we find that in the short run substantial mergers increase market power considerably: in the transition period the deposit rate falls by 24.3 basis points, as against a reduction of 12.9 basis points for non-substantial mergers (the difference is significant at the 1 percent level). Yet, in the long run substantial

²⁷ Kim and Singal (1993) show that the price changes from M&As are positively related to the HHI.

Table 6

**EFFECT OF MERGERS ON HOUSEHOLDS' DEPOSIT RATES
BY CONCENTRATION OF THE LOCAL MARKET**

Panel A reports the results of estimating equation (1) of the paper for the provinces with below-median Herfindahl-Hirschman index (HHI). Panel B reports the results of estimating equation (1) for the provinces with above-median HHI. In Panel C we report the value of an F-test on the significance of the difference between the coefficients for low- and high-HHI provinces. Size is the banks' total assets. Bad loans is as a percentage of total loans. Cost-Income ratio is overhead divided by gross income. Market concentration is the HHI of the provincial deposit market (the coefficient is multiplied by 100). New banks is a dummy equal to 1 when a new bank enters the local market. GDP *per capita* is in euros. Heteroskedasticity robust standard errors are reported in parentheses. The symbol *** indicates a significance level of 1 per cent or less; ** between 1 and 5 per cent; * between 5 and 10 per cent.

Variables	Panel A:	Panel B:	Panel C:
	Herfindhal below median	Herfindhal above median	Difference test
Transition period (years 0-2)	-0.105 *** (0.024)	-0.190 *** (0.030)	5.0 **
Completion period (years 3+)	0.134 *** (0.024)	0.107 *** (0.031)	0.5
Size (log value)	-0.040 *** (0.006)	-0.065 *** (0.007)	6.7 ***
Bad loans	0.026 *** (0.002)	0.039 *** (0.002)	23.1 ***
Cost-income ratio	-0.003 (0.006)	-0.016 *** (0.003)	3.8 *
Market concentration	-0.004 *** (0.001)	-0.007 *** (0.001)	3.3 *
New banks	0.124 ** (0.061)	0.244 *** (0.053)	2.2
GDP per capita (log value)	-0.697 *** (0.161)	-0.595 *** (0.191)	0.2
No. of observations	11,657	11,640	
R-Square	0.878	0.879	

Table 7

EFFECT OF SUBSTANTIAL MERGERS ON HOUSEHOLDS' DEPOSIT RATES

Panel A reports the results of estimating equation (1) of the paper separating mergers that violate the Department of Justice (DOJ) bank merger guidelines (Herfindahl greater than 1,800, increase of over 200) from those that do not. Panel B reports the results of estimating equation (1) separating mergers that involve a target with a local market share of at least 3 percent. Size is the banks' total assets. Bad loans is a percentage of total loans. Cost-Income ratio is overhead divided by gross income. Market concentration is the HHI of the provincial deposit market (the coefficient is multiplied by 100). New banks is a dummy equal to 1 when a new bank enters the local market. GDP *per capita* is in euros. Difference Test is the value of an F-test on the difference between the coefficients for substantial and non-substantial mergers. Heteroskedasticity robust standard errors are reported in parentheses. The symbol *** indicates a significance level of 1 per cent or less; ** between 1 and 5 per cent; * between 5 and 10 per cent.

Variables	Panel A:	Panel B:
	Mergers that violate the U.S. DOJ Bank Mergers Guidelines	Mergers with target market share $\geq 3\%$
Transition period (years 0-2)		
Non-substantial mergers	-0.129 *** (0.019)	-0.114 *** (0.022)
Substantial mergers	-0.243 *** (0.090)	-0.181 *** (0.032)
Completion period (years 3+)		
Non-substantial mergers	0.121 *** (0.020)	0.129 *** (0.022)
Substantial mergers	0.200 ** (0.100)	0.092 *** (0.034)
Size (log value)	-0.051 *** (0.005)	-0.051 *** (0.005)
Bad loans	0.031 *** (0.001)	0.031 *** (0.001)
Cost-income ratio	-0.011 *** (0.002)	-0.011 *** (0.002)
Market concentration	-0.006 *** (0.001)	-0.006 *** (0.001)
New banks	0.190 *** (0.040)	0.190 *** (0.040)
GDP per capita (log value)	-0.726 *** (0.118)	-0.730 *** (0.118)
Difference test: Substantial vs. non substantial M&As		
Transition period	1.6	3.1 *
Completion period	0.6	0.8
No. of observations	23,297	23,297
R-Square	0.878	0.878

mergers increase deposit rates by 20 basis points. Interestingly, the long-run increase in the deposit rates is greater for substantial mergers than for the non-substantial ones (the difference is not significant).²⁸

In our second definition, a substantial merger is one in which the local market share of the target in year t-1 is greater than 3 percent. As in the previous case, we construct dummies to identify the transition and completion period for these mergers and re-estimate equation (1) distinguishing mergers with targets' local market share below or above the 3 percent threshold (see Panel B of Table 7). Again, substantial mergers reduce deposit rates more than non-substantial mergers (18.1 versus 11.4 basis points; the difference is highly significant) but result in a long-run increase of the deposit rate.

5.4 Robustness of the sub-sample results

We try the alternative specifications and estimation techniques described in section 4.4. In all cases, the sub-sample results (unreported) are similar to those discussed above. We then challenge the sub-sample results by including dummies for out-of-market mergers, but this does not influence the estimates of the effects of in-market mergers. Moreover (i) no market power effect is detected for out-of-market mergers in the transition period in any of the sub-samples; (ii) for all sub-samples out-of-market mergers result in a long-run rise in the deposit rate.

6. Is it efficiency or quality?

In the previous sections we ascribed the long-run increase in the deposit rates of merged banks to efficiency gains. However, an alternative explanation is quality deterioration: the complexities that might arise in integrating the workforces and the organizational structures might have an adverse impact on the quality of products and services. This could prompt the merged bank to raise its deposit rate in order to avoid customer defections. In this section we analyze the competing explanations of the rate changes. According to our hypothesis, the rise in deposit rates in the completion period should be correlated with efficiency gains and unrelated to changes in product quality.

²⁸ In unreported regressions we check the robustness of this result to alternative specifications. In all cases the results remain qualitatively unchanged: substantial mergers generate a large short-run rate reduction followed by a long-run increase. However, the point value of the increase is influenced by the specification chosen, owing to the limited number of observations on mergers that violate the DOJ guidelines.

6.1 Cost savings.²⁹

If the favorable rate change for depositors that we find in the long run is indeed related to the gains from M&As, then the rise should be larger for the mergers that improve banks' post-acquisition performance most significantly. In order to examine this issue, we split our merger sample into two subgroups: "successful" mergers, i.e. those that during the transition period (years t , $t+1$ and $t+2$) reduce costs more than the entire sample of reporting banks (or increase by less); and "unsuccessful" mergers, i.e. those that generate smaller cost savings than those of the entire sample.³⁰ We then estimate equation (1) distinguishing between successful and unsuccessful mergers.

The results indicate that only successful mergers increase deposit rates (see Table 8): for these deals the long-run rate increase is equal to 16.1 basis points and is highly significant. In contrast, unsuccessful mergers have no effect on deposit rates (the coefficient is slightly negative but is not significant). The short-run market power effect is similar for the two sub-samples: in the transition period the deposit rate drops by 10.8 basis points for the successful mergers and by 14.5 basis points for the unsuccessful ones (an F-test indicates that the difference is not significant).

6.2 Quality changes

To test whether the post-merger rise in deposit rates is explained by quality changes, we run regressions including controls for product quality.

The quality of banks' services to households is likely to be influenced by three factors. The first is the bank's coverage of the local market with its branch network: given the existence of transport costs, a capillary distribution network is likely to be a key element in the success of bank services. We proxy this factor with the number of branches per 100,000 inhabitants, defined as the ratio between the number of branches of bank i in province k and the population. An analogous proxy is constructed using the number of ATMs. The second gauge of service quality is the amount of time it takes to customers to perform bank operations (e.g. to withdraw cash). We proxy this variable with the average number of employees per branch in each local market: a high value should be associated with quicker service and better quality. The third factor is the availability of a full range of products (mutual funds, international payments, etc.) at a single provider. A natural proxy for this factor is size: an increase in size might improve product diversification, allowing banks to offer customers one-stop shopping.

²⁹ We thank Allen Berger for suggesting this analysis.

³⁰ Cost savings are defined as the ratio between operating costs and gross income. The change in the cost-income ratio between year $t-1$ and t is computed on the basis of the *pro forma* balance sheet.

Table 8

**EFFECT MERGERS ON HOUSEHOLDS' DEPOSIT RATES:
SUCCESSFUL VS. NON-SUCCESSFUL MERGERS**

The table reports the results of estimating equation (1) of the paper separating “successful” mergers from “unsuccessful” mergers. Successful mergers are those that in the transition period (i.e. in year t , $t+1$ and $t+2$) reduce the cost-income ratio more than the entire sample of reporting banks (or increase by less). The change in the cost-income ratio between $t-1$ and t is computed using the *pro forma* balance sheet. Size is the banks' total assets. Bad loans is a percentage of total loans. Cost-Income ratio is overhead divided by gross income. Market concentration is the HHI of the provincial deposit market (the coefficient is multiplied by 100). New banks is a dummy equal to 1 when a new bank enters the local market. GDP *per capita* is in euros. Difference Test is the value of an F-test on the difference between the coefficients for successful and unsuccessful mergers. Heteroskedasticity robust standard errors are reported in parentheses. The symbol *** indicates a significance level of 1 per cent or less; ** between 1 and 5 per cent; * between 5 and 10 per cent.

Transition period (years 0-2)		
Successful mergers	-0.108	***
	(0.024)	
Unsuccessful mergers	-0.145	***
	(0.028)	
Completion period (years 3+)		
Successful mergers	0.161	***
	(0.021)	
Unsuccessful mergers	-0.030	
	(0.037)	
Size (log value)	-0.052	***
	(0.005)	
Bad loans	0.031	***
	(0.001)	
Cost-income ratio	-0.006	***
	(0.001)	
Market concentration	-0.011	***
	(0.002)	
New banks	0.189	***
	(0.040)	
GDP per capita (log value)	-0.727	***
	(0.118)	
Difference test: successful vs. unsuccessful M&As		
Transition period	1.02	
Completion period	18.7	***
No. of observations	23,297	
R-Square	0.841	

The results are reported in Table 9. Our proxies for service quality all have the expected sign and are significant (although the number of employees per branch is only marginally so): the banks that have the potential to supply customers with all the products and advice they need and those that offer the convenience of quick service (thanks to an extensive branch network or large staff) pay lower rates (in Panel B we replace the number of branches with the number of ATMs; the results are unchanged). However, the inclusion of our proxies for service quality has little effect on the size and significance of the pricing impact of M&As.

6.3 Discussion

The results reported in this section support the hypothesis that the long-run rise in the deposit rates of merged banks reflects efficiency gains, while quality does not explain the price changes documented in the previous sections. However, there are several caveats to these findings.

First, the quality of services is likely to be influenced by variables not included in our regressions. Ideally, we would like to have a measure of customer satisfaction, but constructing such a measure is problematic. A number of factors that influence customers' perception of quality may not be observable, and even if they were, it might not be possible to proxy them with quantifiable measures. These difficulties and data constraints are presumably the reasons why previous studies have not examined whether the price changes reflect quality changes rather than efficiency or market power effects. Nevertheless, we are convinced that our proxies capture significant components of the quality of bank services. The importance of the extent of the branch network is supported by the results of surveys showing that consumers rely on nearby institutions for their banking services. For example, Kennickell, Starr-McCluer and Sundén (1997) show that a large majority of households do their banking near home or the workplace. Evidence from the supply side squares with this: the number of branches in Italy, in the U.S. and in most countries continues to increase even as the number of banks declines. This means that banks consider a strong local presence crucial. The importance of one-stop shopping is also well documented. In fact, households tend to cluster several financial products with their deposit account (see Kwast, Starr-McCluer and Wolken, 1997). Indeed, bankers consider providing customers with the convenience of one-stop shopping to be one of the most important motives for consolidation (see Group of Ten, 2001).

Second, our proxies may also capture effects unrelated to service quality. For example, a large number of branches and of number of employees could reflect inefficiency, not the ability to provide customers with quick service. However, this risk is attenuated by the fact that we include the cost/income ratio, a direct measure of efficiency. Therefore our proxies should capture quality, not inefficiency.

Finally, we acknowledge that there are other important sources of efficiency gains besides cost saving. We focus on cost-cutting for two reasons. First, among the potential sources of efficiency improvement, cost reduction is the most likely to have a direct influence on prices. Second, empirical evidence shows that cost savings play a pre-eminent role among the various sources of efficiency improvement: they represent the main source of expected gains from mergers and are positively related to the improvement in operating performance (see Houston, James and Ryngaert, 2001).

Table 9

**EFFECT OF M&AS ON HOUSEHOLDS' DEPOSIT RATES:
RESULTS INCLUDING PROXIES FOR THE QUALITY OF SERVICES**

The table reports the results of estimating equation (1). Size is the banks' total assets. Bad loans is a percentage of total loans. Cost-Income ratio is overhead divided by gross income. Market concentration is the HHI of the provincial deposit market (the coefficient is multiplied by 100). New banks is a dummy equal to 1 when a new bank enters the local market. GDP *per capita* is in euros. The branches and ATMs refer to the bank-province pairs and are expressed per 100,000 inhabitants. Employees per branch refers to bank-province pairs (the coefficient is multiplied by 10); we exclude employees working in the banks' headquarters. Heteroskedasticity robust standard errors are reported in parentheses. The symbol *** indicates a significance level of 1 per cent or less; ** between 1 and 5 per cent; * between 5 and 10 per cent.

Variables	Panel A	Panel B
Transition period (years 0-2)	-0.114 *** (0.019)	-0.141 *** (0.019)
Completion period (years 3+)	0.147 *** (0.019)	0.133 *** (0.019)
Size (log value)	-0.053 *** (0.006)	-0.044 *** (0.006)
Bad loans	0.032 *** (0.001)	0.029 *** (0.001)
Cost-income ratio	-0.006 *** (0.001)	-0.005 *** (0.001)
Market concentration	-0.011 *** (0.002)	-0.015 *** (0.003)
New banks	0.181 *** (0.040)	0.065 (0.051)
GDP per capita (log value)	-0.724 *** (0.120)	-1.453 *** (0.200)
Branches (per 100,000 inhabitants)	-0.011 *** (0.001)	
ATMs (per 100,000 inhabitants)		-0.009 *** (0.001)
Employees per branch	-0.011 * (0.006)	-0.009 * (0.006)
No. of observations	23,094	18,976
R-Square	0.878	0.871

7. Summary and conclusion

The unprecedented merger movement observed in recent years is changing the corporate landscape and raising questions about the effects of consolidation on competition. Prior analyses of the pricing effects of M&As found that in-market consolidation generates substantial market power, thus harming consumers. These studies, however, look only at the short-run impact, ignoring effects that take a longer time to materialize. This paper seeks to fill this gap in the literature.

Using a unique database that includes information on the deposit rates paid by individual banks in local markets to different categories of depositors, we study the effect of M&As on prices, separating short-run from long-run effects. We find strong evidence that the short-run and the long-run consequences of mergers are different.

Consistent with previous research, we find that in the short run in-market mergers increase market power and lead to deposit rate changes that are unfavorable to consumers. The interest rate reduction is larger in sub-samples that are sensitive to market power, such as small deposits, highly concentrated markets and substantial mergers. In the long run, however, the deposit rates of the banks involved in in-market mergers rise relative to the control sample, regardless of these features.

Out-of-market mergers (which do not change the banks' local market shares) have no influence on deposit rates in the short run. In the long run, like in-market mergers, they generate an increase in the deposit rates for households.

Finally, we find that deposit rates rise only for banks that are successful in reducing costs. In contrast, the rate changes are not explained by modifications in the quality of services. These findings constitute evidence for the hypothesis that in the long run the efficiency gains from mergers prevail over the market power effects, so that consumers benefit.

This paper has important implications for research and policy analysis. Although at each announcement of a new consolidation the benefits from the deal are emphasized by all concerned, the empirical literature has failed to find convincing evidence of these benefits (see for example Andrade, Mitchell and Stafford, 2001 and Kaplan, 2000 and, for banking, the review in Piloff and Santomero, 1998). This has led some researchers to question the usefulness of M&As (see for example Ravenscraft and Scherer, 1989 for industrial firms and Gorton and Rosen, 1995 for banks) or to refer to the "merger puzzle" (see Group of Ten, 2001). Our results suggest that taking a longer time horizon, separating the short-run from the long-run consequences of the mergers, could help solve the puzzle. In the short run the costs of restructuring the consolidated firm may overlay the gains, which cannot fully emerge for years.

From the policy standpoint, policymakers should be skeptical of claims of rapid efficiency improvement by firms proposing consolidations. Yet if properly measured, in the long run the efficiency benefits from M&As appear to dominate the market power effects, suggesting that mergers can help shift assets to more productive uses.

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