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BANK COMPETITION AND REGULATORY REFORM: THE CASE OF THE ITALIAN BANKING INDUSTRY

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Abstract

The paper analyzes the evolution of competitive conditions in the Italian banking industry using firm-level balance sheet data for the period 1983-1997. Regulatory reform, large-scale consolidation, and competitive pressure from other European countries have changed substantially the banking environment, with potentially offsetting effects on the overall degree of competitiveness of the banking market. We find that competitive conditions, relatively unchanged until 1992, have improved substantially thereafter, with estimated mark-ups decreasing over the last five years of the sample period. Also, there is no evidence that banks involved in mergers and acquisitions gained market power; at the same time, however, they exhibit lower than average marginal costs. Finally, after controlling for various factors that may have determined the time pattern of banks' estimated mark-ups, we still detect a significant unexplained drop in our competitive conditions indicators after 1992. This is consistent with the hypothesis that the introduction of the Single Banking License in 1993 contributed to improve bank competition.

JEL classification: G21, G34.

Keywords: bank competition, mergers and acquisitions, Lerner, consolidation.

Contents

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1. Introduction[1]

In the last twenty years, European countries have implemented numerous regulatory changes affecting the banking industry, motivated by the need to achieve the level of harmonization required for the establishment of a single, competitive market for financial services. This process culminated in the early 1990s with the implementation of the Second Banking Coordination Directive, which defined the basic conditions for the provision of the so-called Single Banking License. Prior to this initiative, cross-border expansions were subject to the authorization and subsequent control of the host country, as well as to capital requirements, as if the branch represented the establishment of a new bank. Under the current regime, in contrast, banks from European Union (EU) countries are allowed to branch freely into other EU countries.

The new legislation, by removing substantial entry barriers and exposing national banking markets to potential new entrants, should have produced pro-competitive effects.[2] However, another important recent development in the European banking system has been a significant consolidation process. On average, the number of banks in EU countries shrank by approximately 29 percent between 1985 and 1997, with about 90 percent of the reduction taking place between 1990 and 1997 (European Central Bank, 1999). In keeping with the structure-conduct-performance hypothesis (Bain, 1953), one might expect such notable structural transformation to have had negative effects on competition. Therefore, how bank competitive conduct has changed in Europe in recent years is a priori unclear.

In this study, we focus on the Italian banking industry over the 1983-1997 period. Italy implemented the Second Banking Directive in 1993.[3] Meanwhile, between 1985 and 1997 the process of consolidation brought with it a 20 percent reduction in the number of banks in the country (about 90 percent of the reduction took place between 1990 and 1997). Casual observation across

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2 See e.g. Vives (1991 a,b).

3 In December 1992 law 14.12.92 n° 481 introduces the Second EC Banking Directive into the Italian legislation. In September 1993 Legislative Decree 1.9.93, n° 385 rationalizes the banking regulatory framework, replacing some 1,400 previous regulations and completing the introduction of the Directive.

European banking markets seems to suggest a shift toward increased competition in recent years. Danthine, Giavazzi, Vives and von Thadden (1999) report a somewhat generalized decrease in banks' net interest margins across Europe during the 1990s. Consistent with the European evidence, a declining trend in bank margins is also observed across different markets in Italy. Based on this observation, we explore more thoroughly competitive conditions in the Italian banking industry by adopting a methodology developed in empirical industrial organization, and used extensively in banking, to estimate Lerner indexes (the complement to one of the ratio between marginal cost and price). Underlying the empirical analysis is the attempt to gauge the impact of the two mentioned factors – regulatory change and consolidation – on competition.

The effect of regulatory reform on bank competition has been analyzed with similar methodologies in other studies. Gelfand and Spiller (1984) and Spiller and Favaro (1987) investigate the competitive impact of the relaxation of entry restrictions in the Uruguayan banking industry, concluding that strategic interactions across banks and across different markets decreased after the regulatory reform. Shaffer (1993) focuses on the Canadian banking industry, finding an already perfectly competitive conduct prior to the reform and evidence of negative margins afterwards. Meanwhile, Ribon and Yosha (1999) find evidence of an improvement in competition in the Israeli banking industry in the years following financial liberalization.

Whereas much of the existing literature relies on aggregate time-series with relatively few observations, our dataset includes virtually all Italian banks (about 900 on average each year) over a sample period of 14 years. This provides us enough identification power to pursue multiple goals. First, a thorough investigation of banking competition in Italy during an important transition period is presented for the first time. Second, we estimate Lerner indexes in five distinct markets within the country, separating banks according to their prevalent geographical area of business (Nation-wide, North-West, North-East, Center and South). In contrast, in part due to the above mentioned data constraint, most existing studies analyze bank competition at the nation-wide level, thereby overlooking the problems associated with the notion of "relevant banking market"; the latter is generally considered of relatively narrow size, especially for anti-trust purposes. In addition, in light of the aforementioned theoretical connection between market concentration and competition, we give special attention to banks that have experienced mergers or acquisitions and test whether such banks have in fact increased their market power relative to the rest of the banking system. Furthermore, we analyze separately commercial banks and cooperative credit banks (CCBs henceforth), small institutions somewhat similar to U.S. credit unions. Several characteristics documented below put CCBs in a “niche position” which potentially gives them extra market power, providing the opportunity to investigate the existence of market segmentation.

Finally, in a second stage of the analysis we attempt to identify the causes of the cross-market and time series pattern of the estimated indicators of competition. Did the regulatory reform of 1993 trigger changes in competitive conduct? In addressing this question, and in contrast to the existing literature, we control for concurrent economic factors, such as inflation, the business cycle, and market concentration, as well as other events that, while unrelated to competitive conditions, may in principle have affected our indexes and introduced a bias in the estimated degree of market power.

In the following section we lay out the details and discuss various issues related to the methodology adopted to estimate market power. In section 3 we briefly survey the literature on competition in the Italian banking industry. In sections 4 and 5 we illustrate the details of the dataset and present the empirical results. Concluding remarks are presented in section 6.

2. The methodology

2.1 The analytical framework

The traditional approach to the analysis of industry competition is based on the structure-conduct-performance hypothesis, which postulates a direct connection between concentration and performance: a rise in concentration should be associated with a decrease in the cost of collusion, in turn inducing non-competitive pricing behavior. This approach suggests the use of concentration measures (e.g. the Herfindahl index) to infer competitive conditions, and indeed these measures, intuitive to interpret and simple to construct, are popular in policy analysis and in research-oriented literature. Several empirical studies have detected a direct relationship between market concentration and market power in the banking industry (e.g. Berger and Hannan, 1989, Hannan and Berger, 1991, and Neuman and Sharpe, 1992). Other contributions, however (e.g. Jackson, 1992, 1997, Rhoades, 1995, and Hannan, 1997), have cast doubt on the overall robustness of the market concentration-market power relationship. In addition, while the relationship can be derived from oligopoly theory under the assumption of Cournot behavior, it is not warranted under alternative models.[4]

[4] Some of the empirical applications to the banking industry surveyed in this paper, such as Gollop and Roberts (1984) and Berg and Kim (1994), have actually tested and rejected the hypothesis of Cournot conduct.

An alternative approach to the analysis of competitive conditions, based on more sound microeconomic foundations, draws inference from the econometric estimation of the parameters of a firm's behavioral equation.[5] More precisely, it is assumed that a firm (in our case, a bank) sets equilibrium prices and quantities in order to maximize profits. Such a decision is based on cost considerations and on the degree of competition in the market. In turn, the latter depends on the characteristics of interaction among firms and on demand conditions.

Consider an industry producing quantity Q at price p. Let q_j be the quantity produced by firm j, j=1, 2, ...m, and $\Sigma_j q_j \equiv Q$. Let the inverse demand function be p=$p(Q,z)$, where z is a vector of exogenous variables affecting demand. In addition, let $C(q_j,w_j)$ be the cost function for firm j, where w_j is the vector of the prices of the factors of production employed by firm j. Firms in the industry solve:

$$\underset{q_j}{Max}\, \Pi = p(Q,z)q_j - C(q_j,w_j).$$

The corresponding first order condition is:

$$p_j = C^{'}(q_j,w_j) - q_j \frac{\partial p}{\partial Q}\frac{\partial Q}{\partial q_j}, \tag{1}$$

where the second term on the right-hand side measures the departure from a perfectly competitive benchmark, where price would be set equal to marginal cost. This equilibrium condition can be rewritten as:

$$p_j = C^{'}(q_j,w_j) - \frac{\Theta_j}{\tilde{e}}, \tag{2}$$

where Θ_j is usually defined as the conjectural elasticity of total industry output with respect to the output of the jth firm,

$$\Theta_j \equiv \frac{\partial Q/\partial q_j}{Q/q_j}, \tag{3}$$

and $\tilde{e}$ is the market demand semi-elasticity to the price,

5 See Iwata (1974), Appelbaum (1979, 1982), Gollop and Roberts (1979), Bresnahan (1982), Roberts (1984).

$$\tilde{e} \equiv \frac{\partial Q / \partial p}{Q}, \qquad \tilde{e} < 0 \tag{4}$$

The combination of characteristics affecting firms' oligopolistic interaction and market demand elasticity determines the overall rent-extraction ability in the industry. Specifically, the parameter Θ_j measures the conjectured reaction of the other n-1 firms in the market to a change in quantity produced by firm j. In a perfectly competitive industry, Θ_j is equal to zero for all j, while in a pure monopoly Θ_j equals one. However, it is immediately clear from (2) that for a given value of Θ_j the actual ability of a firm to exercise market power is inversely related to the magnitude of the market demand semi-elasticity, $\tilde{e}$.

The separate identification of Θ_j and $\tilde{e}$ requires the simultaneous estimation of a supply equation such as (2) and a demand equation, from which the parameters necessary for the identification of $\tilde{e}$ can be recovered.[6] However, as noted by Appelbaum (1982, p. 297), if the goal of the investigation is to evaluate the industry's overall degree of market power (i.e. firms' ability to price over marginal cost) it is sufficient to identify and estimate the ratio $l \equiv -\Theta_j / \tilde{e}$, without identifying Θ_j and $\tilde{e}$ separately. Dividing l by the average price one obtains a Lerner index, $L \equiv l \,/\, p$, $L \in [0,1]$, measuring the relative mark-up of price over marginal cost (note from (2) that λ is the difference between the two).

Therefore, in the empirical section we focus on the estimation of λ and the related Lerner indexes. We estimate equation (2) simultaneously with a cost function, imposing cross-equation restrictions which should improve the precision of the estimates (Bresnahan 1989, p. 1040).[7] We assume the total cost function to have a translog specification:

$$\begin{aligned} \ln(C_j) = {} & c_0 + s_0 \ln q_j + \frac{s_1}{2}(\ln q_j)^2 + \sum_{i=1}^{3} c_i \ln w_{ij} + \ln q_j \sum_{i=1}^{3} s_{i+1} \ln w_{ij} \\ & + c_4 \ln w_{1j} \ln w_{3j} + c_5 \ln w_{1j} \ln w_{2j} + c_6 \ln w_{2j} \ln w_{3j} \\ & + \sum_{i=1}^{3} c_{i+6} (\ln w_i)^2 + \sum_g c_g \, dummy_g \end{aligned} \tag{5}$$

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6 Due to the difficulty of gathering a suitable dataset for such estimation, many of the existing applications to banking borrow the estimated elasticity of demand from previous studies and then input it in (2) (see e.g. Berg and Kim, 1994, Spiller and Favaro, 1987, Gelfand and Spiller, 1984).

7 The parameters of the marginal cost functions could also be derived by estimating simultaneously (2) and input demand equations, and invoking standard cost duality results to impose similar cross-equation restrictions (see e.g. Appelbaum, 1982).

where w_{ij} are the prices for the three inputs, deposits, labor and capital for firm j. The dummy variables appearing in the last summation operator allow us to take into account several factors, mentioned in the introduction, which we intend to analyze separately: depending on the specification, we shall use dummies for the various geographical areas of the countries (g = Nation-wide, North-west, North-east, Center, South), for banks' type (g = Commercial banks, Cooperative credit banks) and for banks that underwent mergers or acquisitions.

We then estimate simultaneously equations (5) and (2), rewriting the latter as follows:

(6) $$p_j = \frac{C_j}{q_j}\left(s_0 + s_1 \ln q_j + \sum_{i=1}^{3} s_{i+1} \ln w_{ij}\right) + \sum_g l_g dummy_g ,$$

where the first term of the right-hand side is marginal cost, derived from (5), and where λ_g's are average values estimated across the different groups g. This procedure allows us to derive time series for the Lerner indexes; it also allows us to test whether they are significantly different from zero and whether they differ across bank groups.

2.2 Comments on the methodology

The accuracy of this methodology in providing estimates of market power conditions has recently been tested empirically by Genesove and Mullin (1998), using a controlled environment where a Lerner index could be measured directly and compared with the one estimated. The supply relationship (2) has actually a less restrictive interpretation than that implied by the argument on conjectural variations. As Bresnahan (1987) points out, a relationship such as (2) can be written without necessarily considering Θ_j as a parameter measuring firms' conjectures. In a broader sense, it can fit any oligopolistic model where products are priced above marginal costs. This consideration allows us to shield potential criticism strictly associated with models of conjectural variations (e.g. Carlton and Perloff, 1989).

As in Shaffer (1993), Shaffer and Di Salvo (1994), Berg and Kim (1994) and Shaffer (1996), in the empirical analysis of section 5 the bank is treated as a supplier of an aggregate product, proxied by total assets. This approach does not allow the identification of behavioral differences across single products (e.g. loans or deposits). However, if banks have a certain degree of market power over a specific product while behaving competitively in the supply of another, our aggregate approach is still able to capture a departure from marginal cost pricing. Alternatively, as in Spiller and

Favaro (1984) and Shaffer (1989), one could focus on a specific product; however, this approach fails to take into account the potential ability of banks to act strategically in the various markets (for instance, one product may be supplied at very competitive conditions to attract customers and then extract rents in the supply of other products). Focusing on one product only may therefore bias the estimation of market power.[8]

A related issue regards the treatment of bank deposits. A long running debate in the literature has centered on whether deposits should be considered an input or an output. Following the seminal model developed by Klein (1971), most studies on banking market power have considered deposits as an input. Alternatives, such as the value-added approach (Berger and Humphrey, 1992) or the user-cost model (Hancock, 1991), take the more general view that both assets and liabilities items may have output characteristics. In particular, such studies argue that deposits may be considered part of banking output in that they proxy for the services banks provide to depositors. Deposits are added to various asset measures in some studies (e.g. Berg and Kim, 1994), or treated as a separate output (Suominen, 1994, Shaffer, 1996, and Ribon and Yosha, 1999). We test the robustness of our results to the inclusion of deposits in the definition of output.

An additional issue stems from the treatment of income from services, which has become increasingly important in recent years. Not taking this source of revenue into account may generate a bias in estimated marginal cost, in turn affecting the estimated Lerner index, particularly if banks with more assets are also large providers of non-asset-based services, as seems likely (DeYoung, 1994). We use a measure of price for our aggregate banking product that explicitly incorporates revenues from services, and to assess the robustness of our results to this problem we re-run regressions excluding such component.

Another potential criticism is that the estimation relies on the choice of a proper functional form for the cost function. In this respect, however, the translog specification has the appealing property of being a highly flexible, second order approximation to any other functional form specification.[9]

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8 A few authors have conducted multiproduct analysis of banks market power (e.g. Gelfand and Spiller, 1987, Suominen, 1994, Berg and Kim, 1996 and Vesala, 1995), thus taking into account cross-markets interactions. Such approach, however, increasing the number of coefficients to be estimated, is very demanding in terms of data requirements.

9 The use of parametric cost functions, such as the translog, when the population of banks is highly heterogeneous in size and output mix, has been criticized by McAllister and McManus (1993). However, our approach, based on the separate analysis of multiple banking markets, with the further differentiation between

A final issue worth mentioning regards our definitions of both the price and the price-deposit margins. We compute the price of bank assets and the deposit rate from balance sheet items (rather than using actual posted interest rates, unavailable in our dataset). These are therefore ex-post measures. While ex-ante interest rates incorporate a risk premium, our ex-post measures, based on actual income obtained by the banks after accounting for bad loans, should not. In this respect, since we are focusing on banks' pricing behavior, we need not be overly concerned with controlling for risk in our estimation analysis.[10]

3. The literature on competition in the Italian banking industry

In what follows, forgoing any pretense of completeness, we focus on the subset of empirical papers that attempt to gauge changes in competitive conditions in the Italian banking industry.

Ferri and Gobbi (1992), analyzing the 1986-1990 period, find that after 1988 various measures of dispersion of interest rates on loans (across geographical areas of the country, sectors of economic activity and loan size) began to diminish; in addition, the correlation between the amount of bad and doubtful loans and the interest rate on loans began to increase. These facts are consistent with the implications of their theoretical model and point toward increased competition. However, Ferri and Gobbi (1997) find that the dispersion of interest rates on loans, after reaching a minimum in 1992, increased to a maximum in 1994 (similar measures computed with our dataset confirm this conclusion over the 1995-97 period). They conclude that such measure, although possibly related to competitive conditions, may at certain times be affected by other factors that may make it inadequate as an indicator of market power. Several such factors have been suggested: Ciocca (1995) attributes the mentioned increase in the dispersion of interest rates on loans in 1993-94 to the surge of bad and doubtful loans, to the unfavorable cyclical conditions and to heterogeneous interest rate elasticities across country areas. Also, Cottarelli, Ferri and Generale (1995) point out that this dispersion may depend on the monetary policy stance.

Using individual bank data over the 1980-1991 period, Focarelli and Tedeschi (1993) find that prior to 1988 the interest rate on deposits paid by a bank does not significantly affect its market

institutional categories, should be largely shielded from such criticism. Moreover, since we evaluate the estimated marginal cost function at the means of the data, the translog's lack of flexibility for observations far from the means of the data is not especially problematic for our purposes.

10 See also Demirguc-Kunt and Huizinga (1998) for a similar approach.

share, whereas it does afterwards. They interpret this as a sign of more competitive conditions in the deposits market. They also report the view, held by several commentators, that while the banking system had a substantial oligopolistic power in the period, this rent did not translate into high profits due to the inefficiency of the system, which created high operative costs.

Cesari (1999) builds a measure of competition based on the degree of mobility of customers among banks, under the hypothesis that increased competition should tend to disrupt customer relationships. Over the period 1984-1993 investor mobility increased significantly for small, local banks; however, his aggregate "fidelity" index does not display a clear trend.

Ciocca (1998) lists several indicators pointing to increased competition throughout the eighties: between 1979 and 1989 the average number of banks in each province increased from 20 to 27; the concentration of market shares decreased by 15 percent; the differential between interest rate on short-term loans and T-bills decreased from 5 percentage points in 1980 to less than one in 1989; over the same period the differential between the yield on assets and the interest rate on liabilities went down from 9 to 7 percentage points.

Using yearly aggregate data, Coccorese (1998) rejects the strong hypothesis of a joint monopoly, but fails to reject the hypothesis of perfect competition throughout the period 1971-1996. De Bandt and Davis (1999) find evidence of monopolistic competition for large and small Italian banks over the 1992-96 period; in France and Germany large banks are also characterized by monopolistic competition, whereas small banks tend to show monopolistic behavior.

Generale, Gobbi and Tedeschi (1999) point out that 1993 marks the beginning of a profitability crisis for the Italian banking system, brought about by three factors: the reduction in price-deposits margins; a reduction in costs insufficient to match the parallel reduction in gross income, in turn caused by excessively rigid cost structures, and a surge in bad and doubtful loans, partly related to the cycle. They emphasize that price-deposit margins can be influenced both by competitive conditions and by the bank's free capital. Specifically, a high proportion of bad and doubtful loans in a bank's balance sheet, reducing its free capital, might incorrectly signal that the bank is relatively competitive.

De Bonis and Ferrando (2000) find that over the 1990-97 period Herfindahl concentration indexes computed at the province level using various measures of bank activity display a declining trend, reflecting the liberalization of bank branches in 1989-1990.

Cerasi, Chizzolini and Ivaldi (2000), using a methodology that relies on observed branching patterns, find that over the period 1988-1995 competition has been relatively more intense in the North-west and Center, less so in the South; also, while a deterioration of competitive conditions at the national level is detected, an improvement seems to have come from the implementation of the Second Banking Coordination Directive, proxied by a dummy for the 1993-95 period.

The main conclusions of the literature on banking competition in Italy can be summarized as follows. First, much emphasis is placed on the structural and normative changes implemented between 1985 and 1993, mentioned in the introduction, which suggests the likely occurrence of some change in competitive conditions at some point over the period. Second, while there is widespread agreement that competition increased during the decade following 1985, there seems to be less consensus over the timing of the change.

4. Data

The main dataset used in this study comprises balance sheet information on virtually all Italian banks for the period 1983-1997, obtained from supervisory reports. Missing from the sample are Italian branches of foreign banks as well as special credit institutions ("Istituti di credito speciale"), as their peculiarities (lack of a branch system, high level of specialization) would have complicated the estimation without adding significant identification power.[11]

Prior to the implementation of the Second Banking Directive in 1993, banks were classified into several different categories, partly reflecting their specialization. The 1993 reform left only three categories: commercial banks, "banche popolari" and CCBs. In the empirical section we group together commercial banks and popolari, and analyze CCBs separately.[12] We also pooled all the other categories existing prior to 1993 with the commercial banks, since we felt that, while meaningful in earlier decades, such categories had already lost most of their relevance over our sample period.

[11] Our empirical framework is not well suited to include branches and subsidiaries of foreign banks due to their location in few large centers (essentially Milan and Rome), substantial lack of a branch system and high level of activity specialization. However, market entry by foreign banks can in principle significantly affect competitive conditions and may have in practice. Fazio (1999b) notes that the market share of branches and subsidiaries of foreign banks in Italy has risen from 3 to 7 percent in the nineties, presently standing in intermediate position between France and Spain (12 percent) and Germany (4 percent).

[12] Although "banche popolari" are characterized by a cooperative ownership structure, we pooled them with commercial banks since for our purposes a series of characteristics, including size, makes them more similar to commercial banks than to CCBs.

Table 1: Selected features of the dataset [1]

	North-west		North-east		Center		South and islands		National banks		NATION-WIDE TOTAL	
	Commercial banks	CCBs	Commercial Banks	CCBs	Commercial Banks	CCBs	Commercial banks	CCBs	Commercial banks	CCBs	Commercial banks	CCBs
1983-1990												
Total average number of banks	75	97	82	310	55	98	103	183	16	-	331	688
Annual average number of M&A	1.6	0.2	1.9	2.5	1.5	0.2	2.4	0.8	2.0	-	9.4	3.8
Average total assets per bank (billion ITL)	2,995	80	1,535	48	1,488	60	676	35	17,202	-	2,359	51
Average number of employees per bank	1,051	24	538	16	510	21	307	12	7,955	-	942	17
Total interest on assets/total assets (%)	11.9	13.4	12.3	13.2	12.8	13.9	13.9	14.3	11.5	-	12.8	13.6
Total interest on deposits/deposits (%)	9.0	9.6	9.0	9.5	9.1	9.6	9.5	9.5	8.6	-	9.1	9.5
1991-1997												
Total average number of banks	55	85	62	261	48	92	69	181	19	-	261	619
Annual average number of M&A	2.1	3.7	4.0	9.0	1.1	1.6	5.4	4.9	4.4	-	17.1	19.1
Average total assets per bank (billion ITL)	6,631	247	4,005	140	2,606	171	1,868	80	34,268	-	5,899	142
Average number of employees per bank	1,199	50	784	31	567	37	436	17	7,765	-	1240	30
Total interest on assets/total assets (%)	9.4	10.1	9.4	10.2	10.1	10.5	10.9	11.6	9.9	-	10.0	10.7
Total interest on deposits/deposits (%)	7.6	7.8	7.6	7.4	7.3	7.6	7.2	7.2	7.8	-	7.5	7.4
1983-1997												
Total average number of banks	66	91	72	287	51	95	91	182	18	-	298	656
Annual average number of M&A	1.9	1.9	2.9	5.5	1.3	0.9	3.8	2.7	3.1	-	13.0	10.9
Average total assets per bank (billion ITL)	4,421	152	2,516	87	1,973	110	1,145	56	25,864	-	3,803	91
Average number of employees per bank	1,106	35	637	22	535	28	358	14	7,859	-	1,064	23
Total interest on assets/total assets (%)	10.9	12.0	11.1	11.9	11.6	12.4	12.7	13.1	10.7	-	11.6	12.3
Total interest on deposits/deposits (%)	8.5	8.8	8.5	8.6	8.3	8.7	8.6	8.4	8.2	-	8.5	8.6

(1) The statistics reported are derived from the dataset used in the regression analysis prior to the application of the filters described in the appendix A; details about the variables are in the appendix.

The second main classification criterion relies on banks' geographical location. Banks are clustered in five separate markets (North-west, North-east, Center, South and Nation-wide), according to their "prevailing area of business". Appendix B contains details on the definition of the latter concept, and on the criterion used to assign banks to a given area.

Finally, banks are also classified based on whether they were involved in mergers or acquisitions. A summary of some key features of our dataset according to the criteria outlined above is given in Table 1. Further details on the dataset are reported in Appendix A.

5. Empirical results

In the next subsection 5.1 we estimate indexes of competitive conditions for commercial banks, CCBs and for banks involved in mergers or acquisitions. Section 5.2 presents evidence on the factors that may explain the cross sectional and time series pattern of the estimated indexes.

5.1 Estimation of the Lerner indexes

Estimation of the system (5)-(6) entails choosing an operational definition of the key variables appearing in the equations. As mentioned in section 2.1, we adopted a broad definition of banking output q_j, proxied by total assets. The price p_j is defined as interest from total assets plus revenue from services as a ratio to total assets. This choice, aimed at incorporating the unit revenue from services into the price of our composite banking product, is valid under the assumption that the stock of total assets is a good proxy for the heterogeneous flow of services supplied by banks (e.g. payment processing, portfolio management), which is unobservable in our dataset. Table 2 summarizes the benchmark definitions for the main variables used in subsections 5.1.1 through 5.1.3.

In section 5.1.4 several robustness checks are performed: p_j is defined as interest from total assets over total assets; also, deposits are treated as part of the output, thereby allowing differences in competitive conditions to stem also from the deposits market.

Cross-sectional estimation of system (5)-(6) was performed for each year in the sample period. Because of the endogeneity of the cost and quantity variables, C_j and q_j, we used instrumental variables (3SLS). Since lagged variables appear among the instruments, the results of the econometric analysis are available for the period 1984-1997. The full results of the estimation process, carried out one year at a time for two simultaneous equations generally involving over 20 coefficients overall, are rather cumbersome to illustrate and are therefore reported in a series of appendix tables (Tables C1-C4).

Table 2: Operational definitions of the main variables used in the analysis(1)

p_j	$\frac{\text{Total interest earned on assets + Total revenues from services}}{\text{Total assets}}$
q_j	Total assets
C_j	Total costs
w_{1j}	$\frac{\text{Total interest paid on deposits}}{\text{Total deposits}}$
w_{2j}	$\frac{\text{Labor costs}}{\text{N° of employees}}$
w_{3j}	$\frac{\text{Total operating costs – Labor costs}}{\text{Total assets}}$
Price-deposit margin	$p_j - \frac{\text{Total interest paid on deposits}}{\text{Total assets}}$

(1) See Appendix A for further details on the variables.

The key results, summarized in a series of charts, are illustrated in the following four sub-sections. The first three deal with commercial banks, CCBs and banks that underwent a process of mergers or acquisitions. In all cases, we begin by looking at price-deposit margins, a first, customary indicator of the ability to price over marginal cost. We then move on to consider our estimated Lerner indexes, computed as the ratio between the estimated l_g and the average price for group g. Sub-section 5.1.4 reports the results of the robustness tests.

5.1.1 Commercial banks

Fig. 1a reports price-deposit margins for commercial banks operating in the four areas and for those with a nation-wide market. Several features are worth noting. First, in all cases considered margins remain relatively constant until 1992, declining rather sharply thereafter, albeit with a temporary increase in 1995.[13]

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[13] The 1995 increase is likely due to the monetary policy tightening which took place at the beginning of the year; a less pronounced increase can also be observed in 1992, when a rate increase occurred in the context of the Exchange Rate Mechanism crisis. Following a monetary tightening, banks tend to adjust rates on loans immediately and rates on liabilities with a lag; they tend to do the opposite after a loosening. The extent of this asymmetry has been proposed as a measure of banking competition (Hannan and Berger, 1991).

Fig. 1: Indicators of competitive conditions: Commercial banks(1)
(by geographical area)

Fig. 1a: Price Deposit margins (2)

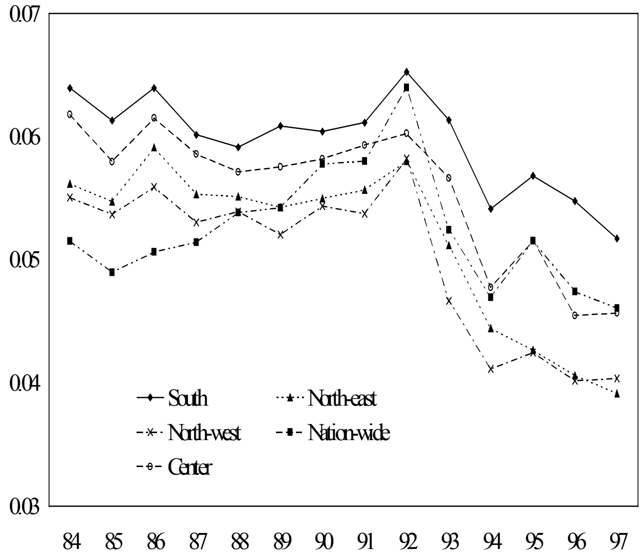


Fig. 1b: Lerner Indexes (3)
(constrained estimation)

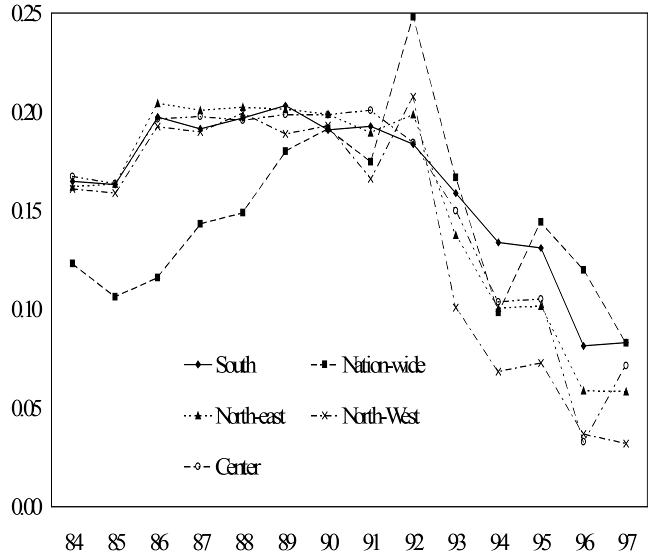


Fig. 1c: Marginal costs (4)
(constrained estimation)

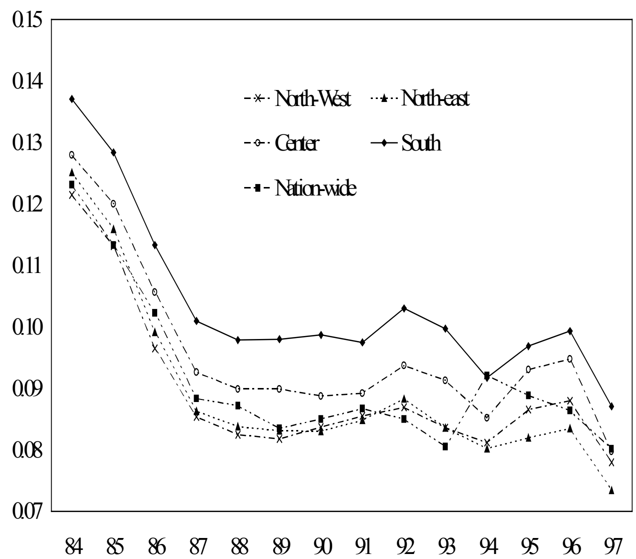
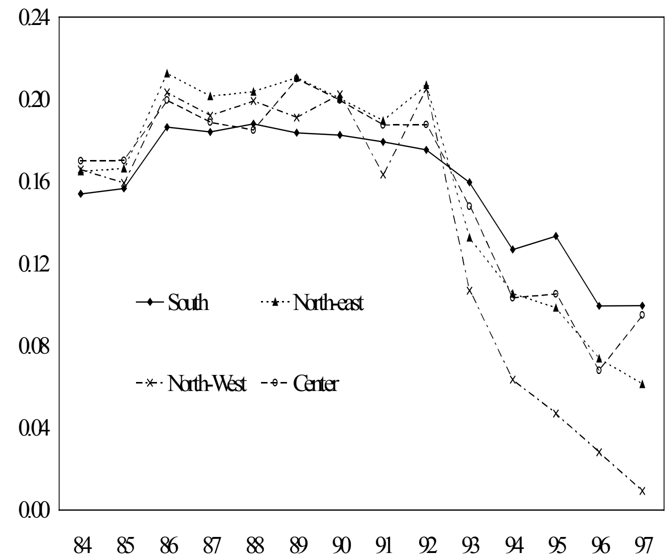


Fig. 1d: Unconstrained Lerner Index (5)



(1) Panels (b) and (c) are obtained from output generated via estimation of system (5) – (6) in Section 2; results of the estimates are reported in Table C1.
(2) See Table 2 for the definition.
(3) Computed as λ_g/p_g, g = North-west, North-east, Center, South and Nation-wide. Estimates for the λ_g for each year are reported in Table C1. The price p_g is a simple average of individual bank data (the p_j defined in Table 2) for group g.
(4) Computed using the regression coefficients reported in Table C1 and evaluating the regressors at their sample mean for each year and group.
(5) Computed by running 4 separate sets of estimates of system (5) – (6) in Section 2, one for each area. The results of the estimates are not reported.

Second, margins tend to increase from North to South; also, they display a roughly coherent time-series behavior across areas. Third, after 1992 the dispersion across the four areas increases substantially: the decline is moderate in the South, more pronounced in the Center, while a sharper drop is observed in the Northern areas.

The overall picture emerging from the corresponding Lerner indexes, broadly similar, confirms that in 1993 a relevant change in competitive conditions took place (Fig. 1b): all the indexes drop, although with differing degrees of intensity. Some differences are worth noting relative to Fig. 1a. First, the dispersion of the indexes across areas is very small between 1984 and 1992 (overlooking nation-wide banks). In particular, the index for the South is no longer above other areas, due to higher marginal costs (Fig. 1c). Recalling that the Lerner is computed as λ_g/p_g, an assessment of whether the differences among the various areas are statistically significant can be obtained from the *t*-statistics on the λ_g in equation (6) (Table C1). The λ_g for the North-west area (λ_{NW}) is always statistically greater than zero at the 1 percent level except for the last two year of the sample, when significance drops to 5 percent and then to zero. The λ_{NE} and λ_{CE} are always larger than λ_{NW}, although in general the difference is not statistically significant. Also, λ_{SO} is significantly larger than λ_{NW}, while the coefficient for nation-wide banks, λ_{NA}, is significantly smaller only in the initial part of the sample period.[14]

The regressions run to generate the data in Fig. 1b implicitly impose an analogous marginal cost structure for all four areas and for large banks; indeed, practically the entire cost function is assumed to be the same, as only the constant is allowed to vary across groups via ad hoc dummy variables. To assess the extent of the bias introduced by this assumption, we ran four separate regressions for each area (the exercise was not repeated for the nation-wide banks due to lack of degrees of freedom). The results (Fig. 1d) are broadly consistent with those obtained via the restricted version of the equations.

The finding of improved competitive conditions after 1993 is reinforced by the results of Schure and Wagenvoort (1999), who detect a significant reduction of X-inefficiency in the Italian banking sector over the 1993-97 period: other things equal, this should have increased bank margins.

14 Several authors have focused on the conditions prevailing in the market for bank loans in the South relative to the rest of the country. Based on a survey of the literature and his own calculations, Jappelli (1993) maintains that accounting for credit risk reduces, but cannot by itself completely explain, the interest rate differential between the South and the North. On the other hand, research conducted at the Bank of Italy finds that the differential (adjusted for a series of factors, most notably credit risk) has recently declined to zero (Annual Report on 1995).

5.1.2 Cooperative credit banks

The analysis of cooperative credit banks is relevant for several reasons. First, the banking services supplied by CCBs are comparable, in nature and quality, to those supplied by commercial banks. In fact, in Italy cooperative banks are the only alternative to commercial banks allowed for by the Second Banking Directive. Thus, the results obtained from this sub-sample represent a relevant robustness check of the main analysis.[15] At the same time, however, relative to commercial banks, CCBs are much smaller in size (three branches on average in 1997), are located primarily in small and medium-size centers, and mostly specialize in providing credit and other banking services to small businesses. Also, due to their cooperative ownership structure, the regulator has granted them special privileges and imposed additional constraints. These peculiar features thus put CCBs in a "niche position", which warrants investigation of potential extra market power.

Since CCBs are non-profit organizations, in principle the maximization problem described in section 2 is not well-suited to describe their behavior. In practice, however, things are not so clear-cut. In particular, in spite of the non-profit principle, net earnings are allowed to insure a proper capitalization, and there is evidence that Italian CCBs have consistently adopted this strategy. Also, it has been argued that in recent times competition between cooperative credit banks and commercial banks at the European level has significantly increased (Revell, 1989; Vittas et al., 1988); this is confirmed by the fact that following the deregulation process started in the mid-eighties, CCBs' share of business with non-member clients grew rapidly.[16] Furthermore, as pointed out in Shaffer (1999), whichever the strategy adopted by these banks, the methodology still allows us to compare their behavior with respect to the competitive benchmark implying marginal cost pricing.

All in all, these considerations suggest to treat CCBs as a separate case, and that an analysis performed along the lines used for commercial banks may yield useful insights. This view is confirmed by the main results of the empirical analysis, which turn out to be broadly in line with those for commercial banks. The behavior of the price-deposit margins (Fig. 2a) is globally similar to that of the analogous indicators in Fig. 1a: the curve for the South is consistently higher than average and a sharp

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15 Although they are often overlooked in the literature on banking structure and performance, credit cooperatives are widespread in industrialized countries. In Germany, for example, the DG Bank federation comprises over 2,000 cooperative banks and 14 million members. In Italy there are almost 600 CCBs, totaling 500,000 members.

16 Even a summary description of these intermediaries is beyond the scope of the present paper. See e.g. Angelini, Di Salvo and Ferri, (1998) for a brief overview of this banking category, and Fazio (1987) for a historical perspective.

Fig. 2: Indicators of competitive conditions: Cooperative credit banks (1)
(by geographical area)

Fig. 2a: Price-Deposit margins (2)

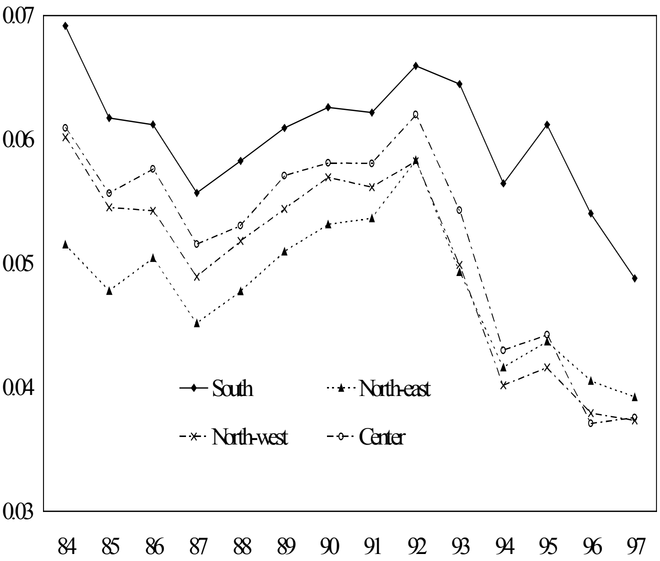


Fig. 2b: Lerner Indexes (3)
(constrained estimation)

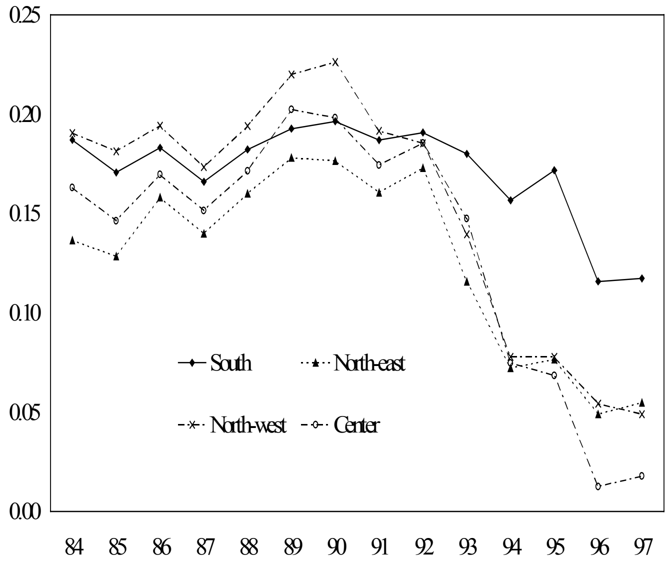


Fig. 2c: Marginal costs (4)
(constrained estimation)

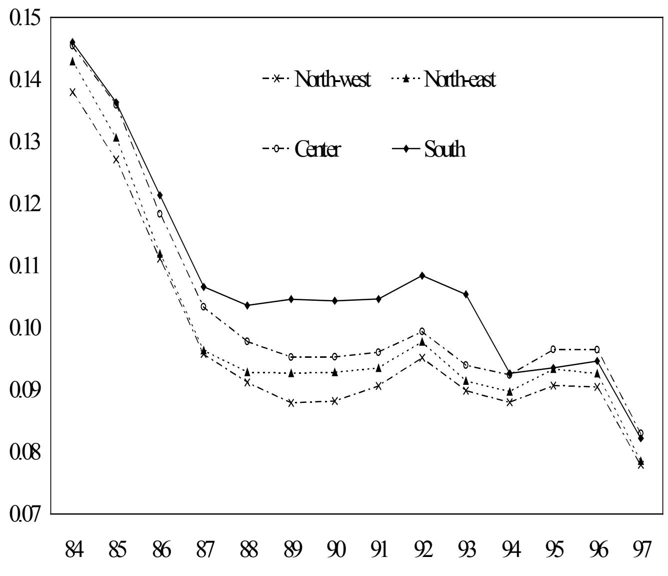
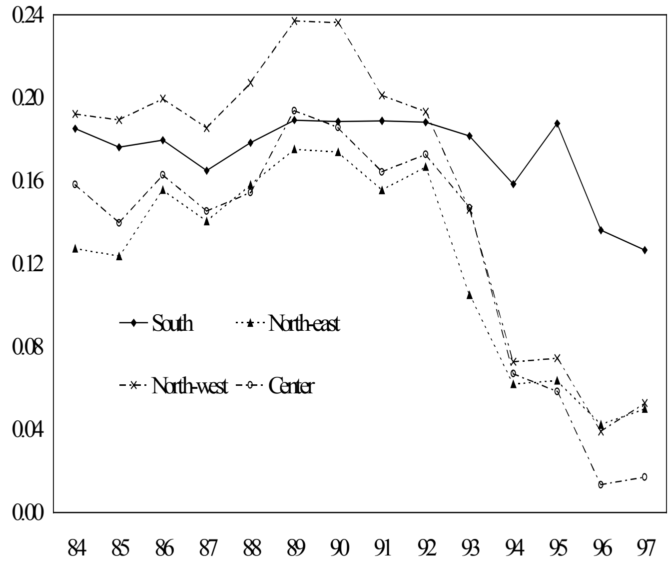


Fig. 2d: Unconstrained Lerner indexes (5)



(1) Panels (b) and (c) are obtained from output generated via estimation of system (5) – (6) in Section 2; results of the estimates are reported in Table C2.
(2) See Table 2 for the definition.
(3) Computed as λ_g/p_g, g = North-west, North-east, Center, South and Nation-wide. Estimates for the λ_g for each year are reported in Table C2. The price p_g is a simple average of individual bank data (the p_j defined in Table 2) for group g.
(4) Computed using the regression coefficients reported in Table C2 and evaluating the regressors at their sample mean for each year and group.
(5) Computed by running 4 separate sets of estimates of system (5) – (6) in Section 2, one for each area. The results of the estimates are not reported.

Fig. 3: Indicators of competitive conditions: Commercial vs. Cooperative credit banks (1)

Fig. 3a: Price-Deposit margins (2)

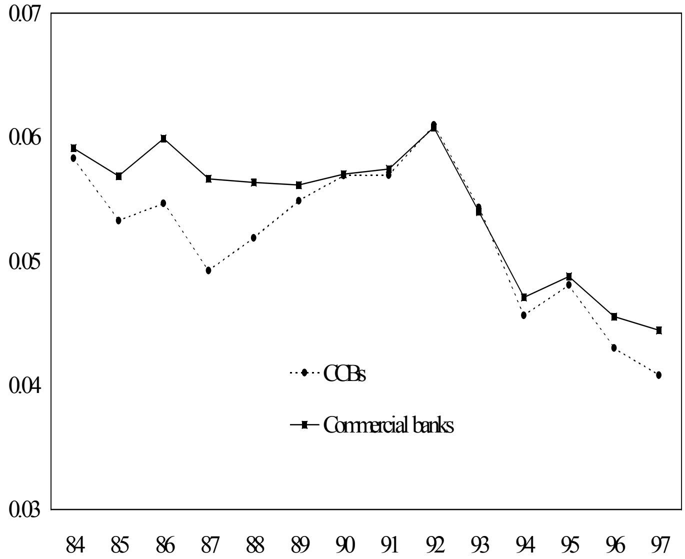


Fig. 3b: Lerner indexes (3)
(constrained estimation)

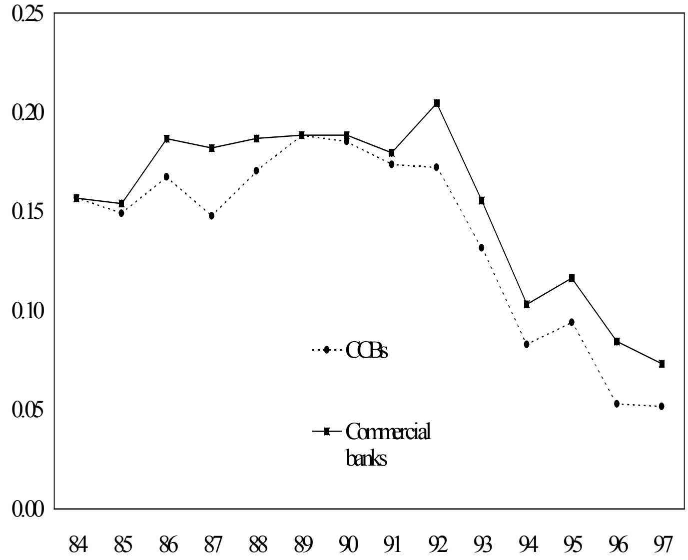


Fig. 3c: Marginal costs (4)
(constrained estimation)

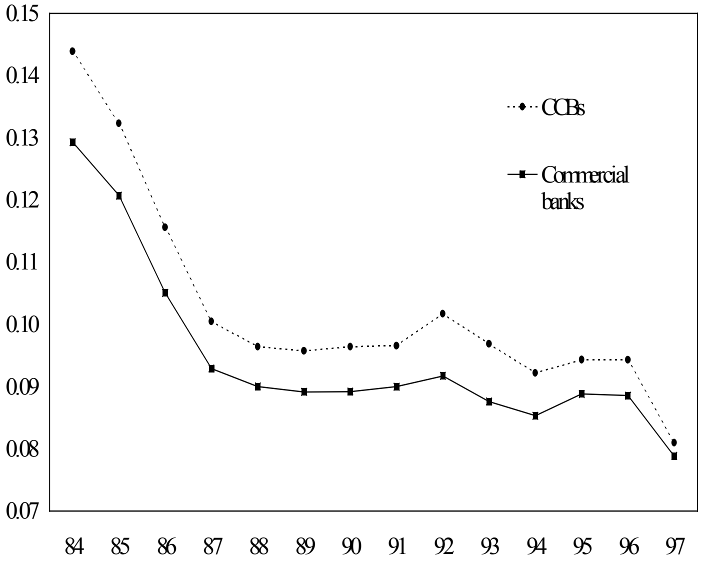
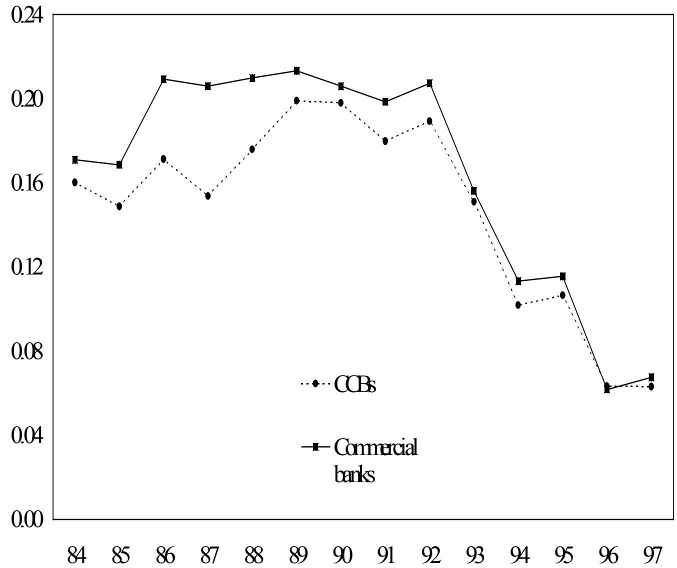


Fig. 3d: Unconstrained Lerner indexes (5)



(1) Panels (b) end (c) are obtained from output generated via estimation of system (5) – (6) in Section 2; results of the estimates are reported in Table C3.
(2) See Table 2 for the definition.
(3) Computed as λ_g/p_g, g = Commercial banks, Cooperative credit banks. Estimates for the λ_g for each year are reported in Table C3. The price p_g is a simple average of individual bank data (the p_j defined in Table 2) for group g.
(4) Computed using the regression coefficients reported in Table C3, and evaluating the regressors at their sample mean for each year and area.
(5) Computed by running 4 separate sets of estimates of system (5) – (6) in Section 2, one for each group. The results of the estimates are not reported.

drop is observed in 1993 in all areas, less pronounced for the South. The behavior displayed by the Lerner indexes is also roughly similar to those for commercial banks. Indexes for all areas are significantly different from zero at the one percent level (Table C2); however, in this case the decline observed for the South is definitely less pronounced than for commercial banks in the same area.

We also compared commercial banks to CCBs directly, overlooking the geographic dimension (Fig. 3). The Lerner indexes for CCBs are systematically lower, mainly as a result of higher marginal costs. However, the difference is not always statistically significant across years; also, it tends to vanish in the more recent period if the indexes are estimated using two separate sets of regressions for commercial banks and CCBs (Fig. 3d).

Altogether, the data seem to reject the hypothesis that CCBs operate in market niches sheltered from competition. This finding may also be relevant if one wishes to identify relevant banking markets of even smaller dimension, further disaggregating the territorial units considered in this study (the four areas). Since CCBs are very numerous and widespread throughout the country, it would be possible to pool them together with the commercial banks, thus obtaining the degrees of freedom necessary to undertake such econometric analysis.

5.1.3 Mergers and acquisitions

While a detailed analysis of the causes and consequences of mergers and acquisitions lies beyond the scope of the present study, we deemed it necessary to gauge the effect of these operations on our set of indexes, given that concentrations can in principle deeply affect competitive conditions.[17] Based on the structure-conduct-performance paradigm, the increase in concentration caused by mergers and acquisitions should cause bank margins to grow at the market level. We try to capture this effect in section 5.2; here we assess whether banks that underwent merger or acquisitions processes (M&A henceforth) gained market power relative to the rest of the banking system. To identify these banks we constructed a dummy variable which was set equal to one for the year of the operation and for all subsequent years. With this method, banks performing only one acquisition over the entire sample are pooled with those acquiring one or more banks each year; however, we deemed it appropriate for our purposes, since we are only interested in estimating an average indicator of competition for the entire group of M&A banks, without making any inference *across* them or explaining motivations behind M&A operations.

[17] For a thorough analysis of the effects of mergers and acquisitions across European banking markets, see Vander Vennet (1996).

Fig. 4: Indicators of competitive conditions: Mergers and acquisitions vs. other banks (1)
(total sample)

Fig. 4a: Price-Deposit Margins (2)

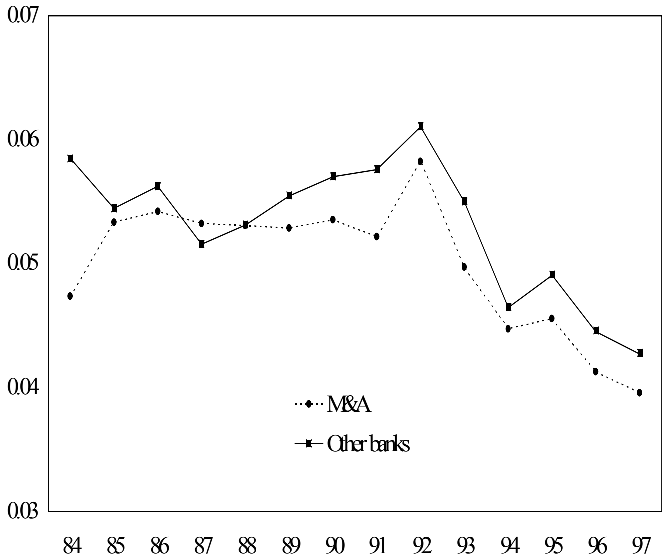


Fig. 4b: Lerner Indexes (3)
(constrained estimation)

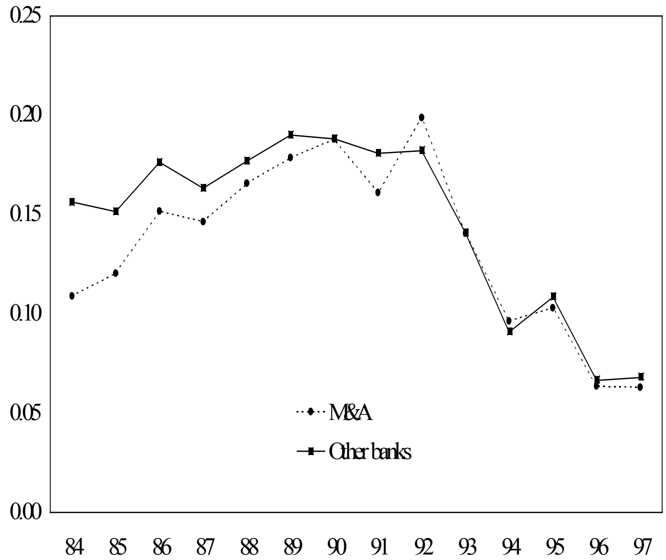
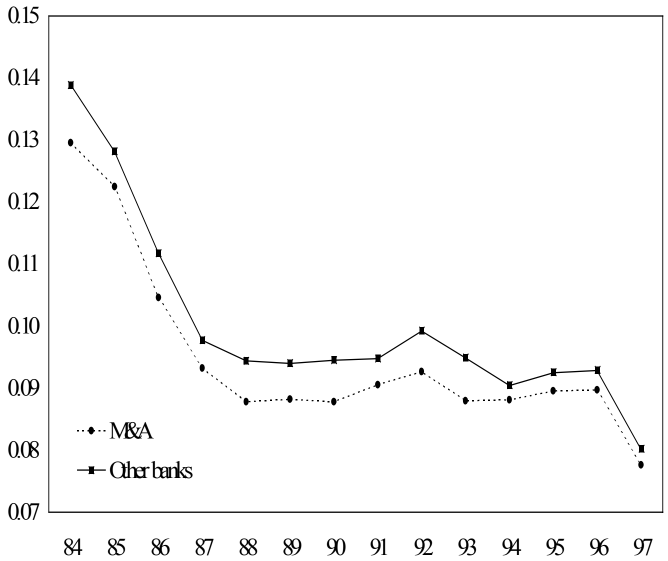


Fig. 4c: Marginal costs (4)
(constrained estimation)



(1) Panels (b) and (c) are obtained from output generated estimation of system (5) – (6) in Section 2; results of the estimates are reported in Table C4.
(2) See Table 2 for the definition.
(3) Computed as λ_g/p_g, g = banks which underwent at least one M&A operation within the sample period, other banks. Estimates for the λ_g for each year are reported in Table C4. The price p_g is a simple average of individual bank data (the p_j defined in Table 2) for group g.
(4) Computed using the regression coefficients reported in Table C4, and evaluating the regressors at their sample mean for each year and group.
(5) Computed by running 4 separate sets of estimates of system (5) – (6) in Section 2, one for each group. The results of the estimates are not reported.

Fig. 4 reports results for the entire sample (commercial banks and CCBs). Price-deposit margins are generally smaller for M&A (Fig. 4a). Similar indications come from the Lerner indexes, but only for the initial part of the sample, which should be regarded with caution, given the small number of observations in the M&A group. In the '90s, the period in which the phenomenon acquired relevance, there does not seem to be evidence of any gain in market power of banks involved in M&A's with respect to the control group. This finding was not obvious ex-ante, since one could have expected an increase in market power for the banks involved in mergers due to the gain in relative size. This result would be in keeping with the available literature, which typically fails to find significant effects of M&A operations (see e.g. the empirical evidence surveyed by Focarelli, Panetta and Salleo, 1999). However, the data also show that banks in the M&A group exhibit consistently lower marginal costs than other banks (Fig. 4c). This seems to suggest that, whatever the reasons for the consolidation (there is evidence that some operations, especially before 1990, were triggered by the need to help troubled banks), the resulting institutions are doing relatively well. Overall, banks involved in merger and acquisitions tend to be more cost-effective and to grant their clients better conditions (lower prices) than average.

While the rest of the banking system may not be the best control group to evaluate the performance of the M&A banks,[18] separate analyses of M&A for commercial banks and CCBs yield substantially similar results (not reported), thus adding confidence about the robustness of the findings.

5.1.4 Robustness checks

Using the commercial banks sample, which we view as the benchmark for our results, we performed several additional robustness checks of the estimation exercise, to account for potential problems arising from the model specification or from the definitions adopted for some of the key variables.

We experimented with several alternative definitions of banking product and price, in addition to the one presented in the previous paragraphs. First, in light of the still unsettled debate over whether deposits should be considered as input or output, discussed in Section 2.1, we modified the analytical setup to allow deposits to be considered as an output. To do so, our measure of the price for the composite banking product p_j was enhanced to include a shadow revenue on deposits (net of required reserves), computed as the difference between a money market interest rate and the interest rate paid on deposits (which is typically lower). The idea is that this interest differential is the price paid

[18] For instance, if most of the mergers occurred among the largest banks in the country, or those located in one

by depositors for the services (e.g. payment services) they obtain from their holdings of deposits. Also, the specification of the cost function (5) was modified, eliminating all the terms involving the interest rate on deposits from the right-hand side and netting the dependent variable of interest paid on deposits. We also redefined q_j as total assets plus total deposits. The changes are summarized in the following table 3.

Table 3: Changes in definitions of key variables implemented for robustness[(1)]

	Deposits treated as an output
P_j	$\dfrac{\text{TIA} + \text{TRS} + r*(\text{TD} - \text{RR}) - \text{TID}}{\text{Total assets} + \text{Total deposits}}$ Where: TIA = Total interest earned on assets r = Interest rate on T-bills TD = Total deposits RR = Required reserves TID = Total interest paid on deposits
Q_j	Total assets + Total deposits
C_j	Total operating costs = Total costs – Total interest paid on deposits
	Revenue from services omitted from price definition
P_j	$\dfrac{\text{Total interest earned on assets}}{\text{Total assets}}$
Q_j	Total assets

(1) See Appendix A for further details on the variables.

The resulting Lerner indexes are displayed in Fig. 5. The most evident change relative to the benchmark Fig. 1b is that the curves shift upwards; however, they retain a roughly similar shape. This sensitivity may be due to the fact that since a break-down of costs by product is not available in balance sheet data, there are few choices for the definition of C in equations (5) and (6), that is either total costs, used in the previous subsections, or total operating costs. Incorrectly attributing total cost to only one banking product (loans) or to an excessively broad definition of such a product (total assets plus deposits) may introduce a biasin the estimates.[19] Leaving the level of the indexes aside, the figure displays a roughly stationary pattern until 1992 and a sharp drop in 1993 for all areas, in line

specific banking market, then the matching group should be constructed controlling for such factors.

19 Probably due to an analogous bias problem, when we tried to use total loans and the related interest rate as alternative definitions of q_j and p_j, we obtained negative Lerner indexes for the entire sample.

Fig. 5: Lerner indexes when deposits are treated as an output (1)
(commercial banks)

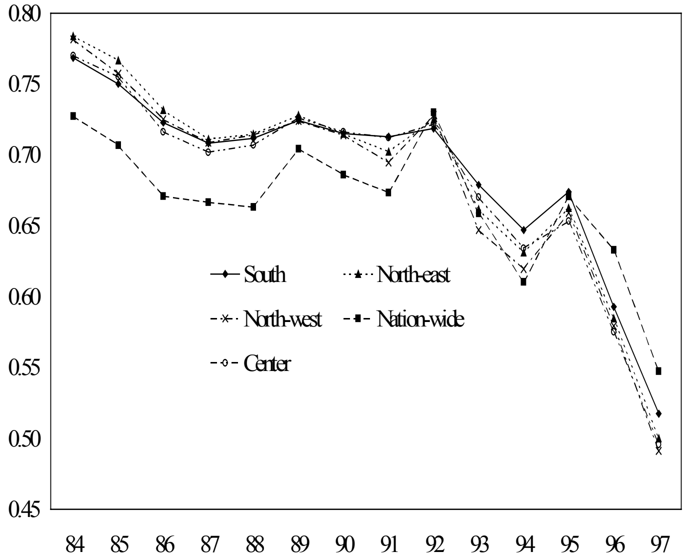


Fig. 6: Lerner indexes when p is defined as $\frac{\text{Total interest on assets}}{\text{Total assets}}$ (1)
(commercial banks)

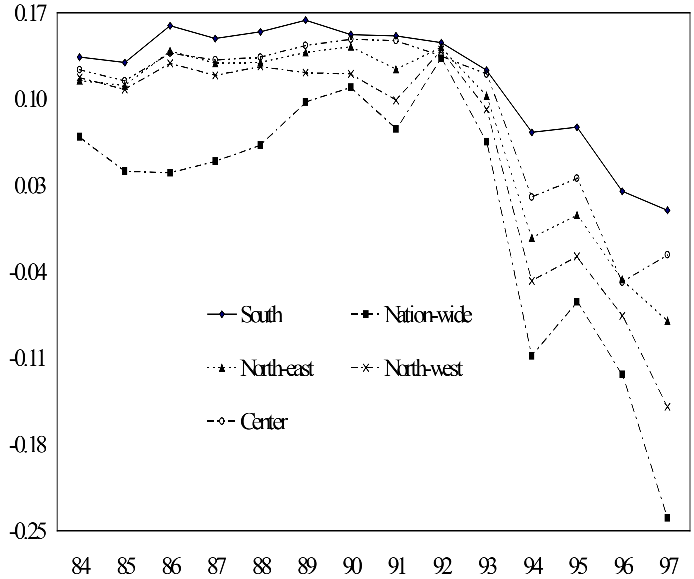
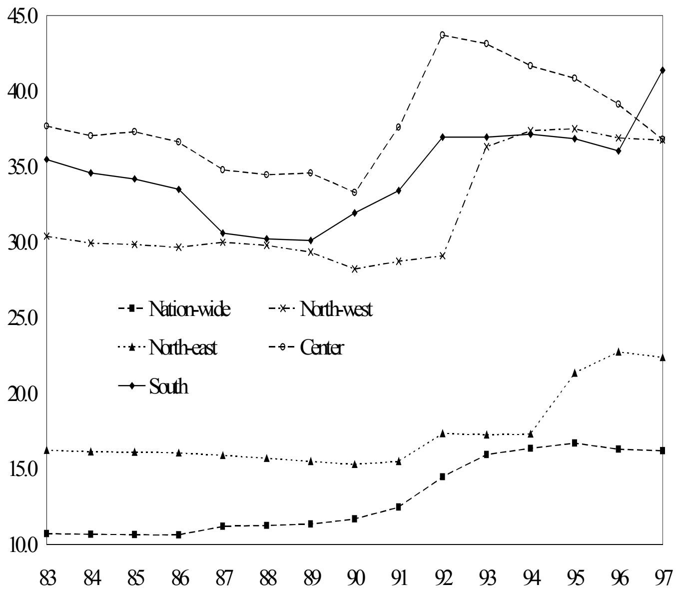


Fig. 7: Herfindhal indexes of market concentration
(computed from data on banks branches)



(1) The indexes are obtained from output generated via estimation of system (5) – (6) in Section 2; results of the estimates are not reported. Specifically, for each year the indexes are computed as λ_g/p_g, g = North-west, North-east, Center, South and Nation-wide. The price p_g is a simple average of individual bank data for group g. Details about the definition of the dependent variables are in Table 3.

with the evidence in Fig. 1b. However, differently from the benchmark case, there is no evidence of increasing dispersion across areas after 1993. This could be due to an improvement in competitive conditions in the Center-South areas stemming from the deposit side.

As a second robustness check, we redefined the output price p_j omitting revenue from services; this amounts to relaxing the assumption of proportionality between the flow of services supplied by a bank and its assets size adopted in subsections 5.1.1 through 5.1.3. The results are reported in Fig. 6. As before, all indexes display a sharp drop in 1993; in this case, however, they turn negative, and often significant, in most areas after 1994. This likely reflects the fact that services have become an increasing source of revenue in recent years; in addition, the mentioned profitability crisis that hit banks in the early 1990's has especially affected the traditional intermediation activity.

We also tried to control for the free capital effect pointed out by Generale, Gobbi and Tedeschi (1999), mentioned in Section 3. To this end, all observations for which the ratio between bad and doubtful loans and total assets exceeded 4 percent were dropped from the sample, and the regressions underlying Fig. 1b and Table C1 were re-run. Although the number of observations drops significantly, almost 30 percent on average over the 1984-1997 period, the shape of the curves (not reported) is roughly unaffected. However, the curves record an upward shift relative to those in Fig. 1b. Such shift is reasonable a priori, since we are dropping less profitable banks from the sample; its average magnitude over the entire sample period and across bank categories turns out to be 1 percentage point (2 percentage points for the South, where bad loans were much higher than average).

Finally, we used interest yielding assets and total interest on assets over interest yielding assets as alternative definitions of q_j and p_j (again, the results are not reported). In this case as well, no significant change in the Lerner indexes relative to the benchmark case portrayed in Fig. 1b could be detected.

Overall, while the results presented in this section lead us to look at the absolute value of the Lerner indexes with a degree of skepticism, they confirm the global time series patterns detected in Section 5.1.1.

5.2 An investigation of the factors affecting bank competition

One robust result emerging from the analysis of the previous section is that the Lerner indexes tend to maintain a rather constant pattern throughout the first part of the sample period and then decline steadily beginning in 1993. The decline occurs concomitantly with the implementation of the Second Banking Directive. For the reasons mentioned in the introduction, such regulatory reform may be responsible for a structural change in the competitive conditions across EU banking markets. The time series behavior of our estimates is consistent with this hypothesis. However, a number of other factors may have had an effect on banks' mark-ups. Before we can reach any conclusion regarding the impact of the regulatory reform, it is therefore necessary to gauge the importance of these other factors.

Recalling the analysis in section 2, the semi-elasticity of demand for banking products comes to mind as a potential candidate to explain the time series pattern of the Lerner indexes. This elasticity may have increased over time as a result of general economic growth and consequent financial deepening, with the emergence of suppliers of financial products alternative to banks, thereby contributing to the observed decline in mark-ups. While we do not provide an empirical assessment of this factor, we do not have evidence that the demand elasticity for banking products increased significantly after 1993. For example, Focarelli and Rossi (1998) estimate demand schedules for bank credit across the four geographical areas considered in this study and report no evidence of coefficient instability.

In addition to demand changes, the concentration of the banking market may affect pricing behavior and can thus account for the time series pattern of the Lerner indexes. Also, the economic cycle are likely to have an impact on banks' pricing decisions. For instance, in Rotemberg and Saloner's (1986) model of implicit collusion, mark-ups are countercyclical due to the fact that a relatively high demand raises each participant's incentives to deviate from the agreement, thereby causing the oligopoly to lower mark-ups to maintain discipline.[20] Since the decline in the Lerner indexes is observable over a period of five years only, we need to test whether this pattern could simply be the result of a short-term cyclical effect rather than a more fundamental change due to a new regulatory environment. Finally, we need to control for idiosyncratic or exceptional factors that may have had an impact on bank's profitability. Within this category, we control for the previously

[20] However, the opposite result is obtained in the implicit collusion model of Green and Porter (1984).

mentioned crisis experienced by the Italian banking industry in 1992-93, which is widely agreed to have been considerably more severe than warranted by general macroeconomic conditions; we also try to account for the administrative constraints imposed on the Italian banking system in the earlier part of our sample, which arguably had effects in subsequent years as well. In particular, until 1987 banks were subjected to portfolio constraints and ceilings on loans expansion, which determined abnormally high holdings of securities and in all likelihood caused profitable borrowers to be credit rationed; as soon as these measures were lifted, banks began to rebalance their assets side, rapidly increasing the share of loans.

To explain the pattern of bank competition emerging from the previous section we perform the following second-stage analysis. We arrange the Lerner indexes displayed in Fig. 1b in a panel and regress them against several variables that should proxy for the different factors described above.[21] We also use an indicator variable equal to one for the years 1993-97 and zero otherwise, which should identify the effect of other factors, such as the regulatory reform. The significance of this indicator after controlling for the other variables would be consistent with the hypothesis that the implementation of the Second Banking Directive, with the elimination of administrative barriers to entry, determined a structural improvement in bank competition.

We use GDP growth and inflation to account for macroeconomic conditions. If mark-ups are countercyclical, then we should expect a negative sign for both variables. At the same time, one could also argue that banks might demand a risk premium in an environment of high inflation or high nominal interest rates.[22] Therefore, the net effect of inflation on bank margins is ambiguous. We use the number of bank branches per capita and a Herfindahl index calculated on bank branches as indicators of market structure. According to the customary view associated with the structure-conduct-performance hypothesis, the signs of these indicators should be, in the order, negative and positive. We add a time trend to the regression to capture the general development in financial markets, and the increasing importance of markets and institutions alternative to banks. The trend should therefore have a negative sign. As a proxy for the general state of banks' health, we use the

[21] Hannan and Liang (1993), who analyze the U.S. deposits market, is to our knowledge the only other contribution to perform a similar two-stage study. Our paper differs from theirs in various ways. First, they impose constant conduct parameters through time, while we explore how conduct may have varied over time. In addition, they do not estimate marginal costs, while we run simultaneous systems imposing cross-equation parameter restrictions.

[22] Saunders and Schumacher (1997) show that interest rate volatility, likely to be high in an environment of high and variable inflation, has a consistently positive effect on bank margins.

ratio of bad and doubtful loans to total assets, which due to the profitability crisis increased noticeably, especially in the South. The expected sign is negative. We also add the ratio between loans and total assets, with an expected positive sign: as banks replaced securities with more profitable loans, their margins should have increased. Finally, we include the indicator variable for the years 1993-97, which is expected to be negative and significant after controlling for the other factors.

The results are reported in Table 4. The estimation period ends in 1996 due to lack of data for GDP growth and inflation at the area level. All regressions include area-specific fixed effects (whose coefficients are not reported), and were estimated with instrumental variables to account for the potential endogeneity of the number of bank branches and loans.

The regression in the first column includes all the variables described above except the 1993-97 indicator variable. The coefficients of real GDP growth and inflation are negative, although the latter is not significant; in general, the significance of these effects does vary across specifications, but the sign pattern is consistently negative, lending some support to the Rotemberg and Saloner's (1986) implicit collusion theory. The number of branches per capita is negative and significant, consistent with expectations. The Herfindahl index has a negative sign, although it is not significant. Comparison of the time series pattern of the Herfindahls (Fig. 7) and the Lerners confirms the existence of a clear inverse relationship, which may be the result of a dynamic adjustment process. Theoretical models of industrial organization predict that the equilibrium number of firms operating in a market may decrease as a result of economic integration (Peretto, 1999). The indicator of banks' health has the expected sign and is significant, thus suggesting that the above mentioned profitability crisis of the early 1990's may have contributed to the decrease in the Lerners. This evidence is in line with the results of the sensitivity analysis reported in Section 5.1.4. The ratio between loans and total assets, proxying for the abolition of administrative controls in the middle eighties, has the expected positive sign and is significant.

To check the robustness of the results, we re-run a similar specification excluding the time trend, whose coefficient has a positive sign, contrary to the a priori that market developments and increasing competition from non-banks should have reduced margins overthe period (column 2).[23] The overall picture remains broadly unchanged.

[23] Replacing the time trend with year dummies results in a significant increase in the standard errors of the coefficients, signaling that the cross-section variability of the data alone is not sufficient to achieve identification.

Table 4: Factors affecting proposed measures of bank competition[1]

(Fixed effects panels for commercial banks; sample period: 1984-1996)

	Dependent variable:							
	Lerner indexes				**Price-deposit margins**			
Real GDP growth	-0.20	-0.21	-0.38	-0.38	-0.09**	-0.09**	-0.11**	-0.11**
	(0.8)	*(1.0)*	*(1.3)*	*(1.5)*	*(3.4)*	*(3.4)*	*(3.6)*	*(3.8)*
Inflation	-1.15**	-1.42**	-0.40	-1.21**	0.11*	-0.09**	-0.02	-0.06*
	(2.7)	*(5.6)*	*(0.8)*	*(5.4)*	*(2.1)*	*(2.7)*	*(0.5)*	*(2.0)*
Herfindahl index	-2.7e-3	-2.8e-3	1.1e-4	-8.9e-4	8.4e-5	9.2e-5	3.8e-4	3.4e-4
	(1.3)	*(1.4)*	*(0.1)*	*(0.4)*	*(0.4)*	*(0.5)*	*(1.9)*	*(1.8)*
Bank branches/Population	-1.10**	-1.03**	-0.64**	-0.55**	-0.11**	-0.12**	-0.06*	-0.06*
	(6.5)	*(7.0)*	*(3.4)*	*(2.9)*	*(5.8)*	*(7.1)*	*(2.4)*	*(2.4)*
Bad and doubtful loans/Total assets	-1.41**	-1.23**	-0.92**	-0.56*	-0.10*	-0.11**	-0.04	-0.02
	(4.9)	*(5.2)*	*(2.9)*	*(2.0)*	*(2.2)*	*(3.1)*	*(1.4)*	*(1.1)*
Loans portfolio/Total assets	0.67*	0.86**	-0.20	0.43	010**	0.09**	5.5e-3	0.03
	(2.6)	*(5.2)*	*(0.5)*	*(1.8)*	*(3.0)*	*(4.8)*	*(0.2)*	*(1.5)*
Linear trend	5.2e-3	-	0.01*	-	-3.8e-4	-	6.8e-4	-
	(0.9)	-	*(2.1)*	-	*(0.5)*	-	*(1.0)*	-
Dummy for 1993-1997	-	-	-0.07**	-0.06*	-	-	-8.4e-3**	-7.8e-3**
	-	-	*(2.7)*	*(2.4)*	-	-	*(3.4)*	*(3.2)*
N° obs.	65	65	65	65	65	65	65	65
R^2	0.60	0.59	0.73	0.71	0.75	0.75	0.83	0.83

(1) In each regression, the dependent variable is obtained by stacking the five time series of the Lerner indexes (the price-deposit margins) displayed in Fig. 1b (Fig. 1a); the regressors are also created with a similar stacking procedure. Each regression includes 5 dummies to eliminate fixed effects specific to the geographical location of the bank (North-west, North-east, Center, South and Nation-wide); the coefficients are not reported. Estimation method: Two-stage least squares; variables with potential endogeneity problems (bad and doubtful loans/total assets, n° bank branches/population, loans portfolio/total assets) were instrumented using their lagged values and exogenous or predetermined variables (current GDP growth and inflation, current and lagged real GDP (levels and logs), lagged bank branches (levels and logs), current and lagged per capita GDP (levels and logs). Heteroskedastiticy-robust *t* statistics are reported in parenthesis in italics. One or two asterisks denote significance at the five and one percent level, respectively. Inflation is computed using the GDP deflators for each area, in turn obtained as a weighted average of regional deflators. Similar results are obtained when the nation-wide category is omitted, leaving 52 observations for each regression.

In the third and fourth columns of the table we add the indicator variable to the first two specifications to capture any unmeasurable factor that had effects after 1992, such as the implementation of the Second Banking Directive. The coefficient is negative and significant. The number of branches per capita and the indicator of banks' health maintain sign and significance, although with a reduced coefficient. As a robustness test, the exercise was replicated using price-deposit margins as the dependent variable (last four columns of the table). The general pattern of sign and significance of the variables is not altered, with a few exceptions (in particular, GDP growth has a consistently significant effect). The regressions in the first four columns were also re-run using the unconstrained Lerners displayed in Fig. 1d, without detecting significant changes in the results (not reported).

Altogether, between 1992 and 1996 the estimated Lerner index for commercial banks drops by 13 percentage points, from an average value of 20 percent across markets to 7 percent. The equation including the time trend and the 1993-96 dummy explains over 75 percent of the reduction. Among the regressors, a prominent role is played by the 1993-96 dummy itself, which accounts for about 6-7 percentage points of the drop. The increase of bank branches accounts for about 5 points; the growth of bad and doubtful loans for about 2. The effect of the latter regressor would suggest that as the credit risk situation goes back to normal, an increase in the Lerner indexes, unrelated to competitive conditions, may be expected.

In sum, this analysis does not allow us to rule out the hypothesis that a series of relevant events, which affected the banking environment in 1993 or in previous years had a major role in shaping the observed pattern of our indicators of competitive conditions.[24] Nevertheless, even after controlling for a number of factors, the evidence is consistent with the hypothesis that the process of

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[24] While a history of the events that contributed to reshape the Italian financial environment in recent years lies outside the scope of this paper, some of the main regulatory changes are worth recalling. In 1989, an EC regulation concerning the creation of new banks is enforced, eliminating previously existing barriers. The completion of the branching liberalization process in March 1990 was followed by a significant increase in the number of branches per capita. In May 1990 geographical limits to the expansion of banks' activity are removed, with the only exception of CCBs. In July 1990 government-owned banks are allowed to choose the joint stock company model and barriers to mergers among banks belonging to different categories are removed, introducing incentives in this sense; also, the law introduces the possibility for the government to authorize the privatization of public banks. The privatization process started in 1993 with the IPO of three large banks, and gained momentum in subsequent years. In October 1990 an Anti-trust Authority is created. Responsibility for competition in the banking sector is assigned to the Bank of Italy, with which the Anti-trust Authority cooperates. In February 1992 minimum transparency requirements concerning terms, prices and supply conditions of banking services are introduced.

regulatory reform had an important impact on the competitive conditions of the Italian banking industry.

6. Conclusions

Banking industries throughout Europe have experienced major transformations in recent years. Important regulatory reforms, aimed at creating the conditions for a single banking market, have been implemented. Significant structural changes, through an intense process of consolidation, have taken place. This study explores the dynamic evolution of banking competition in Italy in response to such modifications, offering at the same time some insights whose relevance extends beyond the Italian experience. Using a dataset that includes balance sheet information on virtually all Italian banks over the 1983-1997 period, we estimate Lerner indexes for five markets, separating banks according to their relevant area of operation. This geographical partition allows us to better approximate the concept of "relevant market". While most analyses of competition in the banking industry adopt a national definition of markets, typically anti-trust regulators operate with a local one.

Our benchmark results relate to the commercial banks cluster, which accounts for more than 90 percent of total assets. However, we also explore the case of cooperative credit banks (CCBs), which are the main institutional alternative to commercial banks in Italy. The main results can be summarized as follows.

Average mark-ups in the supply of banking products remained roughly unchanged throughout the first part of the sample period analyzed and declined steadily after 1992. This pattern is the most robust of our results, as it is detected across geographical areas and bank categories. In particular, it holds for both commercial banks and cooperative credit banks. It is also robust to alternative definitions of bank output and price: we account for revenues from services and we treat deposits as part of banks' output, thereby allowing for the possibility that deposits are a relevant source of market power for banks. This result, which suggests that the Italian banking industry has become more competitive in recent years, is reinforced by recent findings by other authors that X-inefficiencies characterizing the Italian banking sector diminished significantly over the 1993-97 period.

Most of the results obtained for CCBs are remarkably similar to those for commercial banks; estimated Lerner indexes are generally lower than those for commercial banks due to higher marginal costs, but the difference tends to disappear in the more recent period. This suggests that there is little market segmentation between these two bank categories; although CCBs exhibit features that have lead to their characterization as “niche banks,” no evidence is found that they are protected from competitive pressures. Given the current debate regarding the potential for anticompetitive behavior of U.S. credit unions with respect to commercial banks, the issue invites further investigation.

It is worth remarking that this homogeneity of behavior, together with the large number of CCBs operating throughout geographical markets, could be usefully exploited to increase the geographical breakdown of the analysis. In other words, our regional analysis could be pushed one step further to allow for a better approximation of relevant banking markets.

We also consider the recent process of consolidation in the banking industry, focusing on its impact on competitive conditions. To the best of our knowledge, the literature on the banking industry has not examined the impact of mergers on competitive conditions. Yet waves of mergers have been observed in both Europe and the United States in recent years. A plausible supposition is that because of their increased market share, banks involved in M&A operations would gain market power. However, their Lerner indexes do not differ from the average; also, these banks tend to be more cost-effective and to grant clients lower-than-average prices. While these results suggest a positive impact of the consolidation process on social welfare, they also encourage some speculation regarding the dynamic, long-run impact of the wave of mergers and acquisitions on industry structure. The fact that M&A banks have lower marginal costs and offer products at lower prices suggests that this situation might lead to a process of gradual increase in their market share. Consequently, while no evidence is found that merged banks enjoy extra market power, different conclusions might hold in a long-run equilibrium, suggesting the need for further monitoring.

Finally, we arrange the estimated indexes of competitive conditions for the five geographical markets in a panel; this yields enough observations to perform a second stage analysis aimed at identifying factors and events underlying the observed time pattern of the mark-up indicators. We find that this pattern is related to the expansion of bank branches, to a profitability crisis of exceptional relevance in the early 1990’s, and in some measure to the business cycle. The proposed equation explains over 75 percent of the drop in the mark-up indicators observed after 1992. About half of the explained drop is accounted for by a dummy for the 1993-97 years. This evidence is consistent with the hypothesis that the 1993 bank reform introducing the Single Banking License, removing important administrative barriers to entry, contributed to improving competitive conditions.

Appendix A: The data

The dataset, derived from the monthly and annual statistical reports sent by the banks to the Bank of Italy, has an annual frequency. Stock variables are computed as averages of quarterly data, except for 1983 (the initial year of the sample), for which only end-of-period stocks were available. Variables from the profit and loss account are genuinely annual, in that the account is published annually and pertains to the economic performance over the budget year. The following variables were used to create the dataset for the regression analysis.

Stock variables (in million of Italian lire)

Bad and doubtful loans: Do not include non-performing loans.

Deposits: Include savings deposits, certificates of deposit, checking accounts vis-à-vis resident non-bank customers.

Interbank deposits: Held with resident as well as non resident counterparts.

Loans: Include short-term and long-term loans. The main categories of operations include current account overdrafts, portfolio discount, advances on import-export operations, mortgages. The total includes bad and doubtful loans.

Real estate property: At book value.

Required reserves: Outstanding amounts recorded on banks reserve accounts held at the central bank.

Total assets: Total of the assets side of the balance sheet, net of losses pertaining to the current budget.

Total deposits: Computed as the sum of deposits and interbank deposits.

Total interbank assets: Includes interbank deposits and deposits with the central bank for reserve requirements.

Total interbank liabilities: Interbank deposits on the liability side.

Flow variables from the profit and loss account (in million of Italian lire)

Interest on loans: Interest accrued on loans portfolio, including repurchase agreements, with resident non-bank customers.

Labor costs: staff costs.

Total costs: Total operating costs plus interest paid on deposits.

Total interest earned on assets: Includes interest accrued from both the loans and the bond portfolio, commissions, interest from total interbank assets.

Total interest paid on deposits: Interest cost on deposit liabilities, both vis-à-vis non-bank customers and interbank liabilities.

Total operating costs: Inclusive of Labor costs.

Total revenues from services.

Other variables

Number of bank branches: In 1987 the series records a large increase due to the inclusion of offices with limited operational capabilities, previously treated separately from a statistical and normative viewpoint. The regression analysis of section 5.2 was re-run with a corrected series, in which branches for 1987 are computed via interpolation of adjacent years. No significant changes in the results was detected.

Herfindahl index of branch concentration: The index was computed using total bank branches in each of the four areas of the country.

Number of employees: Total of bank staff of all status.

Interest rate on T-bills: computed as a volume-weighted average of yields on three, six and twelve month bills in the primary market.

Classification variables

Ist: Discrete variable taking integer values from 1 through 7, used to create dummy variables for banks' institutional type: "Istituti di diritto pubblico" (large government-owned banks), "banche di interesse nazionale", ordinary commercial banks, "banche popolari" (relatively large-size cooperative banks), "casse di risparmio" (similar to the US savings and loans), "Monti di credito di 1° categoria" (almost extinct even at the beginning of our sample period), Cooperative Credit Banks (small cooperative banks).

Dim: Discrete variable taking integer values from 1 through 5, used to create dummy variables for banks' dimension (major, large, medium, small, very small).

Dummy for M&A: Dummy variable equal to one for banks which in a given year acquire or merge with at least one other bank; specifically, the dummy was set equal to zero for all years prior to the operation, and to one for the year of the operation and for all other years following it. All mergers or acquisitions between banks and non-bank financial institutions are not considered. See also the section below.

Mergers and acquisitions

In the dataset each bank is identified by a special 4-digit code. We addressed the problem of acquisitions by adding a fifth digit - a "1" - to the bank code for the year in which the acquisition took place and all subsequent years. Further acquisitions are labeled with increasing fifth digits. Thus, if bank 1307 buys bank 3421 in 1986 and bank 4456 in 1991, it will appear in our dataset as 1307 between 1983 and 1986, 13071 between 1987 and 1990, and 13072 between 1991 and 1993. Mergers are treated by creating a new bank code. Thus, if banks 4432 and 5674 merge in 1987 forming bank 3344, our sample will have both 4432 and 5674 until 1986, and only 3344 from 1987 onward. In practice, in the analysis a bank that has acquired another bank is treated as a new unit altogether.

All the relevant stock data are adjusted accordingly. Suppose bank 1307 acquires bank 3421 in the third quarter of 1986. All the stock variables for 1307 in this year are computed as follows. In each quarter prior to the acquisition (the first and the second), the stocks are obtained as the sum of the stocks of 1307 and 3421. After the acquisition we use the stock variables of 1307 as they appear in the monthly reports to the central bank.

Filters

We dropped from the dataset: observations with nonpositive operating expenses or staff costs (19 observations for the entire sample period); observations with missing key variables, such as interest on loans or total loans (104 observations). We also dropped observations: if the annual yield on loans was more than 50 percent (6 observations) or less than 2.5 percent (10); if the ratio between total loans and total deposits was over 2.5 (6) or less than 0.15 (1); if the average interest rate on total deposits was more than 24 percent (3) or less than 0.5 percent (1); if the unit cost of labor was more than 200 billion Italian lira (1) or less than 10 billion (10); if the yield on loans increased by more than 200 percent from one year to the next (5) or decreased by more than 180 percent (2).

Variables from national and regional accounts

This part of the dataset, used only for the regressions in Table 4, comprises real GDP and the GDP deflator as reported in national and regional accounts. Area-wide values were computed via aggregation of regional series. The source is the National Institute for Statistics.

Appendix B: Geographical breakdown

The country is partitioned in four areas, North-west, North-east, Center, South and islands.[25] We assume that a bank belongs to a certain area if it collects at least 80% of its deposits in that area.[26] Both the 80 percent threshold and the aggregate chosen to compute the measure (deposits) are arbitrary. As the threshold is increased, the criterion tends to move banks with an area-wide outreach to the nation-wide category, and vice-versa if the threshold is reduced; for instance, moving the threshold from 80 to 90 percent, a bank with 85 percent of its deposits in the Center area, previously labeled “Center”, would become “Nation-wide”. Similarly, the relevant variable could be loans, or total assets, instead of deposits. We performed some sensitivity analysis along both dimensions, without detecting significant changes in the identification of the market clusters. A classification of the Italian banks based on their area of operation, published by the Bank of Italy in 1995, is also based on a similar criterion. This methodology is amenable to analysis of finer partitions, overlooked in the present study: the 4 areas can be partitioned into 20 regions, which in turn can be partitioned into 98 provinces.

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[25] The North-west comprises Val D’Aosta, Piemonte, Lombardia and Liguria, the North-east includes Veneto, Trentino Alto Adige, Friuli Venezia Giulia and Emilia Romagna, the Center comprises Toscana, Umbria, Marche and Lazio, while the South and islands includes Campania, Basilicata, Puglia, Calabria, Abruzzo, Molise, Sardegna and Sicilia.

[26] For a detailed survey of the methodologies proposed for the identification of the relevant banking market see, for example, Wolken (1984).

Appendix C: Regression tables

Table C1: Estimates of system (5) - (6): Commercial banks, by geographical area (1)

dependent variables: total costs, C, for (5) and yield on total assets, p, for (6)

	Cost equation (5)																								
															Supply equation (6)										
	c_0	c_1	c_2	c_3	c_4	c_5	c_6	c_7	c_8	c_9	c_{NW}	c_{NE}	c_{CE}	c_{SO}	s_0	s_1	s_2	s_3	s_4	l_{NW}	l_{NE}	l_{CE}	l_{SO}	l_{NA}	*N. obs.*
1984	-3.201,6	-823,5	558,0	-811,8	-160,3	41,2	99,9	-71,3	-13,9	-26,6	-11,8	-10,6	-7,1	-2,7	4,1	-1,5	-22,0	6,3	-9,8	2,3	0,1	0,2	0,4	-0,6	347
	-5,4	*-3,4*	*3,4*	*-5,8*	*-4,7*	*1,3*	*5,1*	*-3,2*	*-0,8*	*-5,3*	*-5,0*	*-4,4*	*-3,0*	*-1,1*	*0,2*	*-5,4*	*-5,7*	*2,0*	*-6,7*	*16,2*	*0,5*	*1,0*	*2,1*	*-1,8*	
1985	-5.256,8	-1.567,2	1.030,1	-977,9	-181,1	174,1	122,7	-110,9	-26,6	-26,2	-8,0	-5,4	-2,6	3,1	-10,7	-1,3	-25,7	7,7	-8,8	2,1	0,1	0,2	0,4	-0,8	339
	-5,3	*-4,4*	*3,6*	*-6,2*	*-5,0*	*2,5*	*4,3*	*-4,4*	*-1,2*	*-4,0*	*-3,3*	*-2,2*	*-1,0*	*1,2*	*-0,7*	*-4,9*	*-6,0*	*2,7*	*-5,7*	*16,7*	*0,8*	*1,1*	*2,3*	*-2,5*	
1986	-6.128,8	-2.222,1	1.192,3	-810,3	-194,0	236,0	73,4	-165,2	-53,5	-23,1	-14,5	-11,6	-8,9	-2,1	-19,8	-1,4	-22,6	9,9	-9,9	2,3	0,2	0,3	0,5	-1,0	324
	-4,3	*-5,0*	*3,3*	*-4,3*	*-5,1*	*3,6*	*2,5*	*-5,1*	*-3,0*	*-3,2*	*-6,1*	*-4,8*	*-3,5*	*-0,8*	*-1,0*	*-4,8*	*-5,3*	*3,3*	*-5,5*	*20,6*	*1,7*	*1,6*	*3,2*	*-3,3*	
1987	-2.390,5	-650,1	684,3	-359,3	-58,5	79,2	78,2	-52,9	-38,0	-5,8	-15,4	-12,8	-9,4	-3,9	-13,9	-1,5	-11,1	14,0	-10,6	2,0	0,2	0,3	0,4	-0,5	309
	-3,1	*-2,2*	*3,0*	*-3,5*	*-3,0*	*1,5*	*3,5*	*-1,6*	*-1,5*	*-2,2*	*-5,7*	*-4,8*	*-3,2*	*-1,5*	*-0,8*	*-4,7*	*-3,0*	*4,2*	*-6,1*	*21,7*	*1,3*	*1,8*	*2,8*	*-2,0*	
1988	-4232,2	-1.081,4	636,3	-955,5	-137,6	66,7	147,8	-91,1	10,3	-17,0	-14,7	-13,3	-11,4	-2,9	-1,3	-1,5	-15,9	8,3	-9,8	2,1	0,1	0,1	0,3	-0,5	291
	-5,2	*-3,2*	*4,0*	*-4,7*	*-3,5*	*1,1*	*4,3*	*-2,5*	*0,6*	*-1,7*	*-4,7*	*-4,3*	*-3,6*	*-0,9*	*-0,1*	*-4,5*	*-4,2*	*2,9*	*-6,0*	*22,0*	*0,6*	*0,9*	*2,5*	*-2,2*	
1989	-2.614,0	-1.301,2	-80,5	-813,6	-186,6	36,3	43,5	-128,2	32,4	-37,8	-8,7	-6,7	-1,6	4,8	-16,9	-1,4	-20,6	7,4	-11,3	1,9	0,2	0,3	0,6	-0,1	280
	-2,4	*-2,6*	*-0,3*	*-4,9*	*-4,6*	*0,4*	*1,7*	*-3,2*	*2,1*	*-5,5*	*-2,4*	*-1,8*	*-0,4*	*1,2*	*-0,8*	*-3,2*	*-4,5*	*2,0*	*-4,8*	*16,4*	*1,4*	*1,8*	*3,6*	*-0,3*	
1990	-309,9	-883,4	-555,1	-315,5	-73,6	108,7	12,5	-62,6	101,6	-24,6	-10,1	-10,3	-4,1	3,6	32,2	-1,1	-14,0	2,0	-8,4	2,0	0,1	0,2	0,3	0,0	271
	-0,3	*-1,7*	*-1,9*	*-2,3*	*-1,9*	*1,2*	*0,5*	*-1,7*	*3,1*	*-3,9*	*-3,7*	*-3,8*	*-1,5*	*1,3*	*1,6*	*-2,8*	*-3,5*	*0,5*	*-4,0*	*17,8*	*0,4*	*1,1*	*1,9*	*0,1*	
1991	-1.650,0	-41,1	200,0	-655,6	-109,4	-48,9	95,8	21,1	7,3	-12,4	-7,0	-5,9	-1,2	6,7	42,2	-0,5	-4,9	2,3	-9,3	1,7	0,3	0,5	0,6	0,1	246
	-1,0	*-0,1*	*0,5*	*-4,3*	*-2,9*	*-0,5*	*5,6*	*0,4*	*0,3*	*-4,9*	*-2,4*	*-2,0*	*-0,4*	*2,2*	*1,6*	*-1,0*	*-1,1*	*0,5*	*-3,5*	*12,1*	*1,7*	*2,6*	*3,0*	*0,4*	
1992	-453,4	188,4	374,8	-43,9	-5,0	-14,5	26,8	14,6	-56,4	6,8	-5,3	-6,3	-0,6	7,0	44,7	-1,6	-2,2	15,5	-0,5	2,3	-0,1	-0,2	0,0	0,5	240
	-0,2	*0,4*	*0,7*	*-0,3*	*-0,2*	*-0,2*	*0,9*	*0,5*	*-1,3*	*1,3*	*-2,7*	*-3,0*	*-0,3*	*3,2*	*1,6*	*-3,4*	*-0,6*	*2,6*	*-0,2*	*16,3*	*-0,5*	*-0,6*	*0,2*	*1,5*	
1993	-3.829,1	-10,9	1.079,0	-848,7	-62,6	80,1	169,6	78,1	-31,1	-7,5	-6,4	-6,6	-1,6	6,4	27,3	-2,1	-10,7	9,3	-7,5	0,9	0,4	0,7	0,9	0,7	249
	-3,1	*0,0*	*3,6*	*-4,9*	*-1,5*	*1,0*	*5,3*	*1,8*	*-1,9*	*-1,0*	*-2,3*	*-2,3*	*-0,6*	*2,1*	*1,2*	*-3,8*	*-2,0*	*2,8*	*-2,7*	*4,8*	*1,5*	*2,6*	*3,9*	*1,4*	
1994	-2.692,3	260,9	1.011,8	-669,6	-76,1	-53,9	111,0	36,8	-110,2	-2,9	-6,6	-8,4	-1,7	4,1	-13,5	-1,3	-6,4	23,1	-2,2	0,6	0,3	0,4	0,8	0,4	220
	-2,2	*1,3*	*2,4*	*-2,4*	*-3,3*	*-1,3*	*2,3*	*3,8*	*-2,3*	*-0,4*	*-2,8*	*-3,4*	*-0,7*	*1,7*	*-0,4*	*-2,6*	*-2,2*	*4,5*	*-1,2*	*5,0*	*1,7*	*1,8*	*3,9*	*0,5*	
1995	-211,3	280,7	29,7	-270,4	-61,9	-74,7	30,4	3,0	-13,1	1,6	-6,6	-13,2	-3,6	2,5	68,0	-0,4	-10,0	3,2	0,9	0,7	0,2	0,4	0,8	0,8	194
	-0,2	*1,7*	*0,1*	*-1,3*	*-3,4*	*-1,9*	*0,8*	*0,4*	*-0,3*	*0,4*	*-2,3*	*-4,3*	*-1,3*	*0,8*	*2,2*	*-0,8*	*-2,2*	*0,6*	*0,6*	*5,0*	*1,3*	*1,9*	*2,4*	*1,0*	
1996	-443,0	-268,3	-55,1	-155,0	-63,3	16,5	14,9	-20,3	9,5	7,0	-4,3	-9,7	-1,3	3,0	66,0	-1,0	-9,4	5,7	0,7	0,3	0,2	0,0	0,5	0,8	210
	-0,8	*-0,9*	*-0,3*	*-1,2*	*-4,3*	*0,3*	*0,5*	*-2,0*	*0,3*	*1,8*	*-1,5*	*-3,3*	*-0,4*	*1,0*	*2,8*	*-1,9*	*-2,8*	*1,0*	*0,4*	*2,2*	*0,9*	*-0,1*	*1,8*	*1,1*	
1997	236,3	-200,9	-327,6	120,7	-36,1	5,9	-41,9	-17,1	34,6	7,9	-3,2	-6,0	1,5	5,5	145,8	1,0	-2,9	-9,4	5,8	0,3	0,2	0,4	0,5	0,5	214
	0,3	*-0,9*	*-1,6*	*0,8*	*-2,3*	*0,1*	*-1,2*	*-2,5*	*1,5*	*1,3*	*-1,0*	*-1,7*	*0,4*	*1,5*	*5,6*	*1,4*	*-1,1*	*-1,6*	*1,9*	*1,2*	*0,9*	*1,5*	*1,9*	*0,6*	

(1) Coefficients are multiplied by 100; t statistics, reported in italics below each coefficient, are robust to heteroskedasticity. Column λ_{NW} reports estimated differences between price and marginal cost for banks in the North-west; columns λ_g, g = *NE, CE, SO, NA* report differential effects relative to λ_{NW} for banks in the North-east, Center, South areas and for those with a nation-wide dimension, respectively. The coefficient c_0 measures the cost function intercept for banks with a nation-wide reach. The system is estimated with 3SLS using a TSP program. A separate estimation is carried out for each year in the sample. The instruments used are: lagged p and q (levels and logs), current and lagged ω_1, ω_2, ω_3 (levels and logs), lagged C (levels and logs), current and lagged number of employees (levels and logs), total interbank assets, liabilities and the sum of the two (levels and logs), total assets minus real estate property and loans (a proxy for the portfolio of equity and bonds; levels and logs), four dummies for geographical areas, five for bank type, four for bank dimension.

Table C2: Estimates of system (5) - (6): Cooperative credit banks, by geographical area (1)

dependent variables: total costs, C, for (5) and yield on total assets, p, for (6)

	Cost equation (5)																						
														Supply equation (6)									
	c_0	c_1	c_2	c_3	c_4	c_5	c_6	c_7	c_8	c_9	c_{NE}	c_{CE}	c_{SO}	s_0	s_1	s_2	s_3	s_4	λ_{NW}	λ_{NE}	λ_{CE}	λ_{SO}	*N. obs.*
1984	-356,6	165,4	189,9	-164,7	-20,5	-20,8	53,5	-9,8	1,1	3,2	3,7	3,1	4,4	47,8	0,9	-15,2	-1,6	-3,7	3,2	-1,0	-0,4	0,1	638
	-1,1	*1,2*	*1,5*	*-3,2*	*-1,2*	*-0,5*	*4,7*	*-0,9*	*0,1*	*1,9*	*5,9*	*3,9*	*5,4*	*3,8*	*3,8*	*-3,8*	*-1,0*	*-5,2*	*29,1*	*-8,9*	*-2,9*	*0,8*	
1985	-808,3	-241,1	245,3	-66,8	-30,4	70,0	16,1	3,2	-1,2	4,0	2,8	3,2	3,3	68,7	1,2	-8,0	-1,4	-1,1	2,8	-0,9	-0,5	0,0	647
	-1,3	*-0,8*	*2,0*	*-0,8*	*-1,2*	*1,7*	*1,8*	*0,1*	*-0,3*	*1,8*	*4,5*	*4,2*	*3,4*	*5,5*	*5,3*	*-2,3*	*-1,0*	*-1,5*	*27,2*	*-8,6*	*-3,6*	*-0,1*	
1986	-684,2	-187,7	88,7	-123,7	-32,9	7,1	35,2	-18,2	11,2	7,1	2,9	3,3	3,8	84,3	0,9	-1,5	-1,0	-1,1	2,7	-0,6	-0,3	0,0	660
	-1,4	*-0,9*	*0,5*	*-1,4*	*-1,9*	*0,1*	*1,7*	*-0,5*	*1,5*	*3,6*	*4,4*	*4,6*	*4,7*	*4,9*	*3,9*	*-0,3*	*-0,5*	*-1,6*	*28,7*	*-5,9*	*-2,1*	*0,3*	
1987	-40,9	-175,3	56,4	131,9	-9,6	-8,7	-9,4	-50,7	-10,5	8,4	2,5	3,5	3,3	74,8	1,5	-3,4	-2,6	-2,3	2,0	-0,4	-0,2	0,1	663
	-0,1	*-1,1*	*0,7*	*2,7*	*-1,2*	*-0,2*	*-1,0*	*-5,5*	*-2,0*	*11,6*	*3,8*	*4,7*	*4,0*	*8,3*	*6,8*	*-1,4*	*-1,6*	*-2,9*	*25,8*	*-5,6*	*-1,7*	*1,1*	
1988	582,4	269,7	-28,7	134,6	-1,2	-60,5	-14,3	-3,2	-15,6	3,3	2,6	3,6	3,4	96,3	1,1	-0,2	-5,3	-2,6	2,2	-0,4	-0,2	0,1	667
	1,2	*1,7*	*-0,2*	*1,7*	*-0,1*	*-1,5*	*-0,9*	*-0,6*	*-1,9*	*6,8*	*3,9*	*4,5*	*4,0*	*5,7*	*3,6*	*0,0*	*-2,2*	*-4,7*	*32,0*	*-6,0*	*-2,0*	*0,9*	
1989	302,5	-53,5	-222,5	32,4	-34,6	-82,3	-8,5	-61,7	5,5	6,5	5,6	5,1	7,7	107,9	0,9	-1,5	-6,3	-0,6	2,5	-0,5	-0,1	0,0	662
	0,8	*-0,5*	*-2,4*	*0,5*	*-2,5*	*-2,7*	*-0,7*	*-6,6*	*0,8*	*3,2*	*8,5*	*5,9*	*9,1*	*8,2*	*2,7*	*-0,4*	*-2,8*	*-0,6*	*33,3*	*-5,7*	*-0,5*	*0,2*	
1990	-224,7	-237,9	81,0	139,5	0,1	26,6	-4,9	-31,6	-3,6	8,7	4,6	4,8	5,7	83,8	0,6	1,3	0,6	-1,9	2,6	-0,6	-0,2	0,0	651
	-0,6	*-2,2*	*1,0*	*2,1*	*0,0*	*1,6*	*-0,5*	*-5,4*	*-0,5*	*4,6*	*6,5*	*5,8*	*6,6*	*5,8*	*1,7*	*0,4*	*0,2*	*-2,0*	*24,9*	*-5,6*	*-1,8*	*-0,2*	
1991	-665,8	-398,7	73,7	59,3	-30,7	49,7	-13,4	-31,0	9,1	1,9	4,9	4,4	5,9	98,5	0,2	-5,2	-7,0	-3,5	2,1	-0,4	-0,1	0,3	633
	-1,3	*-1,9*	*0,6*	*0,7*	*-1,4*	*0,8*	*-0,8*	*-1,5*	*1,1*	*0,7*	*6,1*	*5,1*	*6,3*	*6,8*	*0,5*	*-1,4*	*-2,5*	*-2,7*	*28,0*	*-4,3*	*-0,9*	*2,1*	
1992	-1267,2	-516,3	189,3	-116,0	-11,8	91,9	38,6	-29,0	25,0	-0,3	4,4	4,2	5,2	70,3	0,2	-3,8	-1,7	-5,8	2,2	-0,1	0,1	0,4	644
	-3,4	*-3,6*	*1,8*	*-1,8*	*-0,9*	*2,2*	*3,7*	*-2,0*	*2,8*	*-0,1*	*6,1*	*5,1*	*6,3*	*4,9*	*0,4*	*-1,3*	*-0,6*	*-5,1*	*23,7*	*-1,2*	*0,8*	*3,0*	
1993	507,8	139,1	-98,1	12,0	8,6	-38,1	20,4	-17,5	2,7	-1,7	2,9	2,6	4,2	63,3	-0,8	2,2	5,7	-6,0	1,5	-0,3	0,2	0,9	601
	1,6	*1,2*	*-1,1*	*0,3*	*0,4*	*-1,2*	*1,2*	*-1,1*	*0,3*	*-0,3*	*4,0*	*3,3*	*4,9*	*3,5*	*-1,7*	*0,5*	*1,8*	*-3,4*	*10,0*	*-1,6*	*0,8*	*5,0*	
1994	-1401,2	-387,4	305,7	-389,4	-77,6	94,1	51,3	10,8	5,9	-2,9	1,8	3,1	0,9	-26,7	0,6	-21,8	9,3	-4,2	0,7	0,0	0,0	1,0	568
	-2,0	*-1,8*	*2,2*	*-3,5*	*-3,4*	*2,4*	*3,3*	*2,1*	*0,9*	*-0,5*	*1,9*	*2,9*	*0,8*	*-1,1*	*0,8*	*-4,5*	*1,9*	*-1,5*	*6,3*	*-0,4*	*0,0*	*6,6*	
1995	643,4	267,3	26,1	-248,9	-4,4	3,6	66,9	6,2	4,2	-2,1	1,0	2,3	1,3	-71,4	0,7	-19,5	19,3	-5,2	0,8	0,0	-0,1	1,2	534
	0,7	*1,0*	*0,1*	*-2,1*	*-0,2*	*0,1*	*2,4*	*0,6*	*0,4*	*-0,4*	*1,0*	*2,1*	*1,1*	*-2,5*	*1,0*	*-4,4*	*4,3*	*-2,7*	*6,1*	*0,1*	*-0,3*	*6,9*	
1996	-693,4	-10,9	172,5	-529,2	-29,2	71,8	114,9	21,1	33,5	-4,4	1,1	2,2	3,0	-58,7	-0,5	-24,5	15,1	-7,3	0,5	0,0	-0,4	0,7	508
	-0,9	*-0,1*	*1,0*	*-3,3*	*-1,3*	*1,4*	*3,3*	*1,6*	*1,3*	*-0,8*	*1,0*	*1,7*	*2,1*	*-2,6*	*-0,8*	*-6,9*	*3,6*	*-3,9*	*4,4*	*-0,4*	*-2,7*	*4,5*	
1997	-887,9	230,0	453,9	-207,6	40,6	49,2	106,1	20,2	10,5	6,9	0,4	3,0	6,3	27,0	-0,1	-13,1	1,7	-7,3	0,4	0,1	-0,3	0,7	497
	-1,5	*1,6*	*2,5*	*-2,1*	*2,7*	*1,2*	*3,8*	*3,2*	*0,6*	*1,0*	*0,4*	*2,5*	*4,4*	*1,3*	*-0,2*	*-5,9*	*0,4*	*-4,0*	*4,8*	*0,6*	*-2,1*	*5,8*	

(1) Coefficients are multiplied by 100; t statistics, reported in italics below each coefficient, are robust to heteroskedasticity. Column λ_{NW} reports estimated differences between price and marginal cost for banks in the North-west; columns λ_g, g = *NE, CE, SO, NA* report differential effects relative to λ_{NW} for banks in the North-east, Center, South areas, respectively. The coefficient c_0 measures the cost function intercept for banks with a nation-wide reach. The system is estimated with 3SLS using a TSP program. A separate estimation is carried out for each year in the sample. The instruments used are: lagged p and q (levels and logs), current and lagged ω_1, ω_2, ω_3 (levels and logs), lagged C (levels and logs), current and lagged number of employees (levels and logs), total interbank assets, liabilities and the sum of the two (levels and logs), total assets minus real estate property and loans (a proxy for the portfolio of equity and bonds; levels and logs), four dummies for geographical areas.

Table C3: Estimates of system (5) - (6): Commercial vs. Cooperative credit banks (1)

dependent variables: total costs, C, for (5) and yield on total assets, p, for (6)

	Cost equation (5)																									
																			Supply equation (6)							
	c_0	c_1	c_2	c_3	c_4	c_5	c_6	c_7	c_8	c_9	c_{NW}	c_{NE}	c_{CE}	c_{SO}	$c_{NW,CCB}$	$c_{NE,CCB}$	$c_{CE,CCB}$	$c_{SO,CCB}$	s_0	s_1	s_2	s_3	s_4	l_{COMM}	l_{CCB}	N. obs.
1984	-696,3	-64,1	135,8	-253,4	-63,2	-38,9	49,4	-32,8	-4,2	2,1	-8,2	-3,8	-1,7	7,5	9,0	4,1	2,2	-7,6	51,7	-0,1	-12,4	2,8	-2,7	2,4	0,3	985
	-1,5	-0,3	1,2	-2,9	-2,6	-1,3	3,0	-2,0	-0,5	1,5	-3,8	-1,5	-0,6	3,0	3,3	1,8	0,5	-3,9	*5,3*	*-1,0*	*-4,4*	*1,7*	*-3,9*	*30,4*	*2,9*	
1985	-3.674,9	-1.536,9	644,9	-454,6	-131,1	197,2	42,8	-109,3	-4,7	-6,4	-7,6	-2,1	4,6	12,7	12,5	4,9	-3,0	-11,2	44,5	0,0	-18,1	0,3	-3,0	2,2	0,1	986
	-4,2	-4,2	3,6	-3,3	-3,9	3,3	2,6	-3,9	-0,6	-1,7	-2,9	-0,7	1,3	4,4	4,3	1,9	-0,7	-4,9	*4,4*	*0,2*	*-6,4*	*0,2*	*-3,8*	*29,9*	*1,3*	
1986	-43,4	-255,7	-313,5	-166,3	-103,7	-99,1	-8,8	-62,4	6,3	-0,3	-12,5	-11,4	-3,1	7,0	7,3	8,4	-1,4	-12,9	81,8	0,0	-3,1	-0,1	-2,2	2,4	-0,1	984
	-0,1	-1,0	-1,7	-1,7	-4,6	-1,8	-0,4	-2,2	0,9	-0,1	-5,6	-4,1	-0,8	2,3	2,3	3,5	-0,3	-5,0	*7,6*	*0,3*	*-1,2*	*-0,1*	*-3,2*	*33,2*	*-1,0*	
1987	188,8	-180,8	-256,9	-24,6	-60,1	-121,4	-2,8	-96,4	-5,3	8,3	-10,6	-11,9	-2,9	8,1	4,2	7,6	-2,5	-16,3	89,7	0,1	-1,7	-1,2	-1,8	2,1	-0,3	973
	0,4	-0,7	-1,7	-0,3	-3,0	-1,8	-0,2	-2,9	-0,6	3,1	-4,1	-4,2	-0,8	2,6	1,3	2,9	-0,5	-7,1	*9,6*	*0,6*	*-0,7*	*-0,7*	*-2,4*	*31,3*	*-4,0*	
1988	59,7	134,5	-38,0	-47,9	-27,5	-60,6	11,7	-8,4	-7,3	5,1	-10,4	-14,1	-6,1	5,5	2,0	8,5	0,0	-14,6	97,0	0,2	0,1	-0,4	-0,1	2,1	-0,1	958
	0,1	0,6	-0,3	-0,4	-1,5	-1,3	0,5	-1,1	-0,7	7,9	-3,5	-4,7	-1,5	1,6	0,7	3,3	0,0	-6,8	*7,7*	*1,2*	*0,0*	*-0,2*	*-0,1*	*32,6*	*-1,1*	
1989	149,2	-83,9	-314,6	-123,0	-53,2	-91,3	6,1	-57,9	17,7	0,8	-5,7	-13,1	6,5	10,0	-0,7	13,9	-11,1	-11,2	104,8	0,3	-0,5	-3,3	-0,5	2,1	0,2	942
	0,3	-0,5	-2,5	-1,3	-2,0	-2,1	0,4	-3,8	2,1	0,3	-1,7	-3,4	1,2	2,4	-0,3	5,1	-2,4	-5,1	*10,0*	*1,6*	*-0,2*	*-1,6*	*-0,4*	*29,0*	*1,7*	
1990	-1.394,9	-748,1	187,3	-1,3	-28,8	107,1	-2,9	-49,3	10,3	1,2	-7,2	-17,9	5,6	11,9	-0,5	16,8	-13,5	-18,0	86,3	-0,1	-2,2	0,0	-1,8	2,1	0,1	922
	-2,2	-3,1	1,3	0,0	-1,7	3,1	-0,2	-3,6	0,8	0,3	-2,4	-5,3	1,1	3,3	-0,2	4,7	-2,5	-7,6	*7,8*	*-0,3*	*-0,8*	*0,0*	*-1,7*	*27,9*	*1,3*	
1991	-493,2	-1,8	46,5	-154,9	-25,9	-27,6	35,0	-18,2	8,2	0,2	-5,7	-15,2	6,4	9,3	-2,3	14,3	-13,4	-12,8	92,7	0,1	-2,6	-3,4	-3,0	2,0	0,1	879
	-0,9	0,0	0,3	-1,2	-1,1	-0,3	1,5	-0,9	0,9	0,1	-1,9	-4,6	1,4	2,5	-0,8	4,5	-3,3	-5,3	*7,3*	*0,3*	*-0,9*	*-1,5*	*-2,2*	*24,2*	*0,6*	
1992	-430,3	44,6	19,3	-146,7	20,1	-2,5	65,2	-10,3	30,3	1,5	-4,5	-19,6	7,5	9,8	-1,3	21,7	-12,2	-10,7	105,8	-0,5	4,0	-2,3	-4,7	2,4	-0,2	884
	-0,7	0,2	0,1	-1,4	0,8	0,0	3,0	-0,5	2,1	0,4	-1,6	-5,6	1,9	3,1	-0,4	6,5	-2,6	-3,7	*8,2*	*-1,9*	*1,4*	*-0,9*	*-3,8*	*26,7*	*-2,4*	
1993	1.382,1	602,2	-332,5	-39,7	3,7	-143,5	27,9	-9,5	5,4	-0,3	-11,0	-17,9	3,9	9,7	6,7	16,4	-11,5	-13,9	91,8	-0,7	5,2	2,8	-4,0	1,6	-0,1	850
	2,3	2,4	-2,0	-0,6	0,1	-2,2	1,3	-0,5	0,3	-0,1	-3,6	-5,1	0,9	2,8	1,5	6,0	-2,3	-5,3	*6,4*	*-2,3*	*1,6*	*1,2*	*-2,4*	*16,6*	*-1,2*	
1994	627,5	335,0	-249,2	-344,2	-66,1	-81,9	54,9	16,3	15,4	5,2	-8,4	-15,9	-1,0	9,6	3,1	14,8	-2,3	-14,3	27,4	0,1	-7,9	10,3	-0,6	1,0	-0,1	788
	0,6	1,1	-1,4	-2,1	-2,1	-1,5	2,6	1,4	1,8	1,0	-2,1	-3,6	-0,2	2,5	0,7	4,7	-0,6	-5,5	*1,4*	*0,4*	*-2,4*	*3,1*	*-0,3*	*9,1*	*-1,2*	
1995	-677,1	21,7	97,8	-446,8	-58,5	-0,2	72,0	5,5	11,0	-3,6	-5,4	-23,7	0,2	0,9	-7,4	17,8	-10,0	-6,8	10,3	-0,1	-15,0	8,2	-3,1	1,2	-0,2	728
	-0,7	0,1	0,4	-2,5	-2,4	0,0	2,1	0,7	0,6	-0,8	-1,4	-5,0	0,0	0,2	-2,3	5,4	-2,3	-2,4	*0,5*	*-0,2*	*-3,9*	*1,9*	*-1,6*	*9,1*	*-1,2*	
1996	-1.861,9	-474,8	164,9	-741,1	-115,0	108,3	100,3	17,7	50,8	-16,5	2,5	-28,2	10,1	4,3	-12,9	28,6	-19,6	-2,9	-26,9	-1,1	-28,6	5,2	-10,5	0,8	-0,3	718
	-2,7	-1,4	1,0	-5,3	-5,6	1,4	3,7	2,2	1,4	-2,6	0,4	-4,8	1,4	0,7	-2,1	6,1	-3,5	-0,8	*-1,5*	*-2,2*	*-8,4*	*1,3*	*-4,6*	*6,8*	*-2,1*	
1997	-2.949,3	-1.020,2	436,9	-368,7	-3,9	271,0	92,3	4,8	72,7	-1,5	0,7	-23,6	3,7	-1,5	-13,6	20,9	-12,6	6,4	43,8	-0,3	-16,2	0,0	-4,1	0,6	-0,2	711
	-3,1	-3,5	1,6	-2,5	-0,2	3,7	2,7	0,5	2,1	-0,2	0,1	-3,9	0,6	-0,2	-2,8	4,8	-2,1	1,6	*2,7*	*-0,6*	*-7,7*	*0,0*	*-1,4*	*6,0*	*-1,6*	

(1) Coefficients are multiplied by 100; t statistics, reported in italics below each coefficient, are robust to heteroskedasticity. Column λ_{COMM} reports estimated differences between price and marginal cost for commercial banks; λ_{CCB} gives the differential effect for CCBs relative to λ_{COMM}. The coefficient c_0 measures the cost function intercept for banks with a nation-wide reach. The system is estimated with 3SLS using a TSP program. A separate estimation is carried out for each year in the sample. The instruments used are: lagged p and q (levels and logs), current and lagged ω_1, ω_2, ω_3 (levels and logs), lagged C (levels and logs), current and lagged number of employees (levels and logs), total interbank assets, liabilities and the sum of the two (levels and logs), total assets minus real estate property and loans (a proxy for the portfolio of equity and bonds; levels and logs), four dummies for geographical areas, six for bank type, four for bank dimension.

Table C4: Estimates of system (5) - (6): Merger and acquisitions vs. other banks, total sample (1)

dependent variables: total costs, C, for (5) and yield on total assets, p, for (6)

	Cost equation (5)																	Supply equation (6)							
	c_0	c_1	c_2	c_3	c_4	c_5	c_6	c_7	c_8	c_9	c_{NW}	c_{NE}	c_{CE}	c_{SO}	$c_{M\&A}$	c_{CCB}	$c_{M\&A,CCB}$	s_0	s_1	s_2	s_3	s_4	λ	$\lambda_{M\&A}$	N. obs.
1984	-824,8	-46,5	174,2	-285,0	-63,1	-35,2	55,4	-26,4	-4,8	1,1	-5,7	-3,4	-3,1	0,6	4,3	0,7	-20,1	54,3	-0,4	-12,6	2,5	-2,8	2,6	-1,0	1.004
	-1,8	*-0,2*	*1,4*	*-3,4*	*-2,6*	*-0,9*	*3,3*	*-1,8*	*-0,5*	*0,8*	*-3,3*	*-1,9*	*-1,8*	*0,3*	*1,7*	*0,9*	*0,0*	*5,4*	*-2,8*	*-3,8*	*1,5*	*-3,5*	*48,6*	*-3,5*	
1985	-4.068,3	-1.564,3	739,2	-529,9	-143,3	215,9	50,6	-88,3	-6,2	-8,2	-3,0	-0,9	0,3	3,5	3,3	-0,7	22,6	49,9	-0,1	-18,5	-0,8	-2,9	2,3	-0,6	1.010
	-4,6	*-4,2*	*3,9*	*-3,8*	*-4,2*	*3,3*	*2,9*	*-3,4*	*-0,7*	*-2,2*	*-1,4*	*-0,4*	*0,2*	*1,6*	*0,8*	*-0,7*	*0,5*	*4,9*	*-1,2*	*-6,4*	*-0,5*	*-3,6*	*44,8*	*-2,5*	
1986	-1.266,7	-336,4	201,8	-218,1	-45,8	18,1	42,9	-25,9	0,1	2,9	-10,2	-7,9	-6,6	-3,7	-1,7	-1,2	20,0	82,8	0,0	-0,3	2,2	-1,4	2,4	-0,5	1.011
	-1,9	*-1,3*	*1,4*	*-2,2*	*-3,4*	*0,4*	*2,2*	*-1,3*	*0,0*	*1,4*	*-5,3*	*-3,9*	*-3,2*	*-1,8*	*-0,5*	*-1,5*	*1,1*	*6,8*	*-0,1*	*-0,1*	*1,0*	*-1,4*	*56,3*	*-2,5*	
1987	24,8	-184,0	-281,5	-110,8	-69,0	-159,4	6,5	-114,0	-10,9	7,5	-7,9	-5,4	-4,0	-1,4	-0,1	-4,4	-9,4	95,1	0,3	0,8	-0,2	-0,4	1,9	-0,3	1.001
	0,0	*-0,7*	*-1,7*	*-1,0*	*-3,6*	*-2,1*	*0,3*	*-3,4*	*-1,1*	*3,0*	*-3,8*	*-2,6*	*-1,9*	*-0,7*	*0,0*	*-4,1*	*-0,6*	*10,3*	*2,3*	*0,3*	*-0,1*	*-0,5*	*44,7*	*-2,3*	
1988	-501,2	98,4	42,0	-174,4	-26,2	-69,3	40,3	-14,0	-4,2	4,9	-10,4	-8,7	-7,5	-5,1	-2,2	-2,9	1,7	112,3	0,4	4,3	-1,1	0,8	2,0	-0,3	985
	-0,6	*0,4*	*0,3*	*-1,3*	*-1,4*	*-1,4*	*1,6*	*-1,8*	*-0,4*	*7,1*	*-4,1*	*-3,3*	*-2,8*	*-1,9*	*-1,0*	*-3,8*	*0,3*	*8,5*	*2,1*	*1,3*	*-0,5*	*0,9*	*51,6*	*-1,9*	
1989	-37,0	-231,2	-473,6	-232,3	-100,8	-151,5	-3,2	-85,9	15,4	-1,8	-9,7	-6,2	-5,4	-0,6	-7,3	-2,7	23,7	122,5	0,4	4,1	-4,7	-0,4	2,2	-0,3	967
	-0,1	*-1,3*	*-3,9*	*-2,1*	*-3,6*	*-3,9*	*-0,2*	*-4,3*	*1,7*	*-0,5*	*-2,9*	*-1,9*	*-1,6*	*-0,2*	*-1,9*	*-2,6*	*1,8*	*10,3*	*2,1*	*1,5*	*-2,2*	*-0,4*	*53,3*	*-2,4*	
1990	796,8	37,9	-114,1	256,5	16,6	9,7	-30,3	-15,9	3,4	4,4	-11,1	-8,8	-7,1	-4,1	-6,1	-3,6	17,4	83,6	-0,2	-4,0	-0,4	-2,0	2,2	-0,2	957
	1,3	*0,2*	*-0,7*	*2,6*	*1,0*	*0,3*	*-2,3*	*-1,6*	*0,3*	*1,2*	*-4,4*	*-3,5*	*-2,8*	*-1,5*	*-2,3*	*-3,5*	*2,6*	*5,0*	*-1,4*	*-0,8*	*-0,2*	*-1,3*	*51,1*	*-1,6*	
1991	-922,3	8,8	101,9	-285,6	-25,2	-45,4	63,5	-24,3	8,8	1,3	-7,6	-4,5	-3,3	0,5	1,0	-3,4	2,6	100,6	0,1	0,1	-2,7	-1,9	2,1	-0,4	908
	-1,6	*0,0*	*0,7*	*-2,6*	*-1,2*	*-0,7*	*3,3*	*-1,3*	*0,9*	*0,7*	*-2,6*	*-1,5*	*-1,1*	*0,2*	*0,4*	*-3,2*	*0,6*	*8,2*	*0,4*	*0,0*	*-1,1*	*-1,3*	*48,6*	*-3,0*	
1992	-1.323,6	-242,6	166,4	-293,1	-5,2	25,1	72,0	-27,0	20,3	-0,9	-6,4	-3,3	-2,2	1,3	-1,8	-1,0	6,9	88,4	0,0	1,3	0,9	-2,2	2,2	0,1	906
	-2,4	*-1,3*	*1,1*	*-3,2*	*-0,2*	*0,5*	*4,0*	*-1,5*	*1,7*	*-0,2*	*-2,7*	*-1,4*	*-1,0*	*0,5*	*-0,6*	*-0,9*	*1,7*	*6,4*	*-0,2*	*0,5*	*0,3*	*-1,6*	*49,4*	*0,7*	
1993	1.038,5	547,9	-251,3	-41,1	7,5	-142,1	27,6	-16,7	-5,4	5,8	-7,0	-5,5	-3,9	0,3	4,0	-0,7	-2,7	106,3	-0,4	6,8	4,2	1,1	1,6	-0,1	870
	1,9	*2,2*	*-1,6*	*-0,7*	*0,3*	*-2,1*	*1,5*	*-0,9*	*-0,4*	*1,1*	*-2,9*	*-2,3*	*-1,6*	*0,1*	*1,5*	*-0,6*	*-0,7*	*8,4*	*-1,5*	*2,1*	*2,1*	*0,6*	*27,8*	*-0,7*	
1994	632,5	373,5	-227,9	-287,0	-55,2	-84,0	46,6	15,9	9,0	8,8	-5,0	-3,3	-1,4	0,3	10,3	-0,2	-10,8	47,7	-0,1	-6,8	9,8	2,6	0,9	0,0	821
	0,7	*1,4*	*-1,4*	*-2,0*	*-2,0*	*-1,6*	*2,4*	*1,6*	*1,1*	*1,7*	*-1,3*	*-0,9*	*-0,4*	*0,1*	*3,2*	*-0,1*	*-2,4*	*2,8*	*-0,5*	*-2,2*	*3,4*	*1,9*	*16,3*	*0,3*	
1995	-433,2	83,7	59,5	-449,9	-67,0	-17,7	62,7	2,5	3,7	-5,5	-7,7	-6,9	-4,2	-2,0	9,0	-1,8	-9,1	-3,5	-0,2	-17,5	10,3	-2,6	1,1	-0,1	772
	-0,6	*0,5*	*0,3*	*-2,6*	*-3,3*	*-0,5*	*1,8*	*0,3*	*0,2*	*-1,3*	*-1,9*	*-1,6*	*-1,0*	*-0,5*	*2,1*	*-1,3*	*-1,6*	*-0,2*	*-0,5*	*-4,7*	*2,7*	*-1,3*	*16,6*	*-0,8*	
1996	-1.271,4	-422,7	41,9	-537,9	-85,2	73,8	72,9	-5,2	38,6	-7,2	-1,7	-1,7	1,0	4,2	9,1	0,2	-9,2	3,4	-0,7	-19,9	7,7	-4,2	0,7	-0,1	761
	-2,6	*-2,0*	*0,3*	*-4,5*	*-4,8*	*1,5*	*3,2*	*-0,7*	*1,5*	*-1,6*	*-0,5*	*-0,5*	*0,3*	*1,2*	*2,3*	*0,2*	*-1,7*	*0,2*	*-2,0*	*-6,0*	*2,1*	*-2,5*	*9,6*	*-0,5*	
1997	-1.971,4	-663,5	319,0	-306,4	-15,1	174,3	67,9	3,0	36,2	0,8	-1,6	-2,2	0,8	5,6	13,5	2,7	-15,2	24,5	-0,5	-13,6	8,3	-1,0	0,6	-0,1	759
	-3,2	*-3,3*	*1,8*	*-2,7*	*-0,8*	*3,3*	*2,6*	*0,4*	*1,4*	*0,1*	*-0,4*	*-0,5*	*0,2*	*1,3*	*3,7*	*2,0*	*-3,3*	*1,7*	*-1,4*	*-7,1*	*2,6*	*-0,5*	*10,5*	*-0,7*	

(1) Coefficients are multiplied by 100; t statistics, reported in italics below each coefficient, are robust to heteroskedasticity. Column λ reports estimated differences between price and marginal cost for banks which were not involved in mergers or acquisitions over the sample period. Column $\lambda_{M\&A}$ reports the differential effect relative to λ for banks involved in such operations. The coefficient c_0 measures the cost function intercept for banks with a nation-wide reach. The system is estimated with 3SLS using a TSP program. A separate estimation is carried out for each year in the sample. The instruments used are: lagged p and q (levels and logs), current and lagged ω_1, ω_2, ω_3 (levels and logs), lagged C (levels and logs), current and lagged number of employees (levels and logs), total interbank assets, liabilities and the sum of the two (levels and logs), total assets minus real estate property and loans (a proxy for the portfolio of equity and bonds; levels and logs), four dummies for geographical areas, six for bank type, four for bank dimension.

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