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## Abstract

In this working paper we examine variation in financial performance, both across organizational form and through time. Because variation in financial performance may be driven by variation in productivity, we also examine variation in productivity, again across organizational form and through time. The organizational forms we consider are Spanish commercial banks, savings banks and financial cooperatives, and the time period is 1993-2004. We decompose multilateral variation in profit into price variation and quantity variation. We then decompose multilateral quantity variation into margin variation and productivity variation. Finally we decompose multilateral productivity variation into variation in technology, variation in cost efficiency and variation in scale. We find variation in financial performance across the three organizational forms, some of which is attributable to variation in productivity, although the nature of the relationship is sensitive to the financial performance indicator used. We also find that deregulation and liberalization have acted to narrow performance gaps among organizational forms. However evidence that the mechanism through which convergence has occurred is increased competition is not compelling.

## Key words

Productivity, profit, organizational form.

## Resumen

En este documento de trabajo se analizan las variaciones en el desempeño financiero entre distintas formas institucionales a través del tiempo. Como dichas variaciones pueden estar ocasionadas por las alteraciones productivas, éstas también son estudiadas. Las formas organizacionales que se consideran son los bancos, cajas de ahorro y cooperativas de crédito españoles, en el período de tiempo 1993-2004. Se descomponen las variaciones multilaterales en el beneficio empresarial entre variaciones en los precios y variaciones en las cantidades. Adicionalmente, las variaciones multilaterales en las cantidades son descompuestas en un efecto margen y un efecto productividad. Finalmente, se dividen las variaciones multilaterales de productividad entre variaciones tecnológicas, variaciones en la eficiencia en costes y variaciones en la escala. Se encuentran diferencias en el desempeño financiero en las tres organizaciones estudiadas, algunas de las cuales son atribuibles a variaciones en la productividad, aunque la naturaleza de la relación es sensible al indicador de desempeño financiero utilizado. Asimismo, se descubre que el proceso de liberación del sistema financiero ha reducido las diferencias entre las tres formas institucionales. Sin embargo no puede concluirse que este proceso de convergencia se deba a una mayor competencia en el mercado financiero español.

## Palabras clave

Productividad, beneficio, formas organizacionales.

***Profit, Productivity and Distribution:***
***Differences Across Organizational Form***



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*C O N T E N T S*

# 1. Introduction

THE wave of domestic deregulation and liberalization of the Spanish banking sector culminating at the beginning of the 1990s, in conjunction with the harmonization of national regulatory structures imposed by the European Monetary Union, has motivated numerous studies of their joint impacts on the performance of the Spanish banking sector. Some studies have examined the economic performance of commercial banks, and some studies have examined the economic performance of savings banks. Some studies have gone beyond economic performance to examine financial performance. Some studies have compared the economic and/or financial performance of commercial banks with that of savings banks. Finally, a handful of studies have examined the economic and/or financial performance of cooperative financial institutions (CFIs). However to date no study has examined the economic and financial performance of all three organizational forms [1].

Grifell-Tatjé and Lovell (2004) noted that an inclusive comparative study would be interesting because the three organizational forms differ in ways that might affect their performance. Our objective is to conduct just such a comparative study that incorporates the two key features of the Spanish banking sector: continuing differences in organizational form and an operating environment that has been deregulated and liberalized, and so

1. A partial listing of recent studies of the performance of Spanish financial institutions, with the study period in brackets, follows. It is, however, worth keeping in mind that the term *performance* means different things in different studies. Commercial banks: Grifell-Tatjé and Lovell (1999) [1987-1994]. Savings banks: Grifell-Tatjé and Lovell (1996) [1986-1991], Lozano Vivas (1997) [1986-1991], Fuentelsaz and Gómez (2001) [1986-1996], Kumbhakar, Lovell and Hasan (2001) [1986-1995], Cuesta and Orea (2002) [1985-1998], Fuentelsaz, Gómez and Polo (2002) [1986-1996], Prior (2003) [1986-1995], Kumbhakar and Lozano-Vivas (2004) [1986-1999], Cuesta and Zofio (2005) [1985-1998]. Commercial banks and savings banks: Grifell-Tatjé and Lovell (1997) [1986-1993], Lozano-Vivas (1998) [1985-1991], Maudos (1998) [1990-1993], Pastor (1999) [1985-1995], Hasan and Lozano-Vivas (2002) [1986-1995], Maudos and Pérez (2002) [1985-1996], Pérez and Tortosa-Ausina (2002) [1985-1996], Tortosa-Ausina (2002a) [1985-1997], Tortosa-Ausina (2002b) [1985-1995], Tortosa-Ausina (2002c) [1985-1997], Tortosa-Ausina (2002d) [1985-1997], Maudos and Pastor (2003) [1985-1996], Tortosa-Ausina (2003) [1986-1991, 1992-1997], Tortosa-Ausina (2004) [1992, 1995, 1998], Kumbhakar and Lozano-Vivas (2005) [1986-2000], Prior and Surroca (2006) [1998], Zúñiga-Vicente and Vicente-Lorente (2006) [1983-1997]. CFIs: Millán (1997) [1995], Marco Gual and Moya Clemente (1999) [1988-1996], Grifell-Tatjé and Lovell (2004) [1994-2001].

has become potentially more competitive. The property rights literature hypothesizes that differences in organizational form lead to differences in performance. However a potentially more competitive operating environment leads to hypothesized convergence in performance. We develop and empirically test two hypotheses. The first asserts that the combination of a superior organizational form and nascent competition gave commercial banks a performance advantage at the beginning of our study period, which extends from 1993 through 2004. The second asserts that eventually the virtues of increasing competition overcame the advantages of organizational form, leading to a convergence of the performance of the three organizational forms. We emphasize that evidence of an increase in actual, as distinct from potential, competition is indirect, inferential and open to alternative interpretations. We discuss this evidence in section 2.

The study is structured as follows. In section 2 we discuss some similarities and differences in the organizational form of Spanish banking institutions, and we characterize the evolving institutional environment in which they operate. We then develop our two performance hypotheses, and we distinguish economic performance from financial performance. By economic performance we generally mean productivity, and by financial performance we mean profit or some other profit-related financial ratio. The distinction between economic and financial performance is important for two reasons. First, strong economic performance is neither necessary nor sufficient for strong financial performance, which also depends on pricing power (Miller, 1984). Second, the relationship between economic and financial performance is sensitive to the way financial performance is measured, principally whether or not the financial performance indicator is independent of size. In section 3 we present the analytical framework we use to explore the relationship between economic and financial performance. The framework combines economic indicators with economic theory, and enables us to identify both the drivers of economic performance and the recipients of the financial benefits of economic performance. Section 3 concludes with a presentation of the empirical technique we use to implement the analysis, which is sequential data envelopment analysis (DEA). In section 4 we present and discuss our data, which cover all three organizational forms in the Spanish banking sector from 1993 through 2004. In section 5 we present our findings on the impact of organizational form on economic and financial performance, and we discuss the results of tests of the two hypotheses. The empirical analysis summarized in section 5 is conducted at the individual bank level but reported as averages across all banks within each organizational form. In section 6 we examine the financial perfor-

mance of individual banks within each organizational form prior to and subsequent to merger and acquisition (M&A) activity, and we report our findings for each participating bank. Such activity is generally advertised as a way of generating cost savings through scale economies and cost efficiencies, and our analytical framework enables us to investigate the financial consequences of M&A activity. In section 7 we draw some conclusions and provide some suggestions for related research.

# 2. Organizational Form and Operating Environment

COMMERCIAL banks, savings banks and CFIs have different organizational forms, and it is widely believed that organizational form influences both economic and financial performance. However the market in which they operate arguably is becoming more competitive, and it is also widely believed that the strength of competition influences economic and financial performance. There are conflicting arguments in the literature, and conflicting evidence in the data, as to whether the market actually is becoming more competitive, and we will add some insights of our own. Nonetheless Spanish banking provides an interesting market in which to attempt to disentangle the separate impacts of differences in organizational form of the incumbents, and changes in the strength of competition in the market in which they operate, on their economic and financial performance.

## 2.1. Organizational form

Organizational form is thought to influence performance in a variety of contexts. Alchian (1965) argued, influentially, that private firms should exhibit superior performance relative to public entities because they have a superior organizational form. The owners of private firms, the shareholders, have property rights enabling them to buy and sell their shares. Property rights, together with relatively concentrated ownership, provide private owners with a strong incentive to monitor the performance of private managers. Public entities have no owners in a practical sense; public ownership is diffused throughout society, and no public owner has the right to sell ownership shares. Consequently there is little incentive for public owners to monitor the performance of public managers, who have more freedom than their private sector counterparts to pursue their own objectives.

Essentially the same argument has been made for the superiority of for-profit firms over not-for-profit entities in the private sector, particularly

in markets for financial services. The term *not-for-profit* does not specify an alternative objective, but it does encompass the possibility that management at not-for-profit institutions engages in expense preference behavior incompatible with good performance. In addition, while for-profit financial institutions can augment capital by selling shares, not-for-profit institutions can increase capital only by retaining earnings. As growth opportunities become available, this provides for-profit institutions a degree of operational flexibility not available to not-for-profit institutions [2].

Commercial banks are stock institutions, privately owned by shareholders who have, and can exercise, property rights in an effort to induce good performance by managers. Under this governance structure it seems reasonable to attribute a profit maximization objective to commercial banks, and to expect relative success in the pursuit of this objective. The degree of success depends on levels and rates of productivity growth, and also on the ability to manage prices, particularly financial intermediation margins, the difference between loan rates and investment returns received and deposit rates paid.

Savings banks are mutual institutions, with multiple stakeholder groups and no formal owners. The absence of a market for corporate control creates a weak system of governance, an attenuated system of property rights and a consequently diminished ability to induce good managerial performance by stakeholder groups. Monitoring difficulties contribute to relatively higher agency costs at mutual institutions, which leads to the expectation of inferior performance at mutual institutions. Crespí, García-Cestona and Salas (2004) argue that managers and workers, the insiders, dominate savings bank decision-making, and as a consequence they suggest that external monitoring leading to merger and acquisition (M&A) activity replaces internal governance as a mechanism for punishing poor performance (measured by accounting rates of return). M&A activity also provides an attractive opportunity for external growth at high performing institutions by acquiring underperforming rivals.

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2. Williamson (1964) developed the expense preference hypothesis and its performance consequences against a backdrop of what is now known as an agency problem resulting from a separation of ownership (stockholders) from control (management) at large corporations. Edwards (1977) analyzes the hypothesis for financial institutions in general, and Mester (1991) provides an empirical application comparing the performance of US stock and mutual savings and loans. Hasan and Lozano-Vivas (2002) restate the theory and provide empirical evidence comparing the performance of Spanish commercial banks and savings banks. Cummins, Rubio-Misas and Zi (2004) restate the theory and provide empirical evidence comparing the performance of Spanish stock and mutual insurance companies.

CFIs are cooperatives, organized somewhat differently than savings banks and formally owned by their members although, like savings banks, CFIs have multiple stakeholder groups. This leads to a similarly weak system of governance and a limited ability of members to monitor and influence managerial performance. However it can be argued that CFI governance structure is more effective at dealing with agency problems than is savings bank governance. The key is the governing council *(consejo rector)* that is elected at a general meeting of all members, each of whom typically has one vote, and that supervises the CEO and the executive board. One major task of the board is to distribute the annual surplus, and, to the extent that members influence the governing council which in turn influences the CEO and the executive board, the distribution should reflect member interests. The degree to which member preferences is actually reflected in the annual distribution undoubtedly varies across CFIs, and Grifell-Tatjé and Lovell (2004) argue that the structure of CFI governance serves the general interest of employees (who with two notable exceptions, Caja Laboral Popular and Caixa Popular, must be members) rather than the entire membership, although they draw no inference concerning whether monitoring by other stakeholder groups or M&A activity is effective at influencing managerial performance.

There is thus a pervasive and, to many, a compelling argument that organizational form, interpreted broadly to incorporate both ownership form and business objective, matters for economic and financial performance. In the context of Spanish banking, we expect the performance of commercial banks to dominate those of savings banks and CFIs. Commercial banks have private owners endowed with property rights and an incentive to monitor and, if warranted, to act in an effort to improve managerial performance; this gives management little leeway to pursue non-profit objectives. Savings banks and, to a somewhat lesser extent, CFIs, have a variety of stakeholders with conflicting objectives and attenuated property rights, leading to the expectation of relatively high agency costs and greater opportunity for management to engage in expense preference behavior, both of which retard economic and financial performance [3].

3. Some studies have found just the opposite, that savings banks have performed at least as well as commercial banks; examples include Grifell-Tatjé and Lovell (1997) [1986-1993] and Lozano-Vivas (1998) [1985-1991]. However these studies, and virtually all other comparison studies cited in note 1, are based on data from the mid-1980s through the early 1990s, a period in which deregulation and liberalization had not yet had their full impact on competition. Our study period begins in 1993, well after domestic and EU deregulation and liberalization had ended, and the operating environment has remained relatively stable since. Purroy and Salas (2000) attempt to

## 2.2. Competition

It is also widely believed that the nature of competition, primarily in product markets, also influences economic and financial performance. A standard industrial organization argument is that managers of institutions enjoying market power may exploit their power over consumers by artificially raising prices of the services they provide; market power thus enhances financial performance, whether or not it influences economic performance. As competition increases, pricing power declines and financial performance deteriorates regardless of its impact on economic performance. Hicks (1935), on the other hand, enunciated the easy life hypothesis, which asserts that managers enjoying market power need not strive to maximize profit, and are able to exchange profit for an easy life; this behavior retards financial performance relative to the profit-seeking market power outcome and, depending on the form the easy life takes, perhaps economic performance as well. The easy life hypothesis is, however, subject to one potential qualification. Hirschman (1970) warned that consumers may find it difficult to *vote with their feet,* as he put it. If consumers' exit option is constrained, the potential positive impact of increased competition on economic and financial performance may be dampened.

It is commonly asserted, but not convincingly documented, that competition has increased in Spanish banking during the past two decades. Although the number of financial institutions has been declining, largely through M&A activity, deregulation and liberalization, by lowering legal barriers to entry, are thought to have lowered actual barriers to entry, thereby fostering increased competition among, and perhaps within, the three groups. Additional sources of potential competition have come from nonbank financial services firms and non-Spanish banks. Among the more recent studies, Crespí, García-Cestona and Salas (2004: 2314) claim that product market competition is *quite severe,* citing as evidence geographic expansion of savings banks and declining financial intermediation margins. Cuesta and Orea (2002: 2232) claim that "growing, and more complex, competition in the Spanish banking sector is the result of a more liberalized

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explain why savings banks might outperform commercial banks. They develop a theoretical model in which the two compete in an oligopolistic market, and they show that, under certain conditions, an expense preference behavior firm (savings bank) may outperform a profit maximizing firm (commercial bank) in terms of market share and profit. They do not provide an empirical test of their hypothesis, but savings banks have been gaining market share and they consistently generate higher return on assets (although not higher profit).

regulatory framework, the emergence of new financial intermediaries carrying out similar functions to those traditionally associated with banks, the disintermediation process, and the intensive diffusion of new information technologies." Fuentelsaz and Gómez (2001: 536) refer to "an increase in competition in the banking sector", citing as evidence the ability of savings banks to undertake the same activities as commercial banks, and the consequent expansion of savings banks outside their base province that has led to both an increase in provinces per savings bank and also to an increase in savings banks per province. Fuentelsaz and Lucea (2006: 21) refer to "a new competitive landscape and a completely different market structure" which they attribute to regulatory change. Hasan and Lozano-Vivas (2002: 138) claim that the "pro-competitive forces of banking liberalization appear to be strong", citing without evidence declining markups. Maudos and Pastor (2003: 11) characterize the 1985-1996 period as one of "structural change and increasing competitio", and note that the downward pressure on financial performance from growing competition might be offset by improved economic performance gained through improvements in cost and profit efficiency. Tortosa-Ausina (2002b: 661-662) describes the transition "from regulation to competition", and cites as evidence declining margins, although he notes that such declining trends are "not so clear when considering the traditional indicators of banking profitability (ROE and ROA)". We find a similar disparity between real financial intermediation margins and ROA in graphics 2.2 and 2.3 below. Finally, Tortosa-Ausina (2003) and Zúñiga-Vicente and Vicente-Lorente (2006) emphasize an increasing reliance on nontraditional (fee generating) activities and other complementary competitive strategies as operational responses to an increasingly competitive market brought on by deregulation and liberalization.

Kumbhakar and Lozano-Vivas (2004) are among the few agnostics. Rather than assume the answer, they ask the question. They specify a value-added model in which loan services and deposit services are the two outputs, and they estimate markups of price over marginal cost for each output. For savings banks they find markups for loan services averaging 7% and declining through 1986-1999, and they find markups for deposit services averaging 26% and declining through the period. They conclude that the market for loan services is more competitive than the market for deposit services, and that both markets are gradually becoming more competitive. We provide additional data-based evidence below in this section, and we present model-based evidence in section 5.

The question of whether competition is increasing or declining is attracting growing attention, in part due to the growing availability of micro

data. Martín Oliver, Salas-Fumás and Saurina (2006) use recent (1988-2003) bank-level data on five loan products to study trends in competition. Their first finding is that adjusting loan products for risk premia reflecting information asymmetries reduces calculations of market power. Since most previous studies fail to make this adjustment, it is reasonable to conclude that they overstate market power in loan markets. However their second finding is that, even with this adjustment, market power has increased from 1994-1998 through 1988-1993 and 1999-2003. It is reasonable to infer that, although market power may have been overstated previously, properly measured it continues to increase despite deregulation and liberalization. Ayuso and Martínez (2006) provide complementary evidence for deposit markets, also based on recent (1988-2003) bank-level data. Their main finding is that adjusting for the quality of deposit services provided leads to the conclusion that competition has increased in deposit markets. Since most previous studies fail to make such an adjustment, previous inferences on trends in competition may have been misleading.

As for the exit option, we speculate that household customers are unlikely to move checking accounts from one financial institution to another, although they are more willing to move their remaining financial transactions in the pursuit of maximum returns. Montoriol Garriga (2006) provides evidence on the behavior of Spanish business customers, which involves a tradeoff between the benefits of relationship lending and the costs of the resulting informational monopoly. Kumbhakar and Lozano-Vivas (2004) do not distinguish between household and business customers, and their findings are consistent with (household and business) depositors being less willing than borrowers to vote with their feet.

There is thus an equally compelling argument that the nature of competition matters for economic and financial performance. In the context of Spanish banking, those who believe that deregulation and liberalization have led to an increase in competition would expect a narrowing of the performance gap between commercial banks and the other organizational forms. Those who remain agnostic would reason in reverse, and interpret a narrowing (widening) of the performance gap as providing indirect evidence that deregulation and liberalization have brought an increase (decline) in competition.

## 2.3. The hypotheses

The institutional environment in which Spanish banks operate has changed since deregulation and liberalization. Commercial banks traditionally have offered broad product lines and have concentrated on wholesale banking

and corporate business, and have operated nationally. Savings banks and CFIs traditionally have offered limited product ranges and have concentrated on providing retail banking services to households and small businesses, and have concentrated on regional business. The regulatory structure in place prior to the 1990s tended to constrain economic and financial performance and to minimize competition, particularly between commercial banks and savings banks. However Fuentelsaz and Lucea (2006) find that these same regulations, by constraining the geographic markets of savings banks, actually fostered competition between savings banks and CFIs, both of which were founded with a regional focus.

The wave of domestic deregulation and liberalization that concluded in the early 1990s is well documented, and does not need repeating here, except to emphasize the important point raised by Kumbhakar and Lozano-Vivas (2005) that the harmonization of banking rules imposed by European Monetary Union in the early 1990s has played a role in opening up the Spanish banking market to cross-border competition. Crespí, García-Cestona and Salas (2004: 2317) claim that the operating environment is now *practically the same* for the three organizational forms.

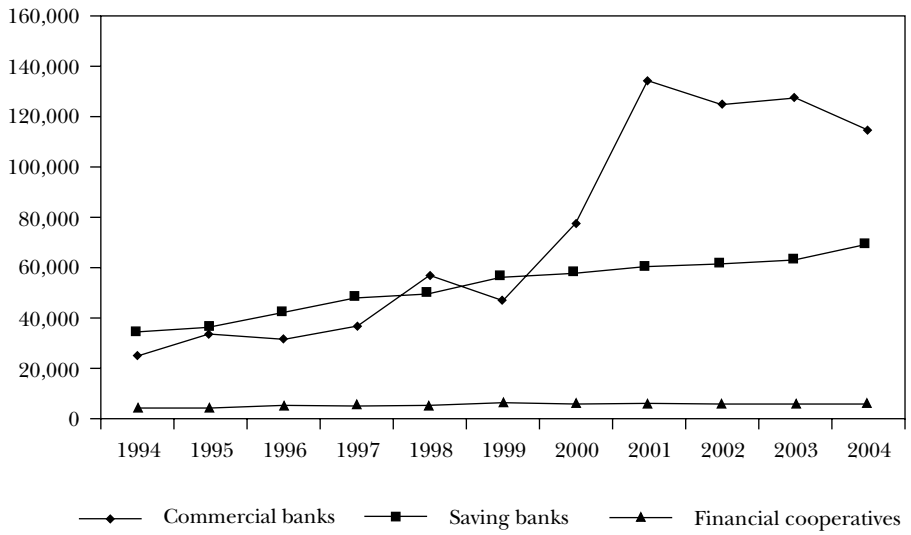
We are left with two competing paradigms. The first invokes the property rights and expense preference paradigms to assert the superiority of the stock organizational form of commercial banks. The second asserts the impact of growing competition on all organizational forms, but particularly on the savings banks that had been most constrained prior to deregulation. To the extent that competition has increased, it should lead to improved economic performance of all surviving financial institutions, and to an uncertain impact on their financial performance that depends on the significance of the easy life hypothesis. Which paradigm is more compelling? Echoing an old argument enunciated by Caves and Christensen (1980) in the context of the relative performance of public and private Canadian railroads operating in a competitive environment, Crespí, García-Cestona and Salas (2004) suggest that competition is more important than organizational form in influencing comparative performance of commercial banks and savings banks (and presumably CFIs). Domestic and EU deregulation and liberalization have fostered potential competition. This leads to the following hypotheses:

**Hypothesis 1**. In the early years of our study period, the organizational form hypothesis that predicts superior economic and financial performance at commercial banks dominates a competition hypothesis that predicts no significant performance gaps.

**Hypothesis 2**. The economic and financial performance gaps observed in the early years of the study period diminish toward the end of the study period, as the advantages of increased competition dominate the disadvantages of inferior organizational form at savings banks and CFIs.

It is useful to provide a rough sketch of the background against which these two hypotheses will be tested in section 5. Information on financial performance is readily available, while information on economic performance is not, and so we concentrate on financial performance of the three organizational forms. Graphics 2.1-2.3 summarize the financial performance of the three organizational forms during our study period. The graphics report annual averages, across all institutions of a given organizational form, of three popular financial performance indicators. Together they provide motivation for the empirical investigation into economic and financial performance that follows in section 5.

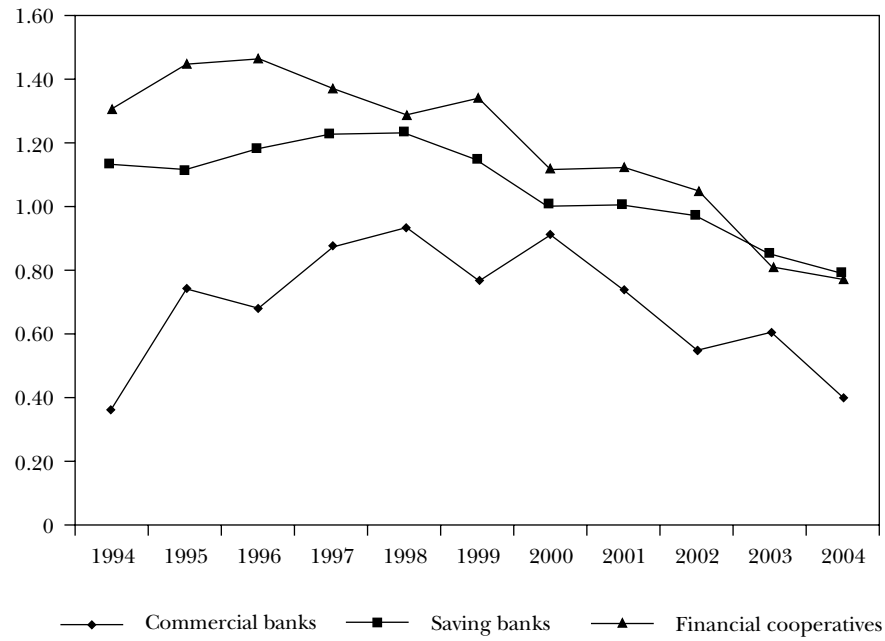
GRAPHIC 2.1: **Real average operating profit**
(thousands of 1993 euros)




Graphic 2.1 shows that commercial bank real operating profit, after lagging behind that of the smaller savings banks for the first half of the study period, has surpassed that of savings banks and remains nearly double that of savings banks even after a three-year decline. CFIs lag far behind. Average operating profit at commercial banks has more than doubled since 1998. Part of the rapid growth of operating profit at commercial banks is a

direct consequence of M&A activity, which reduces the denominator in the average operating profit ratio. The number of commercial banks in our sample declined by 25% during the study period, while the number of savings banks and CFIs declined by only 6%. Consequently, while part of the operating profit story told in graphic 2.1 is clearly size related, it remains unclear how much of the eventual superior profitability of commercial banks is independent of size, and the consequence of a superior organizational form or of increased competition. It is noteworthy that the performance advantage of commercial banks occurs in the second half, rather than the first half, of the study period. Part of the gap is clearly an artifact of the pattern of M&A activity, but if competition is increasing one might expect a less dramatic growth in the gap.

**GRAPHIC 2.2: Return on assets**
(percentages)




Graphic 2.2 adjusts for size variation by dividing real operating profit by assets, and the story changes in two respects. One is a substantial performance variation in the first half of the sample period that places CFIs ahead of savings banks (by 20 to 30 basis points), with commercial banks lagging far behind (by roughly 40 additional basis points) despite their allegedly superior organizational form. Variation in ROA is unsurprising, but the ranking and the magnitudes of the early gaps are surprising. The other is con-

vergence that eliminates much of the variation in ROA by the end of the sample period. Variation between CFIs and savings banks has disappeared, although commercial banks continue to lag both by a large margin (by between 20 and 50 basis points since 2000). Convergence also is unsurprising; convergence is consistent with, although not evidence of, growing competition. It is unclear, however, how much of the ROA story is due to organizational form, and how much is due to growing competition, if indeed it has been growing.

The major puzzle raised by graphic 2.2 concerns why (commercially oriented) commercial banks perform so poorly on the ROA criterion. The puzzle can be partly solved by resort to the *duPont triangle,* named after the company at which it was developed and first applied, which decomposes ROA performance into two drivers. Following Bliss (1923), Horrigan (1968), Amey (1969) and others, we write the duPont triangle as

$$\text{ROA} = \pi/A = \pi/R \times R/A, \tag{2.1}$$

where $\pi$ is profit, A is assets and R is revenue. The apex of the triangle is ROA = $\pi/A$. The base of the first leg is the profit margin $\pi/R$. The base of the second leg is the asset turnover ratio $R/A$, which Bliss (1923) describes as "[...] a broad measure of the economy and efficiency observed in the use of capital in a business a measure of the effectiveness of the financial management".

The asset turnover ratio measures the ability to manage assets in a way that enhances revenue, and provides a financial measure of partial productivity, loosely conceived. The profit margin is a measure of pricing power, also loosely conceived. Since $\pi/R = (R\text{-}C)/R$, $C$ being cost, a low profit margin could be due to an inability to control costs, either through an inability to control input prices or through misallocation of inputs or through reliance on outdated technology. Assuming constant returns to scale (a plausible assumption for Spanish banking, as we show in section 5), Edwards, Kay and Mayer (1987) have shown that the profit margin becomes $\pi/R$ = (price-marginal cost)/price, which is Lerner's (1934) index of monopoly power. This index reflects the ability to price above marginal cost, and also to keep cost down.

We are now prepared to search for an explanation for the poor performance of commercial banks on the ROA criterion. If commercial banks perform poorly on the profit margin component, their poor performance can be traced to their inability to control costs, or to their lack of product market pricing power. If they perform poorly on the asset turnover ratio,

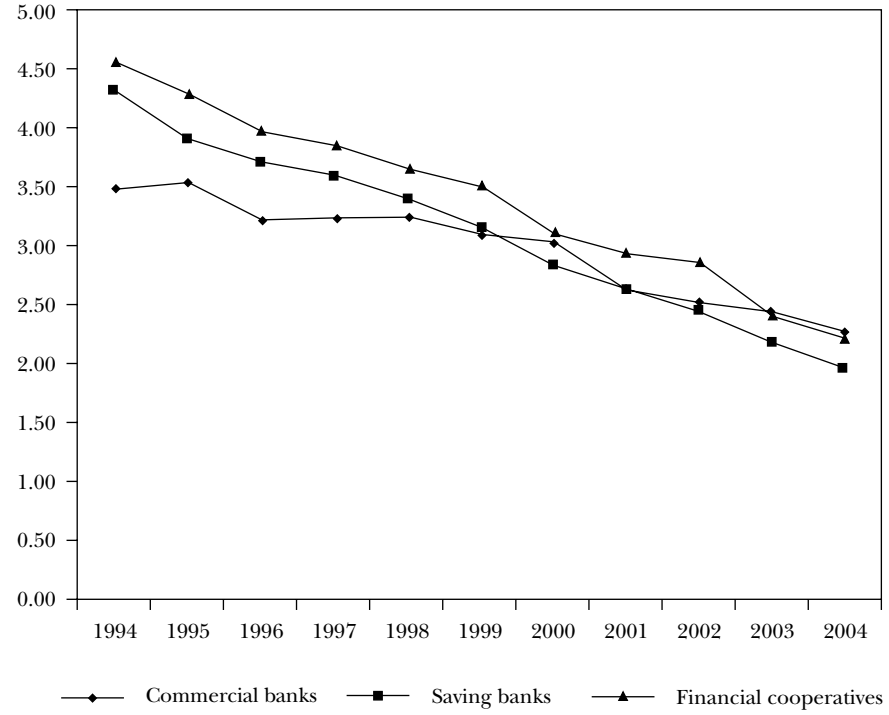
their poor performance can be traced to an inability to deploy assets in a revenue enhancing manner.

Empirical results are relegated to appendix 2, tables A.2.1-A.2.4. However the story these tables tell is clear and can be summarized here. Appendix 2, tables A.2.1-A.2.4 report average ROA for each organizational form. They also report average $\pi/R$ and average $R/A$, and the product of the two, for each organizational form. Heterogeneity within each organizational form causes this product to differ from average ROA, particularly at commercial banks. To reduce this difference, table A.2.2 reports results for commercial banks with two outlying banks deleted. These two banks (Banco Árabe Español and Banco de Inversión) reported dramatically varying ROA ratios during the study period, ranging from over 500% to less than 200%. Deleting them homogenizes the commercial bank sample a bit, leading to a closer concordance of ROA (product) and ROA in table A.2.2 than in table A.2.1, and also to a closer concordance of Margin Effect (product) and Margin Effect in table A.2.6 than in table A.2.5. This problem of excessive heterogeneity is much less severe for savings banks and CFIs.

The three organizational forms perform almost identically on the asset turnover ratio, with all three ratios declining almost monotonically from over 9 to under 5% during the study period. The ability to manage assets in a revenue enhancing way does not vary across organizational form. The three organizational forms perform very differently on the profit margin ratio, and the inferior performance of commercial banks on the ROA criterion is attributable entirely to their inferior profit margins. Savings banks and CFIs perform very similarly, with profit margins increasing from 12-14% to over 17% during the study period. Commercial bank profit margins (with two outliers deleted in table A.2.2) improve from 4 to 15% before falling back to 9%. The source of the inability of commercial banks to keep pace on the ROA criterion is narrowed down to their inability to convert sales revenue into profit. A determination of whether this is due to a lack of pricing power or to an inability to control costs requires an analytical framework, which we develop in section 3 and implement in section 5.

Graphic 2.3 tracks trends in real financial intermediation margins (the difference between the average return on loans and financial investments and the average cost of deposits). Like ROA, this indicator is in principle independent of size, and it tells a story similar to that told by ROA in graphic 2.2, with one major exception. At the beginning of the study period CFIs enjoyed the largest margins, followed by savings banks, and commercial banks earned the smallest margins, again despite their allegedly superior organizational form. However by the middle of the study period

**GRAPHIC 2.3: Real financial intermediation margin**
(percentages)




commercial bank margins caught up with those at savings banks and CFIs, and by the end of the study period little difference remains, even between commercial banks and the other two organizational forms. While the downward trend in real financial intermediation margins has been common in the EU and beyond, the pattern across organizational form remains to be explained. Moreover the downward trend in financial margins is consistent with, but not evidence of, increasing competition.

The Spanish banking sector has become less heavily regulated, and so potentially more competitive. This has had an impact on financial performance in the sector. During the study period average operating profit has increased for all three organizational forms, dramatically so for commercial banks in part as a consequence of M&A activity. After adjusting for size variation, both ROA and real financial intermediation margins exhibit a downward trend for all three organizational forms. These two indicators also exhibit strong convergence through time, with the exception of commercial bank ROA. A third feature of the data is a generally superior financial performance on all three indicators by savings banks over commercial banks during the first half of the study period. During the second half of

the study period this performance differential reverses, with the exception of ROA, for which commercial banks continue to lag behind savings banks. We also have additional evidence within each organizational form suggesting 1) greater variability of all three financial indicators within commercial banks than within savings banks and CFIs, and 2) a tendency toward declining variability of all three indicators within each organizational form. This second is reasonably consistent with disaggregate results reported by Martín, Saurina and Salas (2005), who find *persistent* dispersion in deposit and loan rates, although dispersion increased with the introduction of the Euro and has decreased since, perhaps as a result of diffusion of internet banking.

The evidence we have presented concerns the financial performance of the three organizational forms. This information is gleaned from publicly available data. We have offered no evidence about economic performance (specifically, productivity and its drivers) because this evidence is not provided by the data alone, and must be extracted from the data augmented with an analytical framework and an empirical technique.

# 3. The Analytical Framework

TESTING the hypotheses developed in section 2 requires an analytical framework, which we develop in sections 3.1 and 3.2, and an estimation procedure, which we develop in section 3.3. The analytical framework is an extension of that developed by Grifell-Tatjé and Lovell (1999) for an analysis of the economic and financial performance of a panel of Spanish commercial banks, and applied to time series data on the economic and financial performance of the United States Postal Service by Grifell-Tatjé and Lovell (2007). The analysis is structurally similar to the variance analysis methodology used in managerial accounting. The main differences are that 1) in variance analysis the term *variance* means deviation of current values from targets, or standards, whereas in our analysis variance means deviation of current values from previous values, and 2) unlike most variance analysis, we identify the economic drivers of variation in productivity, and hence of variation in financial performance.

## 3.1. Decomposing change in operating profit

We begin with an expression for operating profit in period t,

$$\pi^t = R^t - C^t = p^t y^t - \sum_n w_n{}^t x_n{}^t, \tag{3.1}$$

where $\pi$ is operating profit, $R$ is revenue, $C$ is cost, $p$ is the price of output $y$ and $w_n$ is the price of input $x_n$, $n = 1,...,N$. Throughout sections 3.1 and 3.2 all expressions refer to a single business operating in $t = 1,...,T$ periods [4].

Operating profit changes through time because quantities change and because prices change. We decompose the change in operating profit between periods $t$ and $t + 1$ into an aggregate quantity effect and an aggre-

4 The analytical model has a single output for data-related reasons described in section 4, although the model generalizes easily to multiple outputs, as in Grifell-Tatjé and Lovell (1999).

gate price effect. We avoid having to choose between base period and comparison period weights by using arithmetic mean price weights $[\bar{p} = {}^1\!/_2(p^{t+1} + p^t)$ and $\bar{w}_n = {}^1\!/_2(w_n{}^{t+1} + w_n{}^t),\ n = 1,...,\mathrm{N}]$ and arithmetic mean quantity weights $[\bar{y} = {}^1\!/_2(y^{t+1} + y^t)$ and $\bar{x}_n = {}^1\!/_2(x_n{}^{t+1} + x_n{}^t),\ n = 1,...,N]$. This weighting procedure generates

$$\begin{aligned}\pi^{t+1} - \pi^t = [\bar{p}(y^{t+1} - y^t) - \sum \bar{w}_n(x_n{}^{t+1} - x_n{}^t)] + \\ + [(\bar{y}(p^{t+1} - p^t) - \sum \bar{x}_n(w_n{}^{t+1} - w_n{}^t)],\end{aligned} \tag{3.2}$$

which decomposes profit change from period $t$ to period $t + 1$ into the contributions of changes in individual quantities (the first term on the right side) and changes in individual prices (the second term). Because profit change is expressed in value terms, so is each component. The first term on the right side is an aggregate quantity effect that shows the contribution of $1 + N$ individual quantity changes to profit change, holding $1 + N$ individual prices fixed at their arithmetic mean levels. The second term is an aggregate price effect that shows the contribution of $1 + N$ individual price changes to profit change, holding $1 + N$ individual quantities fixed at their arithmetic mean levels. Expression (3.2) serves two purposes. It indicates whether profit change is due primarily to quantity changes in the aggregate or to price changes in the aggregate. It also identifies individual quantities and individual prices that have most enhanced or retarded profit change [5].

Expression (3.2) identifies aggregate and individual *sources* of profit change. Expression (3.2) also is useful in identifying the individual *beneficiaries* of the financial fruits of quantity change. This can be accomplished by rearranging expression (3.2) to obtain

$$\begin{aligned}\bar{p}(y^{t+1} - y^t) - \sum \bar{w}_n(x_n{}^{t+1} - x_n{}^t) = (\pi^{t+1} - \pi^t) - \bar{y}(p^{t+1} - p^t) + \\ + \sum \bar{x}_n(w_n{}^{t+1} - w_n{}^t).\end{aligned} \tag{3.3}$$

5. Quantity and price *indexes* are expressed in ratio form, and quantity and price *indicators* are expressed in difference form. In expression (3.2) the $(1 + N)$ components of the aggregate quantity effect are Bennet (1920) quantity indicators, with arithmetic mean price weights $\bar{p}$ and $\bar{w}_n$, and the $(1 + N)$ components of the aggregate price effect are Bennet price indicators, with arithmetic mean quantity weights $\bar{y}$ and $\bar{x}_n$. Just as Fisher indexes are geometric means of Laspeyres and Paasche indexes, Bennet indicators are arithmetic means of Laspeyres and Paasche indicators. Diewert (2005) demonstrates that Bennet quantity and price indicators 1) are superior indicators in the same economic theory sense that Fisher quantity and price indexes are superior indexes, and 2) satisfy a large number of tests analogous to those satisfied by Fisher quantity and price indexes.

A somewhat loose translation of expression (3.3) is that when quantities change (the left side), revenue, expenses and profit also change, and consequently individual stakeholders feel the financial impacts (the right side). The left side is the aggregate quantity effect from expression (3.2). The right side identifies individual stakeholders involved, and quantifies their gains or losses. The stakeholders are residual claimants who receive the change in operating profit $(\pi^{t+1} - \pi^t)$, consumers of financial services who pay the change in output price, with $p^{t+1} < p^t \Rightarrow [-\bar{y}(p^{t+1} - pt)] > 0$, and individual resource suppliers who receive the changes in individual resource prices, with $w_n^{t+1} > w_n^t \Rightarrow \bar{x}_n(w_n^{t+1} - w_n^t) > 0$, $n = 1,...,N$. Expression (3.3) also serves two purposes. It quantifies the financial gains accruing to three aggregate stakeholder groups. It also identifies individual suppliers that have most benefited or most suffered from the quantity effect. We do not identify expression (3.2) with a productivity effect, because as we show in section 3.2, quantity change can contribute to profit change even in the absence of productivity change [6].

An alternative rearrangement of expression (3.2) divides $\Sigma \bar{x}_n(w_n^{t+1} - w_n^t)$ into positive and negative input price effects. Assuming that $\pi^{t+1} > \pi^t$ and that $p^{t+1} < p^t$, and moving $j$ negative input price effects to the left side of (3.3), yields the following expression for potential profit change and its distribution

$$\bar{p}(y^{t+1} - y^t) - \sum_{w^{t+1} < w^t} \bar{w}_n(x_n^{t+1} - x_n^t) + \sum_{w^{t+1} < w^t} \bar{x}_j(w_j^{t+1} - w_j^t) =$$

$$= \underset{\pi^{t+1} > \pi^t}{(\pi^{t+1} - \pi^t)} - \underset{p^{t+1} < p^t}{\bar{y}(p^{t+1} - p^t)} + \sum_{w^{t+1} > w^t} \bar{x}_{n-j}(w_{n-j}^{t+1} - w_{n-j}^t). \qquad (3.4)$$

This expression adds to the quantity effect the additional funds available for distribution as a result of reductions in j input prices. These funds are distributed to residual claimants $(\pi^{t+1} - \pi^t) > 0$, consumers $[-\bar{y}(p^{t+1} - p^t)] > 0$ and suppliers of those inputs whose prices have increased $[\Sigma \bar{x}_{n-j}(w_{n-j}^{t+1} - w_{n-j}^t)] > 0$. If either $\pi^{t+1} < \pi^t$ or $p^{t+1} > p^t$ the corresponding term is moved to the left

6. Some writers (e.g., Jorgenson and Griliches [1967]) specify $\pi \equiv 0$ by defining the price of capital as a gross return. In this approach $\pi^{t+1} - \pi^t \equiv 0$ in expressions (3.2) and (3.3), and suppliers of capital services become dual recipients in expression (3.3), receiving the cost of capital and serving as residual claimants.

side and provides an additional source of funds for distribution to a shorter list of beneficiaries [7].

### 3.2. Decomposing the quantity effect

The right side of expression (3.3) identifies the recipients of the fruits of the quantity effect, and signs and quantifies their receipts. The left side, he quantity effect itself, identifies the individual variables responsible for the quantity effect, and signs and quantifies their contributions. Expression (3.4) more clearly distinguishes winners from losers. Both decompositions are based on observed data and superlative quantity and price indicators. Together they constitute what Davis (1955) called *productivity accounting*, and defined as the use of financial statements to construct the difference between (or the ratio of), revenue and cost, expressed in real rather than nominal terms by adjusting for changing prices. Later Kendrick and Creamer (1961) and Kendrick (1984) extended and applied Davis' framework to analyze the economic and financial performance of individual companies.

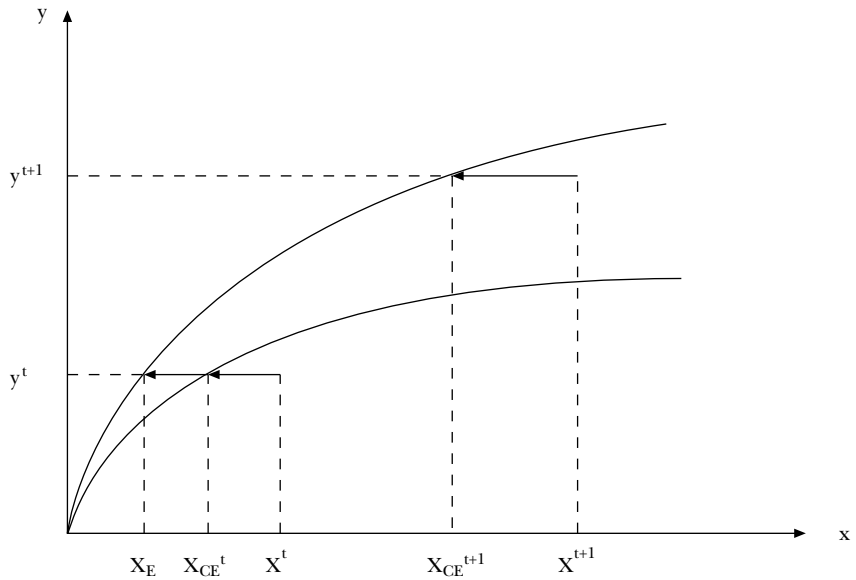
The significance of productivity accounting is its ability to separate the impacts of quantity change and price change on business financial performance. Simply comparing nominal revenue and nominal cost through time conceals the possibility that a relatively productive business is financially unsuccessful because it lacks pricing power, or that a relatively unproductive business is financially successful because it enjoys pricing power. Accounting for price change converts the nominal comparison to one between real revenue and real cost, thereby *accounting* for the impact of *productivity* change on change in financial performance.

Productivity accounting requires data available in business financial statements or regulatory agency files. However an analytical framework is required to decompose the quantity effect into its economic drivers, as distinct from its responsible agents. The use of the economic theory of production to identify the economic drivers of quantity change constitutes our analytical extension of productivity accounting.

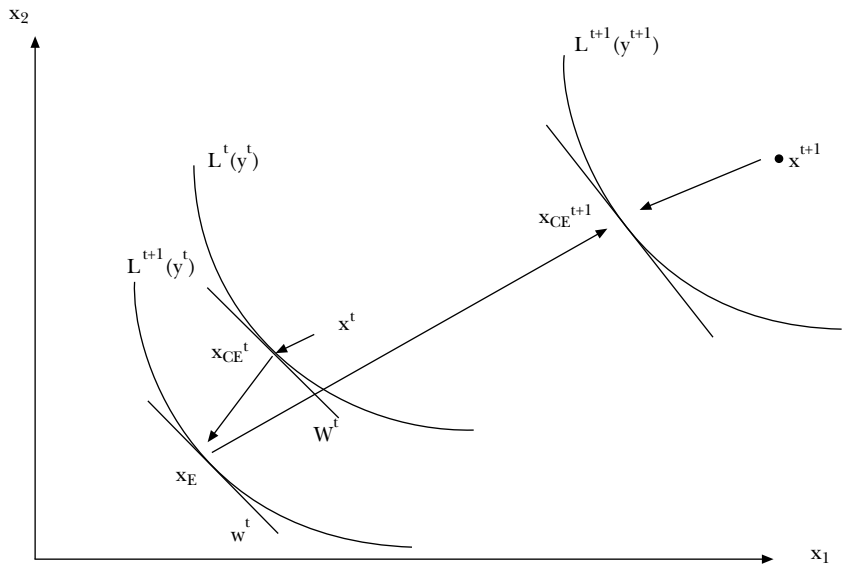
$T^t$ and $T^{t+1}$ in graphic 3.1 are sets of feasible production activities in periods $t$ and $t+1$, and $L^t(y^t)$, $L^{t+1}(y^t)$ and $L^{t+1}(y^{t+1})$ in graphic 3.2 are input sets corresponding to $T^t$ and $T^{t+1}$. In graphic 3.1 the assumption that

7. As a practical matter, output price and one input price both decline for almost all institutions in almost all years in our study period, which justifies the placement of the output price effect on the right side, and at least one input price effect on the left side, of expression (3.4).

**GRAPHIC 3.1: Decomposition of the productivity effect I**




**GRAPHIC 3.2: Decomposition of the productivity effect II**



technical progress has occurred generates $T^t \subset T^{t+1}$. The same assumption generates $L^t(y^t) \subset L^{t+1}(y^t)$ in graphic 3.2, in which $L^{t+1}(y^{t+1}) \subset L^{t+1}(y^t)$ on the assumption that $y^{t+1} > y^t$. In both graphics the objective is to decompose the change from observed $(x^t, y^t)$ to observed $(x^{t+1}, y^{t+1})$, which when weighted by arithmetic mean prices is the quantity effect on the left side of expression (3.3).

In both graphics $x_{CE}{}^t$ and $x_{CE}{}^{t+1}$ are cost-efficient input vectors for $(y^t, w^t, T^t)$ and $(y^{t+1}, w^{t+1}, T^{t+1})$, respectively, that purge $x^t$ and $x^{t+1}$ of cost inefficiency in the allocation of resources. In addition, improvements in technology between periods $t$ and $t+1$ enable cost-efficient input vector $x_{CE}{}^t$ to be displaced by input vector $x_E$, which is cost-efficient for $(y^t, w^t, T^{t+1})$. Although $(x^t, y^t)$ and $(x^{t+1}, y^{t+1})$ are observed, the cost minimizing input vectors $x_{CE}{}^t$, $x_{CE}{}^{t+1}$ and $x_E$ are not observed. Identifying them requires information on the production technologies $T^t$ and $T^{t+1}$. This information is not available in business financial statements or regulatory agency files, and must be estimated from the available data. Doing so enables us to identify the contributions to the quantity effect of a change in cost efficiency, by comparing $(x^{t+1} - x_{CE}{}^{t+1})$ with $(x^t - x_{CE}{}^t)$; an improvement in technology, represented by $(x_{CE}{}^t - x_E)$; and the exploitation of scale economies reflected in a movement along the surface of $T^{t+1}$ from $(y^t, x_E)$ to $(y^{t+1}, x_{CE}{}^{t+1})$. When weighted by arithmetic mean prices, these three sources comprise a productivity effect, which is one component of the aggregate quantity effect on the left side of expression (3.3).

The quantity effect is often equated with a productivity effect. However this is not necessarily the case, since the quantity effect has a margin component as well as a productivity component, as evidenced by the following decomposition of the quantity effect

$$\bar{p}(y^{t+1} - y^t) - \sum \bar{w}_n (x_n{}^{t+1} - x_n{}^t) = \quad \text{quantity effect}$$

$$= [\bar{p} - (\sum \bar{w}_n x_{n\,CE}{}^t)/y^t](y^{t+1} - y^t) + \quad \text{margin effect}$$

$$+ (\sum \bar{w}_n x_{nCE}{}^t/y^t)(y^{t+1} - y^t) - \sum \bar{w}_n (x_n{}^{t+1} - x_n{}^t) \quad \text{productivity effect.} \quad (3.5)$$

The quantity effect contains a margin effect and a productivity effect, and coincides with a productivity effect if, and only if, the margin effect is zero. For nonzero output change $(y^{t+1} \neq y^t)$, the margin effect is zero if, and only if, the margin $[\bar{p} - (\Sigma \bar{w}_n x_{nCE}{}^t)/y^t]$ is zero. The margin effect is expressed in value terms, and weights output change by the difference between arithmetic mean output price and cost-efficient average cost evaluated at aritmetic mean input prices. The margin effect expresses the simple idea that

expansion with a positive margin is profitable, quite independently of any improvement or deterioration in productivity. Expansion with a positive cost-efficient margin $[\bar{p} - (\Sigma \bar{w}_n x_{nCE}^t)/y^t > 0]$ contributes positively to the quantity effect, and hence to profit change. Conversely, a negative cost-efficient margin signals that arithmetic mean output price is insufficient to cover cost-efficient average cost, much less actual average cost, and contraction would reduce losses [8].

The productivity effect also is expressed in value terms, as the difference between weighted output change and weighted input change. It measures the monetary value of productivity change. The weight on output change is cost-efficient average cost evaluated at arithmetic mean input rices, and the weights on input changes are arithmetic mean input prices. The productivity effect contributes positively to the quantity effect, and hence to profit change, if weighted output change exceeds weighted input change.

The productivity effect can be clarified by decomposing it into the sum of three economic drivers of productivity change, also expressed in value terms, as

$$\sum \bar{w}_n (x_{nCE}^t/y^t)(y^{t+1} - y^t) - \sum \bar{w}_n (x_n^{t+1} - x_n^t) = \quad \text{productivity effect}$$

$$= [\sum \bar{w}_n (x_n^t - x_{nCE}^t) - \sum \bar{w}_n (x_n^{t+1} - x_{nCE}^{t+1})] + \quad \text{cost efficiency effect}$$

$$+ [\sum \bar{w}_n (x_{nCE}^t - x_{nE})] + \quad \text{technical change effect}$$

$$+ \sum \bar{w}_n (x_{nCE}^t/y^t)(y^{t+1} - y^t) - \sum \bar{w}_n (x_{nCE}^{t+1} - x_{nE}) \quad \text{scale effect.} \quad (3.6)$$

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8. The quantity effect can be expressed equivalently in growth form rather than difference form, and decomposed as

$$\bar{p}y^t G_y - \Sigma \bar{w}_n x_n^t G_{xn} = \quad \text{quantity effect}$$

$$= (\bar{p}y^t - \Sigma \bar{w}_n x_{nCE}^t)\, G_y + \quad \text{margin effect}$$

$$+ (\Sigma \bar{w}_n x_{nCE}^t)\; G_y - (\Sigma \bar{w}_n x_n^t)\; [\Sigma (\bar{w}_n x_n^t / \Sigma \bar{w}_n x_n^t) G_{xn}] \quad \text{productivity effect.}$$

In the margin effect output growth $G_y = [(y^{t+1}/y^t) - 1]$ is weighted by the difference between total revenue and cost-efficient total cost, using arithmetic mean output and input prices. In the productivity effect output growth is weighted by cost-efficient total cost, and input growth $\Sigma (\bar{w}_n x_n^t / \Sigma \bar{w}_n x_n^t)\, G_{xn}$ is weighted by actual total cost, with both weights using arithmetic mean input prices. The weights convert a conventional productivity growth accounting formula $G_y - \Sigma (\bar{w}_n x_n^t / \Sigma \bar{w}_n x_n^t)\, G_{xn}$ expressed in percentage terms to one expressed in value terms that shows the financial impact of productivity gains.

The cost efficiency effect captures the contribution to the productivity effect of a change in the cost efficiency of resource allocation between periods $t$ and $t+1$, by comparing the value of $(x^{t+1} - x_{CE}{}^{t+1})$ with that of $(x^t - x_{CE}{}^t)$, using arithmetic mean input price weights. A positive cost efficiency effect quantifies the financial benefit of an improvement in cost efficiency, which contributes positively to the productivity effect and enhances profit change.

The technical change effect captures the contribution to productivity change of an improvement in technology between periods $t$ and $t+1$, evaluated with an input-saving orientation at $y^t$, by comparing the cost of $x_{CE}{}^t$ on the surface of $T^t$ with that of $x_E$ on the surface of $T^{t+1}$, again using arithmetic mean input price weights. A positive technical change effect measures the financial benefit of cost-saving technical progress, which contributes positively to the productivity effect and enhances profit change. As graphic 3.2 indicates, technical change can be biased with respect to input use.

The scale effect corresponds to a movement along the surface of $T^{t+1}$ from $(y^t, x_E)$ to $(y^{t+1}, x_{CE}{}^{t+1})$, and captures the contribution of scale economies to the productivity effect. A positive scale effect reflects either expansion in the presence of increasing returns to scale, or contraction in the presence of decreasing returns to scale, either of which contributes positively to the quantity effect and enhances profit change [9].

The productivity effect in expression (3.6) is interpreted broadly to include the impact of scale economies as well as the impacts of technical change and efficiency change. This broad interpretation corresponds to the

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9. The productivity effect can be expressed equivalently in growth rather than difference terms, and decomposed as

$$(\Sigma \bar{w}_n x_{nCE}{}^t)\ G_y - (\Sigma \bar{w} x_n{}^t)\ [\Sigma\ (\bar{w}_n x_n{}^t / \Sigma \bar{w}_n x_n{}^t)\ G_{xn}] = \quad \text{productivity effect}$$

$$= \Sigma \bar{w}_n x_{nCE}{}^t\ [(x_n{}^t - x_{nCE}{}^t)/x_{nCE}{}^t] - \Sigma \bar{w}_n x_{nCE}{}^{t+1}\ [(x_n{}^{t+1} - x_{nCE}{}^{t+1})/x_{nCE}{}^{t+1}] + \quad \text{cost efficiency effect}$$

$$+ \Sigma \bar{w}_n x_{nE}\ [(x_{nCE}{}^t - x_{nE})/x_{nE}] + \quad \text{technical change effect}$$

$$+ \Sigma \bar{w}_n x_{nCE}{}^t\ G_y - \Sigma \bar{w}_n x_{nE}\ [\Sigma (\bar{w}_n x_{nE} / \Sigma \bar{w}_n x_{nE})\ ((x_{nCE}{}^{t+1} - x_{nE})/x_{nE})] \quad \text{scale effect.}$$

Interpretation of the cost efficiency effec and the technical change effect is a straightforward extension of the discussion in the text, after converting input changes to input growth rates. The scale effect is a productivity effect, measured net of cost efficiency change and net of technical change, and using cost-efficient input cost shares $\bar{w}_n x_{nE} / \Sigma \bar{w}_n x_{nE}$ and arithmetic mean input price weights. It is a pure scale effect evaluated on the surface of $T^{t+1}$, and signals increasing, constant or decreasing returns to scale according as $G_y \gtreqless \Sigma (\bar{w}_n x_{nE} / \Sigma \bar{w}_n x_{nE}) G_{xn}$. The weights convert a conventional scale economies formula expressed in percentage terms to one expressed in value terms that shows the financial impact of the exploitation of scale economies.

US Bureau of Labor Statistics (2005) definition of multifactor productivity change as being "[...] designed to measure the joint influences on economic growth of technical change, efficiency improvements, returns to scale, reallocation of resources, and other factors". The OECD (2001: 9) identifies the same three drivers of productivity change, but notes that "[a]lthough it is conceptually possible to isolate different types of efficiency changes, technical change and economies of scale, this remains a difficult task in practice". The empirical techniques we describe in section 3.3 and implement in section 5 enable us to isolate the economic drivers of productivity change.

Summarizing, expressions (3.2) and (3.4) state that profit change is attributable to pricing power, a margin effect and productivity change. Apart from the margin effect, this is consistent with the interpretations of Miller (1984) and others in the accounting literature who attribute profit change to productivity change and price recovery change (their terminology for our price effect). Expression (3.6) converts a standard economic paradigm concerning the drivers of productivity change, typically expressed in percentage terms, into a decomposition expressed in value terms.

In expression (3.6) the productivity effect is decomposed into the financial contributions of its three economic drivers. This decomposition is particularly important in both prospective and retrospective evaluation of the financial benefits of M&A activity. It is frequently proclaimed that mergers or acquisitions will generate cost savings arising from improved cost efficiencies that will be augmented by additional cost savings generated by increased size in the presence of scale economies. Expression (3.6) provides an analytical framework for evaluating these claims. It is also possible that the principal benefit of M&A activity comes about through the margin effect in expression (3.5), or through the price effect in expression (3.2). In section 6 we use this analytical framework to evaluate the financial consequences of a number of recent mergers in Spanish banking.

### 3.3. Implementing the decomposition of the quantity effect

In decompositions (3.5) and (3.6) the output quantity scalar y and the input quantity vector $x$ are obtained directly or derived indirectly from business financial statements or regulatory agencies, as is the output price scalar $p$ and the input price vector $w$. However the cost-efficient input quantity vectors $x_{CE}$ and $x_E$ are not observed, and as graphics 3.1 and 3.2 suggest they must be retrieved from available data and the technologies $T^t$ and $T^{t+1}$. However because the technologies are unobserved as well, they must be esti-

mated. We convert a sequential form of data envelopment analysis (DEA) developed by Tulkens and Vanden Eeckaut (1995) to a cost minimization context. This technique enables us to approximate the technologies, and to solve for the cost-efficient input quantity vectors $x_{CE}$ and $x_E$.

Since $x_{CE}^t$ is a cost minimizing input vector for $(y^t, w^t, T^\tau)$, it can be identified as the solution to the cost minimizing linear program

$$min_x \{w^{tT}x : x \geqq X^\tau\lambda,\ Y^\tau\lambda \geqq y^t, \lambda \geqq 0, \sum\lambda = 1\}. \tag{3.7}$$

In this program the objective is to find an input quantity vector x that minimizes expenditure $w^{tT}x = \sum w_n^t x_n$ required to produce $y^t$, provided that $(x, y^t)$ is feasible with $T^\tau$. The data matrices $Y^\tau$ and $X^\tau$ contain all outputs and inputs observed in periods $\{1,...,t\}$. Thus feasibility of $(x, y^t)$ requires that $(x, y^t)$ belong to the production set $T^\tau_{DEA} = \{(x, y^t) : x \geqq X^\tau\lambda,\ Y^\tau\lambda \geqq y^t, \lambda \geqq 0, \sum\lambda = 1\}$. $T^\tau_{DEA}$ is the sequential DEA approximation to the unobserved production set $T^\tau$. $T^\tau_{DEA}$ is constructed sequentially, on the assumption that activities adopted in previous years are remembered and remain available for adoption in subsequent years; this assumption rules out technical regress. The convexity constraint $\{\lambda \geqq 0, \sum\lambda = 1\}$ allows the surface of $T^\tau_{DEA}$ to satisfy variable returns to scale. The solution to this program is the cost-efficient input quantity vector $x_{CE}^t$ in graphics 3.1 and 3.2 and in decompositions (3.5) and (3.6).

Since $x_E$ is the solution to the same cost minimizing problem, but using technology $T^{\tau+1}$, solving for $x_E$ requires expanding the data matrices to $X^{\tau+1}$ and $Y^{\tau+1}$ and retaining $w^t$ and $y^t$. The solution to this program is the cost-efficient input quantity vector $x_E$ in graphics 3.1 and 3.2 and in decompositions (3.5) and (3.6).

Once the annual cost-efficient input quantity vectors $x_{CE}$ and $x_E$ are calculated, they are inserted into decomposition (3.5) to quantify the margin effect and the productivity effect. The sources of productivity change are quantified on the right side of (3.6), and the beneficiaries of productivity change are quantified on the right side of (3.3). The cost-efficient input quantity vectors are *identified* using linear program (3.7), which uses observed input prices. However the various effects are *quantified* using expressions (3.2)-(3.6), which use arithmetic mean input prices.

# 4. Data

OUR data are obtained directly from financial statements contained in *Anuario Estadístico de la Banca Española* for commercial banks, *Anuario Estadístico de la Confederación Española de Cajas de Ahorro* for savings banks, and *Memorias de la Unión Nacional de la Asociación de Cooperativas de Crédito* for CFIs. Our sample extends from 1993 through 2004, and after calculating first differences of quantities, prices and profit, the entire sample contains 1,596 observations. In the terminal year our sample contains 32 commercial banks, 46 savings banks and 55 CFIs, and includes 84% of commercial bank assets, 100% of savings bank assets and 98% of CFI assets. No savings banks have been excluded; exclusion rules for commercial banks and CFIs involve missing or inconsistent data and extremely small size as measured by employment.

The data are summarized in tables A.1.1a-A.1.1c, which report average values of all variables for commercial banks, savings banks and CFIs, respectively. Changes in the number of institutions of each type are, with the exception of the appearance of one new CFI (Credit Valencia Rural, in 2002), due exclusively to M&A activity. If a merger or acquisition occurs in year $t$, we include the pre-merger institutions in year $t-1$ and the merged institution in year $t+1$. None of the participating institutions are included in the year of the merger.

Variables are averages across all institutions within a given organizational form, and are defined as follows:

$\pi$ = real operating profit from intermediation activities, defined as the real value of gross profit less gains and losses from trading in stocks and public debt instruments, less extraordinary profit from sales of fixed assets; $R$ = real gross loan and financial investment income less provision for bad debt, plus net commission income, the difference between commission income generated and commission expenses incurred; $y$ = average of beginning-of-year and end-of-year value of loans and financial investments; $p = R/y$; $C$ = real value of the sum of financial expense, consisting of interest paid on deposit accounts and other liabilities ($w_1x_1$), labor expense ($w_2x_2$) and non-financial, non-labor expense, consisting of non-labor operating expense, direct expenditure on buildings and amortization expense ($w_3x_3$); $x_1$ = average

of beginning-of-year and end-of-year value of deposits and other liabilities that generate financial expense; $w_1$ = real financial expense/$x_1$; $x_2$ = average of beginning-of-year and end-of-year number of employees; $w_2$ = real labor expense/$x_2$; $x_3$ = average of beginning-of-year and end-of-year value of non-financial assets; $w_3$ = real non-financial, non-labor expense/$x_3$.

All nominal values have been converted to real values by deflating by the consumer price index (1993 = 100). We specify a single output because of the data constraint. For all three organizational forms it is possible to allocate total revenue to net revenue derived from loans and financial investments and net revenue derived from fees and commissions. It is possible to divide the first revenue component by the average of beginning-of-year and end-of-year value of loans and financial investments to obtain a rate of return on loans and financial investments. There is no natural way of decomposing the second revenue component into quantity and price components. In Grifell-Tatjé and Lovell (1999) we assumed that net fee and commission income is a function of the number of deposit accounts, and we proxied the quantity component of net fee and commission income by the average of the beginning-of-year and end-of-year number of deposit accounts. The resulting price component is the ratio of net fee and commission income to the average number of deposit accounts. This procedure is feasible for commercial banks and savings banks, but it is not feasible for CFIs because CFI records do not contain information on the number of deposit accounts. Thus our revenue variable incorporates both loan and financial investment income and net revenue derived from fees and commissions. Fernández de Guevara (2001) and Tortosa-Ausina (2003) emphasize the importance of including non-traditional income (revenue derived from fees and commissions). In our sample the revenue share of nontraditional activities has increased from 8.6 to 22.7% over the sample period at commercial banks, from 4.7 to 12.8% at savings banks, and from 4.0 to 13.4% at CFIs.

Average real operating profit is positive and increasing for all three organizational forms, apart from the last three years for commercial banks. All three have experienced large increases in average loans and other investments, and large increases in average deposits and other liabilities. Part of commercial bank growth has been internal, and part has come through M&A activity. Our sample contains six M&A events involving 14 commercial banks, because amalgamation is relatively easy with stock companies. It is not so easy with non-stock companies, and the majority of savings bank and CFI growth has been internal, with our sample containing just three M&A events involving seven savings banks and three M&A events involving eight

CFIs. Average employment and average non-financial assets have grown much more slowly for all three organizational forms.

The study period is most prominently characterized for all three organizational forms by very large declines in average rates on loans and other financial investments, and in average deposit rates. In contrast, the average prices of labor and non-financial capital remained relatively stable across all three organizational forms.

It is worth noting that for all three organizational forms standard deviations of profit, output quantity and input quantities exceed their means and increase through the study period. This feature of the data reflects a large and growing size diversity within each organizational form. In contrast, standard deviations of output price and input prices are small relative to their means, and declining through the sample period, for each organizational form. This feature of the data may reflect tightening competitive conditions in loan, deposit and other markets.

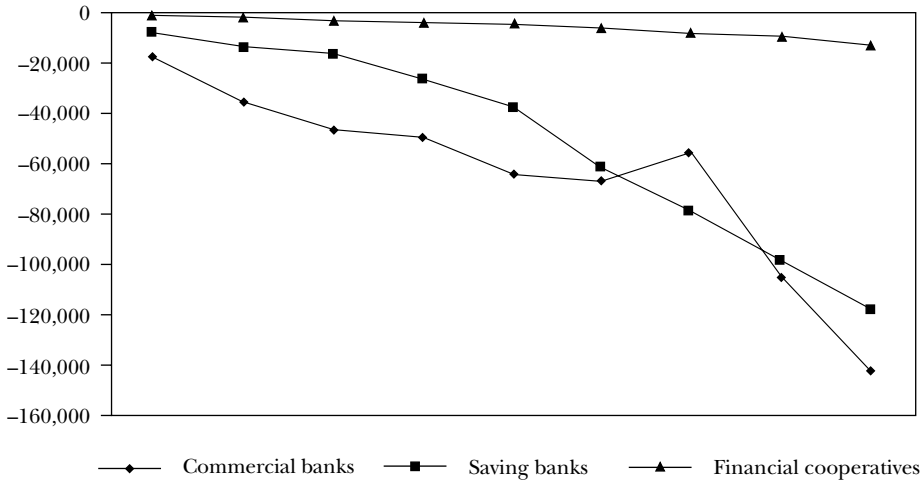
# 5. Findings

OUR empirical findings are summarized in tables A.1.2a-A.1.5c, and in graphics 5.1-5.5. Tables A.1.2a-A.1.4c and graphics 5.1 and 5.2 are derived from data, using expressions (3.2) and (3.3) in section 3. Tables A.1.5a-A.1.5c and graphics 5.3-5.5 are obtained by applying economic analysis to the data, using expressions (3.5) and (3.6) in section 3. All results are averages within each organizational form, and these averages conceal considerable within-group variation.

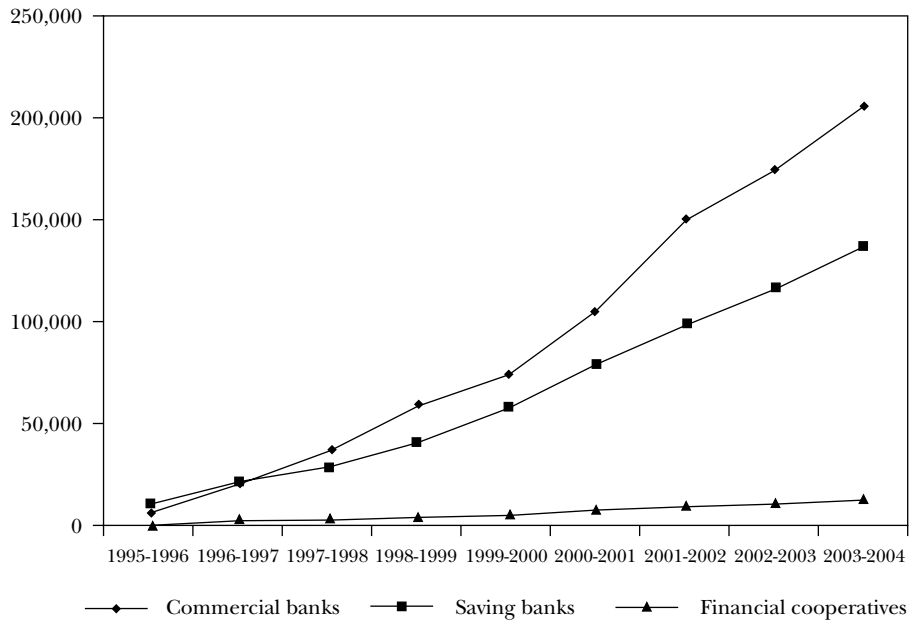
The primary finding that emerges from tables A.1.2a-A.1.2c is one of similarity across the three organizational forms. For all three groups average real operating profit change is positive, over the study period and for 19 of 30 years. For all three groups the average price effect is negative, over the study period and in every year (with one exception for commercial banks in 2000-2001). For all three groups the average quantity effect is positive, over the study period and in every year (with no annual exceptions). All three organizational forms have experienced negative real price recovery as the value of declines in real returns on loans and other financial investments has exceeded the value of declines in real deposit rates throughout the study period. However this negative real price recovery has been more than offset by the positive quantity effect, reflecting an expansion in the value of loans and other financial investments exceeding the expansion in the value of deposits, leading to fairly steady increases in real operating profit. The only difference across organizational forms is the magnitudes of the effects. One possible explanation for this similarity is that deregulation and liberalization have affected the operating environment of all three organizational forms in the same way, without favoring one form over another. The cumulative values of the price effect and the quantity effect are depicted in graphics 5.1 and 5.2. Over the study period, the quantity effect returned over 200 million euros of real profit for commercial banks, almost 140 million of which was erased by the price effect. Corresponding graphics are similar, but smaller, for savings banks and CFIs.

Tables A.1.3a-A.1.3c break down the quantity effect by individual variable. The primary finding remains one of similarity across organizational forms, but an interesting secondary finding of difference emerges. The primary finding is that, for all three organizational forms, the vast majority of

**GRAPHIC 5.1: Cumulative price effect**
(thousands of 1993 euros)




**GRAPHIC 5.2: Cumulative quantity effect**
(thousands of 1993 euros)




the increase in the average quantity effect is due to a very large increase in average deposits that has funded an even larger increase in average loans and other financial investments. However because increases in deposit and loan activity do not require proportionate increases in labor and non-financial capital, increases in these two inputs have been modest.

The secondary finding of difference involves the signs of changes in labor and non-financial capital quantities. Commercial banks have shed labor and reduced stocks of non-financial capital. Exactly the opposite pattern emerges for savings banks and CFIs, who support expansion by increasing employment and expanding use of non-financial capital.

A number of potential explanations are available. One is that, subsequent to M&A activity, commercial banks have been closing branches and shedding labor in a search for proclaimed efficiency gains. Savings banks and CFIs, geographically constrained and lacking practical owners with whom to discuss M&A possibilities, engage in relatively few allegedly efficiency-enhancing mergers. A complementary explanation revolves around market differences. Commercial banks operate nationally, dealing primarily with institutions. Although some savings banks are expanding from their original regional bases, most savings banks and virtually all CFIs (particularly the majority agricultural CFIs) continue to deal locally or regionally, dealing primarily with individuals. This may induce them to place greater emphasis on customer service, by expanding branch networks and adding more employees to provide better customer service, and by expanding ATM networks and internet banking service. The available evidence seems consistent with both explanations, and reflects organizational differences in competitive strategy in response to deregulation and liberalization. Fuentelsaz and Gómez (2001) report the number of branches increasing by 6% at commercial banks and by 49% at savings banks from 1985 to 1996. Kumbhakar and Lozano-Vivas (2004) report that the number of branches per savings bank more than doubled from 171 in 1986 to 376 in 1999, and that the number of ATMs per bank ballooned from 40 to 470 over the same period.

Tables A.1.4a-A.1.4c examine the distribution of the financial fruits of expansion to residual claimants, borrowers, depositors, labor and suppliers of non-financial capital, as described in expression (3.3). Once again the primary finding remains one of similarity across organizational forms, and in this case it is a mild surprise.

For all three organizational forms the primary beneficiaries of the positive quantity effect are borrowers, who have enjoyed the fruits of declining real loan rates. The three output price effects sum to approximately 104 million euros in real borrower savings per year over the study period. The primary victims of the positive quantity effect are depositors, who have suffered declining real deposit rates. The three deposit price effects sum to approximately 77 million euros in real depositor sacrifices per year over the study period. Thus the main distributional feature has been an enormous transfer of real wealth from depositors to borrowers, and this has occurred for all

three organizational forms. Residual claimants have done well, with real profit change being positive on average for all three organizational forms. However residual claimants have done better at commercial banks, where their return has averaged 27% of the quantity effect over the study period, than at savings banks (20%) and at CFIs (9%). This may reflect a commercial orientation at commercial banks and a more widely dispersed set of stakeholders at savings banks and CFIs.

The primary distributional difference involves the labor price effect, which has been small for all three organizational forms, essentially zero at savings banks and CFIs, but positive and non-negligible (5% of the quantity effect) at commercial banks. The institutional arrangements discussed in section 2 suggest the opposite outcome. With multiple stakeholder groups dominated by labor and management, one might expect labor to be better treated at savings banks and CFIs than at commercial banks, yet the opposite has occurred. Three potential explanations occur, although none is particularly relevant to savings banks. It is possible that commercial banks have responded to union pressure by offsetting labor shedding with increased compensation for remaining employees. It is also possible that commercial banks transactions with primarily business customers require an increasingly skilled workforce, in which case the labor price effect is capturing the cost of quality change that is in less demand at savings banks and CFIs. At CFIs, with two exceptions employees are members of the institution, and as members they are eligible for additional distributions from after-tax profit. Consequently the negligible labor price effect at CFIs is likely to understate the financial benefits accruing to employees, since they receive a portion of profit change itself.

Tables A.1.5a-A.1.5c augment data with economic theory to allocate the quantity effect to a margin effect and a productivity effect as described in expression (3.5), and to identify the economic drivers of the productivity effect as described in expression (3.6). Once again the empirical findings are dominated by similarity across organizational forms.

The margin effect is large and growing for each organizational form, accounting for 48, 88 and 125% of the quantity effect at commercial banks, savings banks and CFIs. As the discussion surrounding expression (3.5) suggests, output price exceeds cost-efficient unit cost for all three organizational forms. Even though real rates of return on loans and other financial investments have been falling throughout the study period, declining deposit rates have been driving down cost-efficient unit cost even farther.

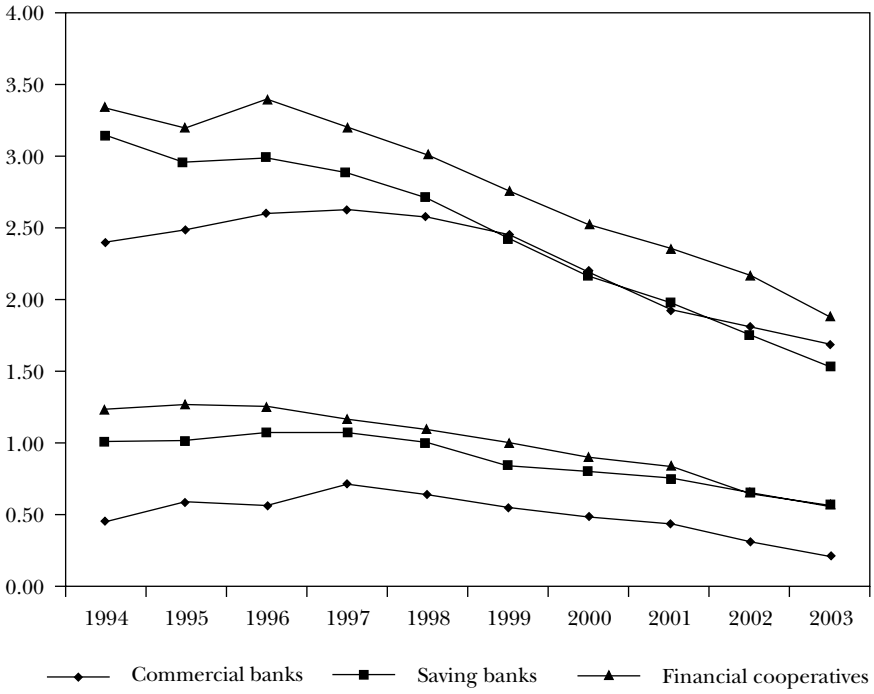
We define the real cost-efficient margin as the first component $[\bar{p} - (\Sigma \bar{w}_n x_{nCE}^t)/y^t]$ of the margin effect in expression (3.5); although the

margin effect is expressed in real euro terms, the real cost-efficient margin is expressed in percentage terms. The real cost-efficient margin is tracked for each organizational form in the upper portion of graphic 5.3. This margin appears similar to the real financial intermediation margin depicted in graphic 2.3, but it is constructed differently, augmenting the data with economic theory to create real cost-efficient unit cost. It thus includes labor and non-financial and non-labor expenses, and these are cost-efficient expenses rather than observed expenses. The two differences notwithstanding, the real cost-efficient margin follows a familiar path: downward sloping and converging through the study period. Even at the end of the study period, however, a real cost efficient margin between 1.5 and 2.0% provides a powerful incentive for expansion. In this environment, each organizational form has the same incentive: to grow as fast as possible, provided only that cost inefficiency is not so great as to force output price beneath actual unit cost.

The cost efficiency proviso is testable. Changes in cost efficiency are captured by the cost efficiency effect in expression (3.6), and we discuss change in cost efficiency as a component of productivity change below. Here we are concerned with levels of cost efficiency. The lower portion of graphic 5.3 depicts trends in real actual margins at each organizational form. Real actual margins fall short of real cost-efficient margins by nearly 2%, although the gap is narrowing. Actual margins have declined to 0.2% at commercial banks, and to 0.5% at savings banks and CFIs. The three gaps in graphic 5.3 thus represent foregone potential real margin income due to cost-inefficient resource allocation at all three organizational forms. Cost efficiency has been lowest at CFIs, and has been deteriorating at all three organizational forms. Details are relegated to appendix 2, table A.2.9, which tracks cost efficiency ratios through the study period at all three organizational forms, and appendix 2, tables A.2.10-A.2.12, which track real cost-efficient margins, real actual margins, and the difference between cost-efficient unit cost and actual unit cost, through the study period and at all three organizational forms.

In marked contrast to the margin effect, the productivity effect has accounted for just over half of the quantity effect at commercial banks, barely 10% at savings banks, and has detracted from the quantity effect at CFIs. Thus all three organizational forms have enjoyed a relatively large and favorable margin effect, but only the profit-seeking commercial banks have augmented the margin effect with profitable productivity growth. Graphics 5.4 and 5.5 depict trends in the cumulative margin effect and the cumulative productivity effect for each organizational form. All three groups have reaped cumulative value from positive margins, but only commercial banks have reaped large cumulative value from productivity gains. Throughout the

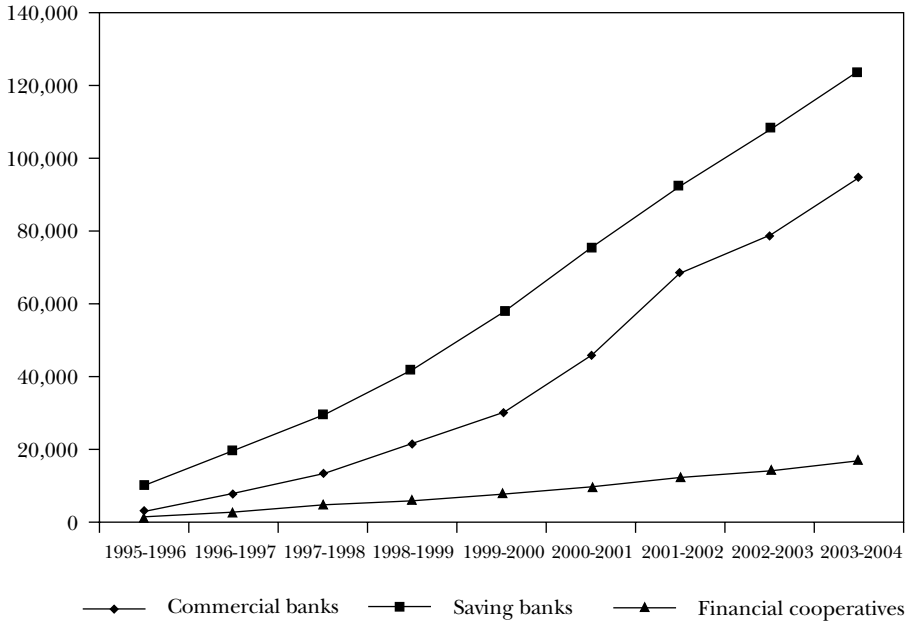
**GRAPHIC 5.3: Real cost-efficient margin and real actual margin**
(percentages)




study period commercial banks have accumulated over 120 million euros from expansion at positive margins, and they have augmented this amount by nearly 120 million from productivity gains. Savings banks have cumulated paltry real productivity gains, and CFIs have lost money through productivity decline.

There are, however, similarities across organizational form in the contribution of the economic drivers of productivity change, as characterized in expression (3.6). For all three groups the technical change effect has been positive and sufficiently large to exceed the value of the productivity effect itself. For example, during the study period productivity growth at commercial banks contributed approximately 12 million real euros annually to improved financial performance; technical change alone contributed over 18 million real euros annually to improved financial performance. It follows that the combined contribution of change in cost efficiency and scale adjustments must have detracted from financial performance at all three organizational forms during the study period. The significance of the technical change effects comes as no surprise. Financial institutions have invested heavily in information and communications technology, and these investments are now paying dividends.

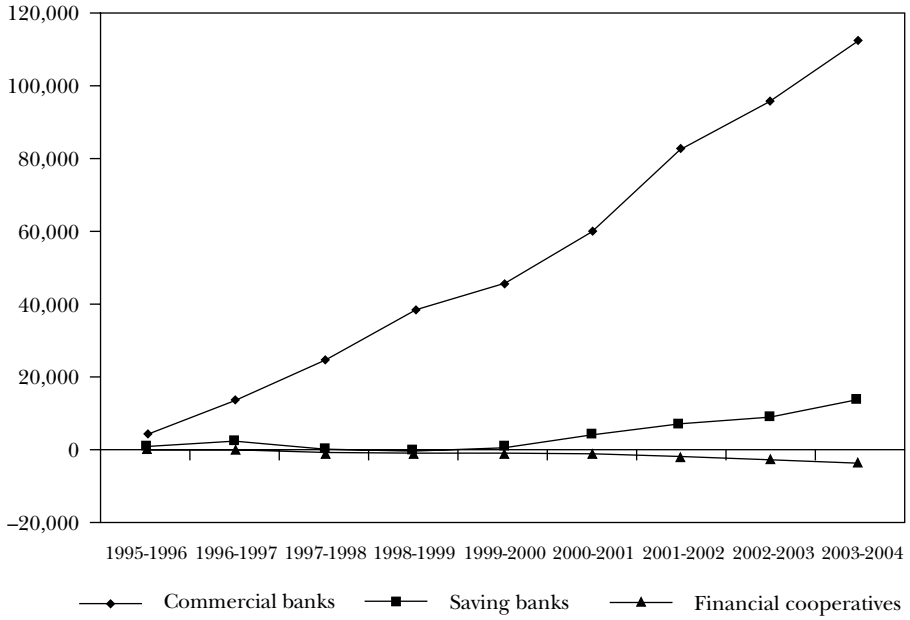
**GRAPHIC 5.4: Cumulative margin effect**
(thousands of 1993 euros)




The cost efficiency effect has been negative for all three organizational forms, although the effect has been relatively large for savings banks and CFIs and relatively small for commercial banks (where it is beginning to turn positive). This finding of a larger negative cost efficiency effect at savings banks and CFIs is consistent with the previous finding that commercial banks are the only group to have grown rapidly and still managed to cut back on employment and non-financial capital. This finding is also consistent with the existence of different competitive strategies at savings banks and CFIs than at commercial banks. The former have pursued a service-oriented strategy that is labor and physical capital-intensive (growth in branch networks appears to be cost-inefficient, and improving cost efficiency might adversely impact service quality and therefore sacrifice otherwise profitable business), while the latter have pursued a price-oriented strategy (consistent with generally lower margins in graphics 2.3 and 5.3).

Finally, the scale effect has been negative and relatively large at commercial banks, suggesting that at least some of their expansion has occurred in the presence of mildly decreasing returns to scale. In contrast, the scale effect has been negligible at savings banks and essentially zero at cooperatives, suggesting that most banks in these two groups operate in a wide region of roughly constant returns to scale, and that the smallest may have been expanding in a region of mildly increasing returns to scale.

**GRAPHIC 5.5: Cumulative productivity effect**
(thousands of 1993 euros)




To test the scale explanation, we have segregated all sample observations into two groups: those in the largest asset decile, and those in the smallest asset decile, without regard to organizational form. The observations in the largest asset decile that have contracted all three inputs have enjoyed a positive scale effect as a group. The observations in the largest asset decile that have expanded all three inputs have had a negative scale effect as a group. All observations in the smallest asset decile that have contracted all three inputs have had a negative scale effect. All observations in the smallest asset decile that have expanded all three inputs have enjoyed a positive scale effect. This experiment reinforces the widespread belief that in banking only the smallest firms experience increasing returns to scale and only the largest firms experience decreasing returns to scale. We conclude that over the sample period scale economies have played in inconsequential role in the financial performance of banks of all three organizational forms.

We can summarize the relative importance of the drivers of the price effect and the quantity effect. The price effect has been driven almost exclusively by two factors: the financial benefits of a rapidly declining real deposit rate have been more than offset by the financial costs (in terms of revenue forgone) of an even more rapidly declining real return on loans and other financial investments. Nothing else has mattered for the price effect. The quantity effect has been driven primarily by the margin effect. The impor-

tance of the margin effect varies across organizational form, but across all three organizational forms 69% of the quantity effect has been due to the margin effect. This leaves 31% to be allocated to the three components of the productivity effect. The importance of the three components also varies across organizational form, but across all three organizational forms the technical change effect has accounted for 55% of the quantity effect, the scale effect has accounted for -13%, and the cost efficiency effect has accounted for -11%. Technical progress has provided more than all of productivity growth.

This is an important, and apparently new, empirical finding. The real cost-efficient margin has declined continuously throughout the study period, from between 2.5 and 3.5% at the beginning to between 1.5 and 2% at the end. The real actual margin has behaved in much the same way, but at lower although still positive levels. However both of these margins are real margins, and expansion remains profitable for all three organizational forms. The margin effect has provided by far the primary incentive for expansion in Spanish banking. In contrast, the widely proclaimed drivers of growth, both internal (improvements in cost efficiency and the exploitation of scale economies) and external (by way of M&A activity), have actually retarded growth. The main driver of growth has not been the exploitation of scale economies or improvements in cost efficiency, but simply rapid expansion in the presence of declining but still positive real margins.

We conclude this section by returning to the two hypotheses proposed in section 2. The first hypothesis asserts that in the early part of the study period, organizational form trumps competition, leading to superior economic and financial performance at commercial banks. If we interpret economic performance as productivity change, tables A.1.5a-A.1.5c provide considerable support for this part of the hypothesis. During the first half of the study period, productivity change contributed well over half of the quantity effect at commercial banks, essentially nothing at savings banks, and detracted from the quantity effect at CFIs. If we interpret financial performance as real operating profit change, tables A.1.2a-A.1.2c do not support the hypothesis. During the first half of the study period real operating profit fluctuated at commercial banks, generating a small overall increase. During the same period real operating profit increased impressively at both savings banks and CFIs. Thus during the early part of the study period commercial banks were unable to convert their predicted superior economic performance into superior financial performance.

The second hypothesis asserts convergence of economic and financial performance toward the end of the study period, as competition dominates

organizational form. If economic performance continues to be interpreted as productivity change, tables A.1.5a-A.1.5c do not support the hypothesis. Productivity growth at commercial banks remained robust throughout the latter part of the study period, and it remained anemic at savings banks and negative at CFIs. If financial performance continues to be interpreted as real operating profit change, tables A.1.2a-A.1.2c provide limited support for the hypothesis. After an impressive mid-period start, real operating profit at commercial banks declined late in the study period. Savings banks enjoyed much better financial performance, but real operating profit declined at CFIs. Thus convergence was partial, involving commercial banks and savings banks but not CFIs. Once again, however, commercial banks were unable to convert their continuing superior productivity performance into superior financial performance.

# 6. Micro Evidence on the Impacts of M&A Activity

ON average across all institutions, and throughout the study period, deterioration in cost efficiency and the deleterious impacts of scale economies have detracted from financial performance. This is precisely the opposite of the proclamations of M&A proponents, who believe that M&A activity will enhance financial performance precisely by driving down costs through improvements in cost efficiency and the exploitation of scale economies. It is possible that the average aggregate results we have reported conceal favorable evidence for participants in M&A activity. Our objective in this section is to summarize the evidence for M&A participants. Our data set contains few M&A events, and even fewer usable M&A events, so our evidence is limited, but we find it compelling.

Our data base contains 12 M&A events, six involving 14 participants at commercial banks, three involving seven savings banks and three involving eight CFIs. Six of these 12 M&A events occurred sufficiently late in the study period that they left less than two years of post-M&A experience. We set the minimum post M&A experience at two years, leaving us with six usable M&A events, one at commercial banks with four years of post-M&A experience, three at savings banks with two or three years of post-M&A activity, and two at CFIs with two years of post-M&A activity [10].

For each of the six usable M&A events we have judged whether there was post-M&A improvement, no significant change, or deterioration, in

10. The commercial bank events involved: 1) Banco Central Hispano and Banco Santander becoming Banco Santander Central Hispano; 2) Banco de Extremadura, Banco Simeón and Banco Luso Español becoming Banco Luso Español; 3) Banco de Murcia and Banco de Valencia becoming Banco de Valencia; 4) Banco Zaragozano and Barclays Bank becoming Barclays Bank; 5) Banco de Vitoria and Banco Español de Crédito becoming Banco Español de Crédito and, 6) Banco Herrero, Banco de Asturias, Banco Atlántico and Banco de Sabadell becoming Banco de Sabadell. The savings bank events involved: 1) Orense, Vigo and Pontevedra becoming Caixanova; 2) Carlet and Bancaja becoming Bancaja and, 3) Pamplona and Navarra becoming Navarra. The CFI events involved: 1) C. R. Huesca and C. R. Zaragoza becoming C. R. Multicaja; 2) C. R. Huelva and C. R. Sevilla becoming C. R. Rural del Sur and, 3) C. R. Alicante, C. R. Credicoop, C. R. Valencia and C. R. Elche becoming Ruralcaja.

each of three performance indicators: the margin effect, the cost efficiency effect and the scale effect. Significant improvement in the cost efficiency effect or the scale effect would provide micro evidence in support of those who proclaim that M&A activity enhances financial performance by driving down costs through improvements in cost efficiency and the exploitation of scale economies. We find credible improvement in the margin effect in five of six M&A events. We find credible deterioration in cost efficiency, and in the scale effect, in five of six M&A events. The evidence is judgmental and limited to six M&A events, but it provides absolutely no support to conventional arguments in support of M&A activity. This micro evidence is consistent with the average aggregate findings: the primary driver of growth in financial performance in Spanish banking has been the margin effect.

# 7. Conclusions

INSTITUTIONS having three different organizational forms populate the Spanish banking system. Property rights theory predicts that stock institutions will perform better than mutual and other institutions. This leads to the hypothesis that commercial banks will outperform savings banks and CFIs, with performance being measured in both economic and financial terms. Domestic and EU deregulation and liberalization have transformed the Spanish banking system. This transformation has leveled the playing field and intensified potential if not actual competition, particularly between commercial banks and savings banks. Economic theory predicts that increased competition will benefit the formerly disadvantaged groups, namely savings banks and, to a lesser degree, CFIs.

The two competing paradigms have led us to propose two hypotheses concerning the performance of the three organizational forms in Spanish banking. The first hypothesis asserts initial dominance of commercial banks. Economic dominance, in terms of productivity growth, is supported, but financial dominance, in terms of change in real operating profit, is not supported. The second hypothesis asserts that intensifying competition will narrow the performance gaps. Economic convergence, in terms of productivity growth, is not supported, but financial convergence, in terms of change in real operating profit, receives limited support. The conclusion is that, although Spanish and EU reforms have obviously had an influence on the Spanish banking system, they have not led to convergence in the economic and financial performance of its three organizational forms. Commercial banks continue to enjoy higher rates of productivity growth. However they have been unable to convert their continuing productivity advantage to growing financial advantage. The explanation for this inability is a challenge for future research.

In the process of attempting to sort out the separate impacts of organizational form and arguably increasing competition on the performance of the Spanish banking system, we have uncovered an interesting empirical regularity. For the Spanish banking system as a whole, the margin effect (expansion with a positive cost-efficient margin in real terms) delivers twice as much financial benefit as does the productivity effect. This finding varies

across organizational form. Within the productivity effect, technical progress brings financial benefit, but cost efficiency change and the scale effect reduce financial benefit. This finding does not vary across organizational form. This interesting regularity thus has two parts: 1) the margin effect is more important for growth than the productivity effect, and 2) within the productivity effect, cost efficiency and scale economies are drags on, rather than drivers of, economic growth and financial performance. This regularity has an important implication: incentives for growth are provided by a positive real margin, and not by the elusive benefits of scale economies and cost efficiency improvements. Continued testing of this empirical regularity, particularly on a larger sample of M&A participants created by extending our sample backward in time, constitutes an additional challenge for future research.

# Appendices

# Appendix 1

**TABLE A.1.1a: Summary statistics for spanish commercial banks (1994-2004)**

| | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 1994-2004 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Real average operating profit (thousands of euros) | 24,501 | 34,060 | 31,441 | 36,646 | 57,307 | 46,199 | 77,679 | 134,287 | 124,986 | 128,047 | 115,295 | 66,840 |
| *Std. Dev.* | *75,818* | *86,912* | *85,807* | *99,314* | *114,135* | *90,675* | *235,870* | *440,918* | *337,937* | *339,536* | *254,578* | *223,959* |
| Y average loans and other financial investments (thousands of euros) | 5,072,411 | 7,209,848 | 7,638,967 | 8,118,426 | 8,262,387 | 6,061,149 | 11,203,836 | 12,993,002 | 14,839,149 | 16,728,768 | 18,773,571 | 9,567,005 |
| *Std. Dev.* | *11,219,875* | *13,921,985* | *15,133,769* | *16,749,842* | *18,037,230* | *14,667,601* | *30,956,686* | *36,558,385* | *38,643,054* | *41,491,495* | *44,284,976* | *25,364,417* |
| p (%) | 9.39 | 9.79 | 8.61 | 7.02 | 6.15 | 5.03 | 5.61 | 5.29 | 4.52 | 4.00 | 3.59 | 6.64 |
| *Std. Dev.* | *0.029* | *0.012* | *0.011* | *0.012* | *0.010* | *0.015* | *0.011* | *0.010* | *0.012* | *0.015* | *0.014* | *0.024* |
| $x_1$ average deposits and other liabilities (thousands of euros) | 4,946,956 | 7,053,685 | 7,478,805 | 7,953,459 | 8,096,299 | 5,983,357 | 10,994,797 | 12,604,102 | 14,395,086 | 16,287,143 | 18,921,702 | 9,342,255 |
| *Std. Dev.* | *11,078,444* | *13,772,320* | *14,977,332* | *16,594,480* | *17,874,594* | *14,801,732* | *30,475,551* | *35,390,619* | *37,340,244* | *40,389,371* | *45,041,692* | *24,774,774* |
| $w_1$ (%) | 5.91 | 6.25 | 5.38 | 3.78 | 2.92 | 1.95 | 2.59 | 2.66 | 1.99 | 1.57 | 1.33 | 3.57 |
| *Std. Dev.* | *0.011* | *0.011* | *0.009* | *0.008* | *0.007* | *0.007* | *0.008* | *0.007* | *0.006* | *0.012* | *0.009* | *0.019* |
| $x_2$ average number of employees | 2,166 | 2,938 | 2,816 | 2,706 | 2,570 | 1,856 | 2,711 | 2,765 | 2,934 | 3,064 | 3,185 | 2,643 |
| *Std. Dev.* | *4,351* | *5,217* | *5,058* | *4,957* | *4,888* | *3,610* | *6,168* | *6,564* | *6,539* | *6,510* | *6,571* | *5,369* |
| Real $w_2$ (thousands of euros) | 34.695 | 34.127 | 34.393 | 35.859 | 36.600 | 38.097 | 38.868 | 37.810 | 39.777 | 37.766 | 38.028 | 36.705 |
| *Std. Dev.* | *5.182* | *5.451* | *4.850* | *6.152* | *5.515* | *11.873* | *15.303* | *7.950* | *9.842* | *6.851* | *8.231* | *8.586* |
| $x_3$ average non-financial capital (thousand of euros) | 127,657 | 182,406 | 183,555 | 178,389 | 161,086 | 118,301 | 179,613 | 186,362 | 192,697 | 186,544 | 187,976 | 169,188 |
| *Std. Dev.* | *293,332* | *361,738* | *370,728* | *369,296* | *348,939* | *267,661* | *464,507* | *501,278* | *480,525* | *445,046* | *434,257* | *390,347* |
| $w_3$ (%) | 82.0 | 64.2 | 70.3 | 55.9 | 68.8 | 69.0 | 73.0 | 77.7 | 80.1 | 96.3 | 125.4 | 72.9 |
| *Std. Dev.* | *1.364* | *0.874* | *1.007* | *0.633* | *0.951* | *0.899* | *0.809* | *0.836* | *0.796* | *1.326* | *1.898* | *0.960* |
| Number of commercial banks | 40 | 43 | 44 | 45 | 44 | 42 | 40 | 40 | 36 | 34 | 32 | 440 |
| Average assets (thousands of euros) | 5,449,761 | 7,753,020 | 8,181,952 | 8,667,750 | 8,833,744 | 6,492,946 | 12,292,367 | 14,311,058 | 16,283,349 | 18,244,905 | 21,256,990 | 11,167,503 |

**TABLE A.1.1b: Summary statistics for Spanish savings banks (1994-2004)**

| | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 1994-2004 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Real average operating profit (thousands of euros) | 33,613 | 36,363 | 42,247 | 48,113 | 49,856 | 56,347 | 57,534 | 60,159 | 61,521 | 63,294 | 68,837 | 50,590 |
| *Std. Dev.* | *37,529* | *42,538* | *48,874* | *56,058* | *51,571* | *69,672* | *75,414* | *77,735* | *73,065* | *82,742* | *101,006* | *63,064* |
| Y average loans and other financial investments (thousands of euros) | 3,731,857 | 4,105,912 | 4,497,789 | 4,906,214 | 5,425,360 | 6,228,175 | 7,406,760 | 8,272,305 | 9,438,353 | 10,537,520 | 11,982,868 | 6,378,492 |
| *Std. Dev.* | *6,647,788* | *7,108,993* | *7,633,515* | *8,097,374* | *8,840,716* | *10,167,451* | *11,981,472* | *13,238,715* | *14,618,660* | *16,656,297* | *19,046,630* | *11,007,548* |
| p (%) | 9.56 | 9.21 | 8.54 | 7.00 | 5.94 | 4.85 | 4.76 | 4.76 | 4.16 | 3.51 | 3.07 | 6.29 |
| *Std. Dev.* | *0.006* | *0.005* | *0.005* | *0.006* | *0.004* | *0.004* | *0.004* | *0.004* | *0.004* | *0.003* | *0.003* | *0.021* |
| $x_1$ average deposits and other liabilities (thousands of euros) | 3,693,167 | 4,064,673 | 4,423,697 | 4,821,568 | 5,325,432 | 6,150,689 | 7,354,578 | 8,211,151 | 9,368,030 | 10,442,674 | 11,834,214 | 6,308,896 |
| *Std. Dev.* | *6,560,628* | *7,066,157* | *7,525,011* | *8,009,735* | *8,752,563* | *10,153,908* | *12,095,353* | *13,442,800* | *14,871,578* | *16,914,088* | *19,215,772* | *11,078,485* |
| $w_1$ (%) | 5.25 | 5.31 | 4.84 | 3.39 | 2.53 | 1.70 | 1.93 | 2.13 | 1.73 | 1.34 | 1.13 | 3.06 |
| *Std. Dev.* | *0.006* | *0.007* | *0.006* | *0.005* | *0.004* | *0.003* | *0.003* | *0.003* | *0.002* | *0.002* | *0.002* | *0.016* |
| $x_2$ average number of employees | 1,628 | 1,646 | 1,686 | 1,745 | 1,827 | 1,945 | 2,105 | 2,176 | 2,308 | 2,370 | 2,423 | 1,934 |
| *Std. Dev.* | *2,157* | *2,189* | *2,269* | *2,406* | *2,586* | *2,848* | *3,110* | *3,275* | *3,409* | *3,498* | *3,564* | *2,786* |
| Real $w_2$ (thousands of euros) | 37.234 | 37.302 | 37.274 | 36.975 | 36.678 | 36.293 | 36.895 | 37.408 | 37.631 | 37.585 | 37.378 | 37.122 |
| *Std. Dev.* | *5.485* | *5.656* | *5.151* | *5.378* | *5.514* | *5.817* | *5.342* | *5.378* | *4.568* | *4.801* | *4.500* | *5.292* |
| $x_3$ average non-financial capital (thousand of euros) | 147,951 | 157,474 | 166,175 | 177,407 | 183,446 | 189,318 | 198,027 | 200,665 | 205,450 | 209,755 | 215,047 | 182,940 |
| *Std. Dev.* | *263,313* | *287,628* | *306,274* | *319,358* | *328,605* | *334,764* | *337,784* | *340,076* | *339,480* | *337,168* | *333,403* | *317,392* |
| $w_3$ (%) | 35.6 | 34.4 | 34.0 | 33.0 | 30.7 | 30.2 | 28.7 | 29.4 | 29.0 | 28.0 | 27.2 | 31.4 |
| *Std. Dev.* | *0.126* | *0.135* | *0.139* | *0.125* | *0.105* | *0.100* | *0.078* | *0.079* | *0.075* | *0.074* | *0.072* | *0.110* |
| Number of savings banks | 49 | 49 | 50 | 50 | 50 | 48 | 45 | 45 | 46 | 46 | 46 | 524 |
| Average assets (thousands of euros) | 4,051,824 | 4,440,101 | 4,836,418 | 5,269,574 | 5,819,590 | 6,702,352 | 7,993,083 | 8,940,234 | 10,179,257 | 11,310,227 | 12,788,645 | 7,391,011 |

**TABLE A.1.1c: Summary statistics for Spanish financial cooperatives (1994-2004)**

| | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 1994-2004 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Real average operating profit (thousands of euros) | 4,173 | 4,627 | 5,012 | 5,009 | 5,233 | 6,440 | 6,136 | 6,201 | 6,381 | 5,770 | 6,051 | 5,485 |
| *Std. Dev.* | *9,761* | *10,184* | *12,161* | *9,781* | *10,127* | *13,973* | *14,395* | *13,526* | *14,914* | *13,250* | *13,421* | *12,253* |
| Y average loans and other financial investments (thousands of euros) | 277,267 | 317,425 | 361,304 | 401,152 | 445,511 | 492,240 | 560,082 | 635,974 | 691,581 | 823,008 | 1,000,162 | 495,497 |
| *Std. Dev.* | *458,412* | *522,440* | *592,579* | *638,447* | *719,944* | *807,629* | *963,631* | *1,215,339* | *1,372,573* | *1,576,843* | *1,901,724* | *952,618* |
| p (%) | 9.71 | 9.31 | 8.64 | 6.92 | 5.81 | 4.88 | 4.72 | 4.83 | 4.39 | 3.50 | 3.09 | 6.32 |
| *Std. Dev.* | *0.009* | *0.009* | *0.008* | *0.007* | *0.006* | *0.006* | *0.006* | *0.005* | *0.009* | *0.005* | *0.004* | *0.022* |
| $x_1$ average deposits and other liabilities (thousands of euros) | 266,604 | 305,862 | 347,236 | 384,018 | 424,539 | 468,670 | 532,045 | 609,632 | 661,501 | 779,481 | 946,384 | 473,161 |
| *Std. Dev.* | *433,229* | *494,832* | *556,549* | *594,177* | *669,134* | *753,809* | *897,868* | *1,147,272* | *1,300,169* | *1,478,748* | *1,782,090* | *895,038* |
| $w_1$ (%) | 5.12 | 5.02 | 4.67 | 3.06 | 2.17 | 1.38 | 1.62 | 1.90 | 1.53 | 1.10 | 0.88 | 2.79 |
| *Std. Dev.* | *0.006* | *0.007* | *0.005* | *0.004* | *0.003* | *0.002* | *0.003* | *0.003* | *0.004* | *0.002* | *0.002* | *0.016* |
| $x_2$ average number of employees | 176 | 181 | 189 | 199 | 210 | 219 | 232 | 244 | 257 | 275 | 310 | 217 |
| *Std. Dev.* | *229* | *237* | *251* | *274* | *302* | *324* | *358* | *418* | *448* | *483* | *540* | *339* |
| Real $w_2$ (thousands of euros) | 29.111 | 29.135 | 29.550 | 29.672 | 29.647 | 29.407 | 29.594 | 29.358 | 29.397 | 29.272 | 29.257 | 29.416 |
| *Std. Dev.* | *5.285* | *4.861* | *4.649* | *4.082* | *4.021* | *4.067* | *4.234* | *3.783* | *3.818* | *3.740* | *3.422* | *4.263* |
| $x_3$ Average non-financial capital (thousand of euros) | 8,870 | 9,608 | 10,514 | 11,717 | 12,609 | 13,049 | 13,786 | 14,887 | 15,563 | 18,203 | 21,334 | 12,802 |
| *Std. Dev.* | *22,255* | *23,994* | *24,499* | *26,462* | *27,798* | *27,941* | *29,024* | *32,777* | *35,287* | *39,335* | *42,851* | *29,106* |
| $w_3$ (%) | 59.8 | 56.0 | 53.3 | 49.4 | 47.9 | 46.7 | 45.5 | 44.7 | 50.3 | 47.0 | 43.3 | 50.1 |
| *Std. Dev.* | *0.274* | *0.216* | *0.202* | *0.171* | *0.185* | *0.195* | *0.208* | *0.195* | *0.365* | *0.400* | *0.380* | *0.253* |
| Number of financial cooperatives | 59 | 59 | 59 | 59 | 59 | 59 | 59 | 55 | 55 | 54 | 55 | 632 |
| Average assets (thousands of euros) | 297,385 | 340,623 | 361,377 | 428,604 | 474,612 | 525,158 | 596,703 | 680,845 | 738,953 | 871,355 | 1,053,832 | 572,067 |

**TABLE A.1.2a: Comercial banks: operating profit change decomposition**
(average results, thousands of 1993 euros)

| | | Operating profit change | = | Bennet price effect | + | Bennet quantity effect |
|---|---|---|---|---|---|---|
| 1994-1995 | *Mean* | –9,987– | | 16,480 | | 6,493 |
| | *Std. Dev.* | *54,499* | | *82,343* | | *36,143* |
| 1995-1996 | *Mean* | –1,988 | | –16,481 | | 14,493 |
| | *Std. Dev.* | *40,665* | | *60,904* | | *32,808* |
| 1996-1997 | *Mean* | 6,000 | | –10,572 | | 16,572 |
| | *Std. Dev.* | *30,579* | | *39,816* | | *35,642* |
| 1997-1998 | *Mean* | 18,577 | | –2,918 | | 21,495 |
| | *Std. Dev.* | *75,133* | | *54,910* | | *43,588* |
| 1998-1999 | *Mean* | 1,361 | | –14,366 | | 15,727 |
| | *Std. Dev.* | *38,529* | | *59,154* | | *36,397* |
| 1999-2000 | *Mean* | 27,727 | | –2,746 | | 30,473 |
| | *Std. Dev.* | *173,320* | | *85,568* | | *102,117* |
| 2000-2001 | *Mean* | 56,608 | | 11,170 | | 45,438 |
| | *Std. Dev.* | *354,819* | | *293,207* | | *121,784* |
| 2001-2002 | *Mean* | –23,162 | | 46,975 | | 23,814 |
| | *Std. Dev.* | *165,826* | | *220,627* | | *61,672* |
| 2002-2003 | *Mean* | –3,404 | | –35,456 | | 32,052 |
| | *Std. Dev.* | *87,993* | | *106,884* | | *80,828* |
| 2003-2004 | *Mean* | –19,680 | | –43,432 | | 23,752 |
| | *Std. Dev.* | *165,283* | | *208,750* | | *52,647* |
| **1994-2004** | ***Mean*** | **6,142** | | **–16,527** | | **22,669** |
| | ***Std. Dev.*** | ***149,994*** | | ***142,147*** | | ***66,527*** |

**TABLE A.1.2b: Savings banks: operating profit change decomposition**
(average results, thousands of 1993 euros)

| | | Operating profit change | = | Bennet price effect | + | Bennet quantity effect |
|---|---|---|---|---|---|---|
| 1994-1995 | *Mean* | 2,750 | | –7,531 | | 10,282 |
| | *Std. Dev.* | *13,507* | | *14,959* | | *11,852* |
| 1995-1996 | *Mean* | 5,849 | | –5,370 | | 11,219 |
| | *Std. Dev.* | *13,273* | | *10,837* | | *12,317* |
| 1996-1997 | *Mean* | 5,866 | | –2,221 | | 8,087 |
| | *Std. Dev.* | *17,099* | | *18,331* | | *9,668* |
| 1997-1998 | *Mean* | 1,743 | | –10,003 | | 11,746 |
| | *Std. Dev.* | *12,461* | | *20,506* | | *17,616* |
| 1998-1999 | *Mean* | 6,117 | | –10,298 | | 16,415 |
| | *Std. Dev.* | *22,169* | | *12,434* | | *25,030* |
| 1999-2000 | *Mean* | –1,072 | | –22,794 | | 21,723 |
| | *Std. Dev.* | *28,878* | | *44,323* | | *33,051* |
| 2000-2001 | *Mean* | 3,485 | | –16,229 | | 19,713 |
| | *Std. Dev.* | *27,715* | | *31,181* | | *26,469* |
| 2001-2002 | *Mean* | –1,025 | | –18,526 | | 17,501 |
| | *Std. Dev.* | *33,078* | | *56,358* | | *28,016* |
| 2002-2003 | *Mean* | 1,773 | | –18,916 | | 20,689 |
| | *Std. Dev.* | *39,366* | | *22,368* | | *41,716* |
| 2003-2004 | *Mean* | 5,544 | | –20,552 | | 26,096 |
| | *Std. Dev.* | *34,053* | | *33,295* | | *48,383* |
| **1994-2004** | ***Mean*** | **3,158** | | **–12,973** | | **16,131** |
| | ***Std. Dev.*** | ***25,451*** | | ***29,945*** | | ***28,192*** |

**TABLE A.1.2c: Financial cooperatives: operating profit change decomposition**
(average results, thousands of 1993 euros)

| | | Operating profit change | = | Bennet price effect | + | Bennet quantity effect |
|---|---|---|---|---|---|---|
| 1994-1995 | *Mean* | 455 | | –962 | | 1,417 |
| | *Std. Dev.* | *1,616* | | *2,611* | | *2,402* |
| 1994-1995 | *Mean* | 385 | | –934 | | 1,320 |
| | *Std. Dev.* | *2,411* | | *1,600* | | *2,839* |
| 1994-1995 | *Mean* | –3 | | –937 | | 934 |
| | *Std. Dev.* | *3,368* | | *3,828* | | *2,053* |
| 1994-1995 | *Mean* | 223 | | –883 | | 1,106 |
| | *Std. Dev.* | *2,455* | | *3,183* | | *2,301* |
| 1994-1995 | *Mean* | 1,207 | | –100 | | 1,307 |
| | *Std. Dev.* | *4,123* | | *2,043* | | *3,205* |
| 1994-1995 | *Mean* | –304 | | –2,064 | | 1,760 |
| | *Std. Dev.* | *2,186* | | *4,816* | | *4,823* |
| 1994-1995 | *Mean* | 138 | | –1,650 | | 1,787 |
| | *Std. Dev.* | *2,064* | | *6,424* | | *5,002* |
| 1994-1995 | *Mean* | 183 | | –1,349 | | 1,532 |
| | *Std. Dev.* | *2,064* | | *2,336* | | *3,712* |
| 1994-1995 | *Mean* | –724 | | –3,140 | | 2,416 |
| | *Std. Dev.* | *2,522* | | *7,084* | | *6,614* |
| 1994-1995 | *Mean* | –20 | | –2,072 | | 2,051 |
| | *Std. Dev.* | *2,455* | | *7,312* | | *6,200* |
| **1994-1995** | ***Mean*** | **142** | | **–1,399** | | **1,541** |
| | ***Std. Dev.*** | ***2,624*** | | ***4,591*** | | ***4,157*** |

**TABLE A.1.3a: Comercial banks: Bennet quantity effect primal decomposition**
(average results, thousands of 1993 euros)

| | | Bennet quantity effect | = | Output quantity | – | Deposits quantity | – | Labor quantity | – | Non-financial capital quantity |
|---|---|---|---|---|---|---|---|---|---|---|
| 1994-1995 | *Mean* | 6,493 | | 18,183 | | 13,597 | | –2,152 | | 245 |
| | *Std. Dev.* | *36,143* | | *107,052* | | *74,391* | | *8,646* | | *6,596* |
| 1995-1996 | *Mean* | 14,493 | | 50,934 | | 36,433 | | –2,053 | | 2,060 |
| | *Std. Dev.* | *32,808* | | *136,335* | | *103,435* | | *8,646* | | *9,597* |
| 1996-1997 | *Mean* | 16,572 | | 48,462 | | 33,459 | | –1,765 | | 196 |
| | *Std. Dev.* | *35,642* | | *154,878* | | *119,101* | | *8,592* | | *7,025* |
| 1997-1998 | *Mean* | 21,495 | | 40,945 | | 24,551 | | –1,725 | | –3,376 |
| | *Std. Dev.* | *43,588* | | *92,692* | | *60,830* | | *5,394* | | *11,410* |
| 1998-1999 | *Mean* | 15,727 | | 26,964 | | 14,779 | | –1,706 | | –1,836 |
| | *Std. Dev.* | *36,397* | | *76,101* | | *50,421* | | *7,069* | | *4,511* |
| 1999-2000 | *Mean* | 30,473 | | 89,358 | | 48,271 | | 7,499 | | 3,116 |
| | *Std. Dev.* | *102,117* | | *425,574* | | *247,597* | | *49,378* | | *31,914* |
| 2000-2001 | *Mean* | 45,438 | | 102,448 | | 51,394 | | 3,569 | | 2,047 |
| | *Std. Dev.* | *121,784* | | *378,508* | | *209,856* | | *48,513* | | *29,901* |
| 2001-2002 | *Mean* | 23,814 | | 28,907 | | 12,876 | | –3,186 | | –4,597 |
| | *Std. Dev.* | *61,672* | | *72,572* | | *31,796* | | *21,235* | | *21,944* |
| 2002-2003 | *Mean* | 32,052 | | 47,166 | | 21,558 | | 859 | | –7,303 |
| | *Std. Dev.* | *80,828* | | *86,922* | | *43,704* | | *26,296* | | *30,533* |
| 2003-2004 | *Mean* | 23,752 | | 46,022 | | 26,994 | | 53 | | –4,778 |
| | *Std. Dev.* | *52,647* | | *75,754* | | *57,083* | | *14,273* | | *26,789* |
| **1994-2004** | ***Mean*** | **22,669** | | **49,959** | | **28,635** | | **–122** | | **–1,223** |
| | ***Std. Dev.*** | ***66,527*** | | ***203,037*** | | ***122,037*** | | ***25,005*** | | ***20,281*** |

**TABLE A.1.3b: Savings banks: Bennet quantity effect primal decomposition**
(average results, thousands of 1993 euros)

| | | Bennet quantity effect | = | Output quantity | – | Deposits quantity | – | Labor quantity | – | Non-financial capital quantity |
|---|---|---|---|---|---|---|---|---|---|---|
| 1994-1995 | *Mean* | 10,282 | | 34,247 | | 20,455 | | 722 | | 2,788 |
| | *Std. Dev.* | *11,852* | | *43,940* | | *32,735* | | *3,270* | | *8,818* |
| 1995-1996 | *Mean* | 11,219 | | 35,444 | | 19,928 | | 1,601 | | 2,697 |
| | *Std. Dev.* | *12,317* | | *53,384* | | *32,886* | | *6,295* | | *6,795* |
| 1996-1997 | *Mean* | 8,087 | | 30,734 | | 16,939 | | 2,410 | | 3,298 |
| | *Std. Dev.* | *9,668* | | *43,173* | | *27,890* | | *7,053* | | *8,118* |
| 1997-1998 | *Mean* | 11,746 | | 32,401 | | 15,600 | | 3,228 | | 1,827 |
| | *Std. Dev.* | *17,616* | | *53,503* | | *29,206* | | *8,968* | | *5,706* |
| 1998-1999 | *Mean* | 16,415 | | 35,366 | | 15,627 | | 3,178 | | 146 |
| | *Std. Dev.* | *25,030* | | *60,202* | | *29,987* | | *11,276* | | *3,778* |
| 1999-2000 | *Mean* | 21,723 | | 42,703 | | 18,264 | | 2,957 | | –241 |
| | *Std. Dev.* | *33,051* | | *72,604* | | *35,468* | | *9,809* | | *4,201* |
| 2000-2001 | *Mean* | 19,713 | | 44,880 | | 20,937 | | 3,803 | | 427 |
| | *Std. Dev.* | *26,469* | | *67,972* | | *36,178* | | *9,600* | | *4,298* |
| 2001-2002 | *Mean* | 17,501 | | 39,889 | | 18,305 | | 3,156 | | 927 |
| | *Std. Dev.* | *28,016* | | *70,821* | | *35,443* | | *7,196* | | *3,162* |
| 2002-2003 | *Mean* | 20,689 | | 41,130 | | 17,044 | | 2,443 | | 955 |
| | *Std. Dev.* | *41,716* | | *82,620* | | *37,289* | | *4,269* | | *4,368* |
| 2003-2004 | *Mean* | 26,096 | | 46,651 | | 17,440 | | 2,045 | | 1,071 |
| | *Std. Dev.* | *48,383* | | *80,172* | | *30,618* | | *3,863* | | *5,828* |
| **1994-2004** | ***Mean*** | **16,131** | | **38,118** | | **18,021** | | **2,534** | | **1,432** |
| | ***Std. Dev.*** | ***28,192*** | | ***63,365*** | | ***32,531*** | | ***7,579*** | | ***5,916*** |

**TABLE A.1.3c: Financial cooperatives: Bennet quantity effect primal decomposition**
(average results, thousands of 1993 euros)

| | | Bennet quantity effect | = | Output quantity | – | Deposits quantity | – | Labor quantity | – | Non-financial capital quantity |
|---|---|---|---|---|---|---|---|---|---|---|
| 1994-1995 | *Mean* | 1,417 | | 3,900 | | 2,029 | | 149 | | 306 |
| | *Std. Dev.* | *2,402* | | *6,657* | | *3,511* | | *386* | | *705* |
| 1995-1996 | *Mean* | 1,320 | | 3,998 | | 2,059 | | 227 | | 392 |
| | *Std. Dev.* | *2,839* | | *6,905* | | *3,392* | | *522* | | *805* |
| 1996-1997 | *Mean* | 934 | | 3,172 | | 1,428 | | 304 | | 506 |
| | *Std. Dev.* | *2,053* | | *5,995* | | *2,556* | | *845* | | *856* |
| 1997-1998 | *Mean* | 1,106 | | 2,897 | | 1,092 | | 307 | | 392 |
| | *Std. Dev.* | *2,301* | | *6,001* | | *2,268* | | *1,015* | | *931* |
| 1998-1999 | *Mean* | 1,307 | | 2,563 | | 827 | | 256 | | 174 |
| | *Std. Dev.* | *3,205* | | *5,266* | | *1,738* | | *700* | | *794* |
| 1999-2000 | *Mean* | 1,760 | | 3,454 | | 1,023 | | 389 | | 282 |
| | *Std. Dev.* | *4,823* | | *8,826* | | *2,564* | | *1,211* | | *1,094* |
| 2000-2001 | *Mean* | 1,787 | | 4,563 | | 1,736 | | 519 | | 521 |
| | *Std. Dev.* | *5,002* | | *12,182* | | *4,544* | | *1,641* | | *1,607* |
| 2001-2002 | *Mean* | 1,532 | | 3,899 | | 1,419 | | 450 | | 497 |
| | *Std. Dev.* | *3,712* | | *9,101* | | *3,239* | | *1,096* | | *1,492* |
| 2002-2003 | *Mean* | 2,416 | | 5,473 | | 1,603 | | 391 | | 1,063 |
| | *Std. Dev.* | *6,614* | | *13,978* | | *3,905* | | *1,129* | | *3,020* |
| 2003-2004 | *Mean* | 2,051 | | 3,909 | | 1,115 | | 319 | | 423 |
| | *Std. Dev.* | *6,200* | | *10,486* | | *2,822* | | *1,041* | | *894* |
| **1994-2004** | ***Mean*** | **1,541** | | **3,755** | | **1,434** | | **329** | | **451** |
| | ***Std. Dev.*** | ***4,157*** | | ***8,863*** | | ***3,145*** | | ***1,010*** | | ***1,374*** |

**TABLE A.1.4a: Commercial banks: Bennet quantity effect dual decomposition**
(average results, thousands of 1993 euros)

| | | Bennet quantity effect | = | Profit change | – | Output price | + | Deposits price | + | Labor price | + | Non-financial capital price |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1994-1995 | *Mean* | 6,493 | | –9,987 | | –7,203 | | 11,477 | | –428 | | –1,771 |
| | *Std. Dev.* | *36,143* | | *54,499* | | *137,593* | | *80,656* | | *5,105* | | *10,439* |
| 1995-1996 | *Mean* | 14,493 | | –1,988 | | –56,742 | | –39,543 | | 1,136 | | –1,854 |
| | *Std. Dev.* | *32,808* | | *40,665* | | *112,736* | | *89,868* | | *8,125* | | *12,084* |
| 1996-1997 | *Mean* | 16,572 | | 6,000 | | –137,878 | | –133,294 | | 5,444 | | 544 |
| | *Std. Dev.* | *35,642* | | *30,579* | | *305,470* | | *299,051* | | *14,848* | | *13,380* |
| 1997-1998 | *Mean* | 21,495 | | 18,577 | | –48,621 | | –50,746 | | 2,331 | | 2,712 |
| | *Std. Dev.* | *43,588* | | *75,133* | | *113,928* | | *99,965* | | *5,014* | | *10,481* |
| 1998-1999 | *Mean* | 15,727 | | 1,361 | | –59,960 | | –50,089 | | 509 | | 3,985 |
| | *Std. Dev.* | *36,397* | | *38,529* | | *155,423* | | *112,037* | | *4,484* | | *11,871* |
| 1999-2000 | *Mean* | 30,473 | | 27,727 | | 78,941 | | 66,158 | | 7,243 | | 8,287 |
| | *Std. Dev.* | *102,117* | | *173,320* | | *389,013* | | *241,592* | | *46,729* | | *29,798* |
| 2000-2001 | *Mean* | 45,438 | | 56,608 | | –38,972 | | –44,991 | | –3,649 | | –1,502 |
| | *Std. Dev.* | *121,784* | | *354,819* | | *493,993* | | *263,869* | | *42,145* | | *31,419* |
| 2001-2002 | *Mean* | 23,814 | | –23,162 | | –175,020 | | –130,318 | | –921 | | 3,194 |
| | *Std. Dev.* | *61,672* | | *165,826* | | *547,407* | | *385,438* | | *11,657* | | *16,163* |
| 2002-2003 | *Mean* | 32,052 | | –3,404 | | –107,931 | | –75,495 | | –3,420 | | 6,440 |
| | *Std. Dev.* | *80,828* | | *87,993* | | *280,582* | | *193,177* | | *16,669* | | *27,639* |
| 2003-2004 | *Mean* | 23,752 | | –19,680 | | –66,258 | | –30,632 | | 1,630 | | 6,177 |
| | *Std. Dev.* | *52,647* | | *165,283* | | *213,723* | | *63,394* | | *7,941* | | *21,488* |
| **1994-2004** | ***Mean*** | **22,669** | | **6,142** | | **–60,972** | | **–47,972** | | **1,103** | | **2,423** |
| | ***Std. Dev.*** | ***66,527*** | | ***149,994*** | | ***312,231*** | | ***214,755*** | | ***21,844*** | | ***19,809*** |

**TABLE A.1.4b: Saving banks: Bennet quantity effect dual decomposition**
(average results, thousands of 1993 euros)

| | | Bennet quantity effect | = | Profit change | – | Output price | + | Deposits price | + | Labor price | + | Non-financial capital price |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1994-1995 | *Mean* | 10,282 | | 2,750 | | –11,443 | | –298 | | –326 | | –3,288 |
| | *Std. Dev.* | *11,852* | | *13,507* | | *25,222* | | *22,763* | | *6,558* | | *10,370* |
| 1995-1996 | *Mean* | 11,219 | | 5,849 | | –27,982 | | –20,019 | | –631 | | –1,962 |
| | *Std. Dev.* | *12,317* | | *13,273* | | *45,010* | | *34,719* | | *2,846* | | *7,070* |
| 1996-1997 | *Mean* | 8,087 | | 5,866 | | –69,692 | | –67,833 | | 69 | | 293 |
| | *Std. Dev.* | *9,668* | | *17,099* | | *114,045* | | *125,097* | | *2,764* | | *11,546* |
| 1997-1998 | *Mean* | 11,746 | | 1,743 | | –55,094 | | –45,080 | | –426 | | 414 |
| | *Std. Dev.* | *17,616* | | *12,461* | | *99,032* | | *87,497* | | *7,833* | | *7,487* |
| 1998-1999 | *Mean* | 16,415 | | 6,117 | | –60,974 | | –51,325 | | –254 | | 903 |
| | *Std. Dev.* | *25,030* | | *22,169* | | *91,796* | | *89,998* | | *3,811* | | *5,834* |
| 1999-2000 | *Mean* | 21,723 | | –1,072 | | 1,110 | | 21,710 | | 611 | | 1,582 |
| | *Std. Dev.* | *33,051* | | *28,878* | | *35,215* | | *47,145* | | *4,011* | | *8,595* |
| 2000-2001 | *Mean* | 19,713 | | 3,485 | | –1,061 | | 12,113 | | 696 | | 2,359 |
| | *Std. Dev.* | *26,469* | | *27,715* | | *19,169* | | *16,546* | | *2,320* | | *6,838* |
| 2001-2002 | *Mean* | 17,501 | | –1,025 | | –59,521 | | –41,697 | | 703 | | –2 |
| | *Std. Dev.* | *28,016* | | *33,078* | | *125,073* | | *79,138* | | *3,971* | | *6,818* |
| 2002-2003 | *Mean* | 20,689 | | 1,773 | | –61,240 | | –42,339 | | 354 | | –339 |
| | *Std. Dev.* | *41,716* | | *39,366* | | *86,457* | | *79,119* | | *2,754* | | *4,212* |
| 2003-2004 | *Mean* | 26,096 | | 5,544 | | –46,176 | | –24,839 | | –274 | | –510 |
| | *Std. Dev.* | *48,383* | | *34,053* | | *66,266* | | *44,194* | | *3,047* | | *7,506* |
| **1994-2004** | ***Mean*** | **16,131** | | **3,158** | | **–39,731** | | **–26,695** | | **34** | | **–96** |
| | ***Std. Dev.*** | ***28,192*** | | ***25,451*** | | ***83,008*** | | ***76,053*** | | ***4,378*** | | ***–8,012*** |

**TABLE A.1.4c: Financial cooperatives: Bennet quantity effect dual decomposition**
(average results, thousands of 1993 euros)

| | | Bennet quantity effect | = | Profit change | – | Output price | + | Deposits price | + | Labor price | + | Non-financial capital price |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1994-1995 | *Mean* | 1,417 | | 455 | | –1,324 | | –119 | | –74 | | –169 |
| | *Std. Dev.* | *2,402* | | *1,616* | | *2,882* | | *1,556* | | *383* | | *831* |
| 1995-1996 | *Mean* | 1,320 | | 385 | | –2,412 | | –1,339 | | 50 | | –188 |
| | *Std. Dev.* | *2,839* | | *2,411* | | *4,104* | | *3,137* | | *320* | | *531* |
| 1996-1997 | *Mean* | 934 | | –3 | | –7,039 | | –5,977 | | –7 | | –118 |
| | *Std. Dev.* | *2,053* | | *3,368* | | *13,655* | | *9,944* | | *243* | | *573* |
| 1997-1998 | *Mean* | 1,106 | | 223 | | –4,353 | | –3,545 | | 14 | | 61 |
| | *Std. Dev.* | *2,301* | | *2,455* | | *7,073* | | *5,636* | | *432* | | *1,692* |
| 1998-1999 | *Mean* | 1,307 | | 1,207 | | –4,168 | | –3,799 | | –64 | | –206 |
| | *Std. Dev.* | *3,205* | | *4,123* | | *6,563* | | *6,595* | | *305* | | *1,167* |
| 1999-2000 | *Mean* | 1,760 | | –304 | | –464 | | 1,574 | | 131 | | –105 |
| | *Std. Dev.* | *4,823* | | *2,186* | | *3,803* | | *4,135* | | *993* | | *1,336* |
| 2000-2001 | *Mean* | 1,787 | | 138 | | –390 | | 1,345 | | –21 | | –65 |
| | *Std. Dev.* | *5,002* | | *2,169* | | *5,647* | | *2,176* | | *326* | | *928* |
| 2001-2002 | *Mean* | 1,532 | | 183 | | –4,493 | | –2,872 | | –33 | | –238 |
| | *Std. Dev.* | *3,712* | | *2,064* | | *9,169* | | *6,144* | | *482* | | *1,214* |
| 2002-2003 | *Mean* | 2,416 | | –724 | | –7,416 | | –3,431 | | –88 | | –757 |
| | *Std. Dev.* | *6,614* | | *2,522* | | *16,016* | | *6,727* | | *726* | | *3,406* |
| 2003-2004 | *Mean* | 2,051 | | –20 | | –4,208 | | –1,761 | | 11 | | –386 |
| | *Std. Dev.* | *6,200* | | *2,455* | | *11,079* | | *3,171* | | *552* | | *942* |
| **1994-2004** | ***Mean*** | **1,541** | | **142** | | **–3,607** | | **–1,987** | | **–9** | | **–211** |
| | ***Std. Dev.*** | ***4,157*** | | ***2,624*** | | ***9,190*** | | ***5,937*** | | ***520*** | | ***1,473*** |

**TABLE A.1.5a: Commercial banks: Bennet quantity effect decomposition**
(average results, thousands of 1993 euros)

| | | Bennet quantity effect | Margin effect | + | Productivity effect | Productivity effect | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Cost efficiency effect | + | Technical change effect | + | Scale effect |
| 1994-1995 | *Mean* | 6,493 | 2,786 | | 3,707 | –13,665 | | 14,841 | | 2,531 |
| | *Std. Dev.* | *36,143* | *5,867* | | *32,916* | *75,435* | | *52,778* | | *13,039* |
| 1995-1996 | *Mean* | 14,493 | 5,018 | | 9,476 | –9,002 | | 25,242 | | –6,764 |
| | *Std. Dev.* | *32,808* | *9,959* | | *30,301* | *26,240* | | *68,688* | | *37,053* |
| 1996-1997 | *Mean* | 16,572 | 5,129 | | 11,443 | –3,607 | | 24,162 | | –9,112 |
| | *Std. Dev.* | *35,642* | *13,981* | | *32,020* | *23,527* | | *91,498* | | *65,242* |
| 1997-1998 | *Mean* | 21,495 | 8,375 | | 13,120 | 852 | | 18,917 | | –6,649 |
| | *Std. Dev.* | *43,588* | *16,871* | | *34,595* | *3,862* | | *71,846* | | *47,675* |
| 1998-1999 | *Mean* | 15,727 | 8,284 | | 7,443 | 3,843 | | 8,261 | | –4,661 |
| | *Std. Dev.* | *36,397* | *15,937* | | *24,173* | *11,655* | | *50,662* | | *28,821* |
| 1999-2000 | *Mean* | 30,473 | 16,370 | | 14,103 | 2,016 | | 13,684 | | –1,597 |
| | *Std. Dev.* | *102,117* | *46,012* | | *57,120* | *29,206* | | *84,559* | | *7,480* |
| 2000-2001 | *Mean* | 45,438 | 22,194 | | 23,244 | 10,121 | | 22,414 | | –9,291 |
| | *Std. Dev.* | *121,784* | *63,119* | | *77,454* | *28,262* | | *93,686* | | *59,981* |
| 2001-2002 | *Mean* | 23,814 | 10,735 | | 13,078 | 920 | | 9,550 | | 2,609 |
| | *Std. Dev.* | *61,672* | *26,185* | | *50,117* | *18,419* | | *45,962* | | *16,440* |
| 2002-2003 | *Mean* | 32,052 | 15,839 | | 16,213 | 1,273 | | 26,113 | | –11,173 |
| | *Std. Dev.* | *80,828* | *29,519* | | *64,615* | *27,252* | | *93,694* | | *66,621* |
| 2003-2004 | *Mean* | 23,752 | 16,886 | | 6,867 | –1,668 | | 23,545 | | –15,010 |
| | *Std. Dev.* | *52,647* | *28,964* | | *45,145* | *21,171* | | *78,628* | | *85,634* |
| **1994-2004** | ***Mean*** | **22,669** | **10,814** | | **11,854** | **–982** | | **18,621** | | **–5,784** |
| | ***Std. Dev.*** | ***66,527*** | ***30,498*** | | ***46,720*** | ***32,336*** | | ***74,457*** | | ***48,268*** |

**TABLE A.1.5b: Saving banks: Bennet quantity effect decomposition**
(average results, thousands of 1993 euros)

| | | Bennet quantity effect | Margin effect | + | Productivity effect | Productivity effect | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Cost efficiency effect | + Technical change effect | + | Scale effect |
| 1994-1995 | *Mean* | 10,282 | 9,684 | | 598 | –6,021 | 6,750 | | -131 |
| | *Std. Dev.* | *11,852* | *8,640* | | *8,584* | *29,308* | *24,500* | | *1,202* |
| 1995-1996 | *Mean* | 11,219 | 9,833 | | 1,386 | –6,898 | 8,025 | | 258 |
| | *Std. Dev.* | *12,317* | *10,503* | | *5,526* | *18,187* | *16,736* | | *1,243* |
| 1996-1997 | *Mean* | 8,087 | 10,061 | | –1,974 | –6,434 | 4,443 | | 17 |
| | *Std. Dev.* | *9,668* | *11,202* | | *8,778* | *18,034* | *10,064* | | *1,032* |
| 1997-1998 | *Mean* | 11,746 | 12,360 | | –614 | –5,957 | 5,157 | | 187 |
| | *Std. Dev.* | *17,616* | *17,082* | | *7,469* | *15,302* | *9,496* | | *911* |
| 1998-1999 | *Mean* | 16,415 | 15,397 | | 1,018 | 884 | 501 | | –368 |
| | *Std. Dev.* | *25,030* | *22,915* | | *10,586* | *10,605* | *254* | | *307* |
| 1999-2000 | *Mean* | 21,723 | 18,157 | | 3,566 | 3,646 | 392 | | –472 |
| | *Std. Dev.* | *33,051* | *27,144* | | *11,010* | *10,935* | *638* | | *403* |
| 2000-2001 | *Mean* | 19,713 | 17,067 | | 2,647 | 485 | 2,473 | | –311 |
| | *Std. Dev.* | *26,469* | *22,076* | | *12,226* | *11,526* | *2,650* | | *643* |
| 2001-2002 | *Mean* | 17,501 | 15,337 | | 2,163 | 430 | 2,196 | | –462 |
| | *Std. Dev.* | *28,016* | *23,558* | | *5,894* | *4,579* | *3,928* | | *1,493* |
| 2002-2003 | *Mean* | 20,689 | 15,899 | | 4,790 | –1,478 | 5,966 | | 302 |
| | *Std. Dev.* | *41,716* | *26,538* | | *16,112* | *6,421* | *18,625* | | *2,508* |
| 2003-2004 | *Mean* | 26,096 | 19,134 | | 6,962 | 175 | 6,445 | | 342 |
| | *Std. Dev.* | *48,383* | *29,950* | | *20,123* | *6,928* | *13,860* | | *1,552* |
| **1994-2004** | ***Mean*** | **16,131** | **14,159** | | **1,968** | **–2,263** | **4,292** | | **–57** |
| | ***Std. Dev.*** | ***28,192*** | ***21,075*** | | ***11,541*** | ***15,428*** | ***13,043*** | | ***1,304*** |

**TABLE A.1.5c: Financial cooperatives: Bennet quantity effect decomposition**
(average results, thousands of 1993 euros)

| | | Bennet quantity effect | Margin effect | + | Productivity effect | Productivity effect: Cost efficiency effect | + | Productivity effect: Technical change effect | + | Productivity effect: Scale effect |
|---|---|---|---|---|---|---|---|---|---|---|
| 1994-1995 | *Mean* | 1,417 | 1,468 | | –51 | –536 | | 421 | | 64 |
| | *Std. Dev.* | *2,402* | *2,551* | | *680* | *1,030* | | *704* | | *96* |
| 1995-1996 | *Mean* | 1,320 | 1,487 | | –167 | –1,710 | | 1,405 | | 138 |
| | *Std. Dev.* | *2,839* | *2,662* | | *1,029* | *1,675* | | *1,388* | | *165* |
| 1996-1997 | *Mean* | 934 | 1,460 | | –526 | –608 | | 134 | | –52 |
| | *Std. Dev.* | *2,053* | *2,912* | | *1,059* | *1,283* | | *431* | | *302* |
| 1997-1998 | *Mean* | 1,106 | 1,508 | | –401 | –606 | | 199 | | 5 |
| | *Std. Dev.* | *2,301* | *3,107* | | *1,397* | *1,638* | | *578* | | *103* |
| 1998-1999 | *Mean* | 1,307 | 1,485 | | –179 | –259 | | 81 | | –1 |
| | *Std. Dev.* | *3,205* | *2,977* | | *1,306* | *1,326* | | *135* | | *129* |
| 1999-2000 | *Mean* | 1,760 | 2,057 | | –297 | –279 | | 21 | | –38 |
| | *Std. Dev.* | *4,823* | *5,257* | | *1,782* | *1,694* | | *40* | | *221* |
| 2000-2001 | *Mean* | 1,787 | 2,435 | | –648 | –728 | | 118 | | –38 |
| | *Std. Dev.* | *5,002* | *6,516* | | *2,319* | *2,292* | | *363* | | *198* |
| 2001-2002 | *Mean* | 1,532 | 2,059 | | –527 | –553 | | 55 | | –30 |
| | *Std. Dev.* | *3,712* | *4,880* | | *1,681* | *1,707* | | *283* | | *131* |
| 2002-2003 | *Mean* | 2,416 | 3,182 | | –766 | –1,009 | | 291 | | –48 |
| | *Std. Dev.* | *6,614* | *8,520* | | *2,144* | *2,053* | | *426* | | *424* |
| 2003-2004 | *Mean* | 2,051 | 2,227 | | –176 | –384 | | 216 | | –8 |
| | *Std. Dev.* | *6,200* | *5,989* | | *953* | *884* | | *619* | | *118* |
| **1994-2004** | ***Mean*** | **1,541** | **1,914** | | **–372** | **–672** | | **298** | | **1** |
| | ***Std. Dev.*** | ***4,157*** | ***4,864*** | | ***1,513*** | ***1,644*** | | ***729*** | | ***218*** |

# Appendix 2

**TABLE A.2.1: Return on assets: Spanish commercial banks**
(percentages)

| | Average ROA | ROA (product) | = | Average [operating profit/revenue] | x | Average [revenue/assets] |
|---|---|---|---|---|---|---|
| 1994 | 0.362 | 1.179 | | 12.873 | | 9.161 |
| 1995 | 0.741 | 0.686 | | 6.896 | | 9.951 |
| 1996 | 0.684 | 0.586 | | 6.435 | | 9.107 |
| 1997 | 0.876 | 0.752 | | 9.873 | | 7.617 |
| 1998 | 0.933 | 0.817 | | 12.022 | | 6.793 |
| 1999 | 0.762 | 1.581 | | 27.870 | | 5.672 |
| 2000 | 0.914 | 0.840 | | 12.955 | | 6.481 |
| 2001 | 0.737 | 0.425 | | 6.705 | | 6.335 |
| 2002 | 0.552 | 0.323 | | 5.782 | | 5.581 |
| 2003 | 0.605 | 0.623 | | 12.174 | | 5.114 |
| 2004 | 0.398 | 0.305 | | 6.587 | | 4.629 |

**TABLE A.2.2: Return on assets: Spanish commercial banks (two observations deleted)**
(percentages)

| | Average ROA | ROA (product) | = | Average [operating profit/revenue] | x | Average [revenue/assets] |
|---|---|---|---|---|---|---|
| 1994 | 0.591 | 0.408 | | 4.377 | | 9.316 |
| 1995 | 0.788 | 0.737 | | 7.408 | | 9.946 |
| 1996 | 0.829 | 0.617 | | 6.722 | | 9.184 |
| 1997 | 1.011 | 0.839 | | 10.895 | | 7.703 |
| 1998 | 1.071 | 0.896 | | 13.055 | | 6.862 |
| 2000 | 1.066 | 0.975 | | 15.232 | | 6.403 |
| 2001 | 1.024 | 0.814 | | 12.616 | | 6.449 |
| 2002 | 0.832 | 0.460 | | 8.063 | | 5.708 |
| 2003 | 0.700 | 0.763 | | 15.021 | | 5.081 |
| 2004 | 0.689 | 0.430 | | 9.105 | | 4.718 |

**TABLE A.2.3: Return on assets: Spanish savings banks**
(percentages)

| | Average ROA | ROA (product) | = | Average [operating profit/revenue] | x | Average [revenue/assets] |
|---|---|---|---|---|---|---|
| 1994 | 1.133 | 1.126 | | 12.180 | | 9.242 |
| 1995 | 1.114 | 1.107 | | 11.838 | | 9.349 |
| 1996 | 1.184 | 1.180 | | 13.097 | | 9.013 |
| 1997 | 1.228 | 1.225 | | 16.251 | | 7.539 |
| 1998 | 1.231 | 1.233 | | 18.887 | | 6.527 |
| 1999 | 1.141 | 1.144 | | 21.018 | | 5.442 |
| 2000 | 0.999 | 0.991 | | 17.998 | | 5.509 |
| 2001 | 1.003 | 0.997 | | 17.430 | | 5.722 |
| 2002 | 0.968 | 0.964 | | 18.557 | | 5.196 |
| 2003 | 0.847 | 0.849 | | 18.724 | | 4.533 |
| 2004 | 0.784 | 0.787 | | 19.206 | | 4.099 |

**TABLE A.2.4: Return on assets: Spanish financial cooperatives**
(percentages)

| | Average ROA | ROA (product) | = | Average [operating profit/revenue] | x | Average [revenue/assets] |
|---|---|---|---|---|---|---|
| 1994 | 1.306 | 1.276 | | 13.453 | | 9.485 |
| 1995 | 1.448 | 1.427 | | 14.977 | | 9.528 |
| 1996 | 1.461 | 1.432 | | 14.626 | | 9.794 |
| 1997 | 1.368 | 1.352 | | 18.047 | | 7.493 |
| 1998 | 1.287 | 1.274 | | 19.814 | | 6.429 |
| 1999 | 1.342 | 1.329 | | 24.070 | | 5.523 |
| 2000 | 1.119 | 1.093 | | 19.775 | | 5.525 |
| 2001 | 1.123 | 1.124 | | 19.295 | | 5.823 |
| 2002 | 1.051 | 1.068 | | 19.424 | | 5.500 |
| 2003 | 0.807 | 0.781 | | 17.138 | | 4.558 |
| 2004 | 0.773 | 0.752 | | 18.329 | | 4.105 |

**TABLE A.2.5: Margin effect decomposition: Spanish commercial banks**
(average results, thousands of 1993 euros)

| | | Margin effect | Margin effect (product) | = | $\frac{[\bar{p} - (\sum \bar{w}x_{CE})/\ y]}{\bar{p}}$ (percentages) | × | $(y^{t+1} - y^t)\ \bar{p}$ |
|---|---|---|---|---|---|---|---|
| 1994-1995 | *Mean* | 2,786 | 3,900 | | 21.45 | | 18,183 |
| | *Std. Dev.* | *5,867* | | | *24.31* | | *107,052* |
| 1995-1996 | *Mean* | 5,018 | 13,166 | | 25.85 | | 50,934 |
| | *Std. Dev.* | *9,959* | | | *14.25* | | *136,335* |
| 1996-1997 | *Mean* | 5,129 | 15,432 | | 31.84 | | 48,462 |
| | *Std. Dev.* | *13,981* | | | *16.27* | | *154,878* |
| 1997-1998 | *Mean* | 8,375 | 15,609 | | | | 38.1240,945 |
| | *Std. Dev.* | *16,871* | | | *17.21* | | *92,692* |
| 1998-1999 | *Mean* | 8,284 | 11,052 | | 40.99 | | 26,964 |
| | *Std. Dev.* | *15,937* | | | *36.10* | | *76,101* |
| 1999-2000 | *Mean* | 16,370 | 37,411 | | 41.87 | | 89,358 |
| | *Std. Dev.* | *46,012* | | | *31.04* | | *425,574* |
| 2000-2001 | *Mean* | 22,194 | 39,290 | | 38.35 | | 102,448 |
| | *Std. Dev.* | *63,119* | | | *18.99* | | *378,508* |
| 2001-2002 | *Mean* | 10,735 | 10,680 | | 36.95 | | 28,907 |
| | *Std. Dev.* | *26,185* | | | *17.94* | | *72,572* |
| 2002-2003 | *Mean* | 15,839 | 19,058 | | 40.41 | | 47,166 |
| | *Std. Dev.* | *29,519* | | | *17.18* | | *86,922* |
| 2003-2004 | *Mean* | 16,886 | 19,576 | | 42.54 | | 46,022 |
| | *Std. Dev.* | *28,964* | | | *19.16* | | *75,754* |

**TABLE A.2.6: Margin effect decomposition: Spanish commercial banks (two observations deleted)**
(average results, thousands of 1993 euros)

| | | Margin effect | Margin effect (product) | = | $\frac{[\bar{p} - (\sum \bar{w}x_{CE})/y]}{\bar{p}}$ (percentages) | × | $(y^{t+1} - y^t)\,\bar{p}$ |
|---|---|---|---|---|---|---|---|
| 1994-1995 | *Mean* | 2,787 | 4,604 | | 23.98 | | 19,202 |
| | *Std. Dev.* | *6,010* | | | *14.73* | | *109,807* |
| 1995-1996 | *Mean* | 5,286 | 13,780 | | 25.74 | | 53,528 |
| | *Std. Dev.* | *10,125* | | | *14.56* | | *139,168* |
| 1996-1997 | *Mean* | 5,326 | 16,304 | | 32.24 | | 50,569 |
| | *Std. Dev.* | *14,288* | | | *16.52* | | *158,294* |
| 1997-1998 | *Mean* | 8,757 | 16,662 | | 38.89 | | 42,841 |
| | *Std. Dev.* | *17,183* | | | *16.79* | | *94,497* |
| 1998-1999 | *Mean* | 8,635 | 13,010 | | 45.80 | | 28,403 |
| | *Std. Dev.* | *16,252* | | | *16.74* | | *77,741* |
| 1999-2000 | *Mean* | 17,159 | 42,810 | | 45.43 | | 94,237 |
| | *Std. Dev.* | *47,140* | | | *17.46* | | *436,690* |
| 2000-2001 | *Mean* | 23,314 | 42,168 | | 39.15 | | 107,713 |
| | *Std. Dev.* | *64,603* | | | *17.17* | | *387,870* |
| 2001-2002 | *Mean* | 11,359 | 11,781 | | 38.57 | | 30,546 |
| | *Std. Dev.* | *26,833* | | | *16.23* | | *74,405* |
| 2002-2003 | *Mean* | 16,878 | 20,212 | | 40.23 | | 50,239 |
| | *Std. Dev.* | *30,144* | | | *17.63* | | *88,752* |
| 2003-2004 | *Mean* | 18,066 | 20,726 | | 42.12 | | 49,203 |
| | *Std. Dev.* | *29,558* | | | *19.67* | | *77,246* |

**TABLE A.2.7: Margin effect decomposition: Spanish savings banks**
(average results, thousands of 1993 euros)

| | | Margin effect | Margin effect (product) | = | $\frac{[\bar{p} - (\sum \bar{w}x_{CE})/y]}{\bar{p}}$ (percentages) | × | $(y^{t+1} - y^t)\,\bar{p}$ |
|---|---|---|---|---|---|---|---|
| 1994-1995 | *Mean* | 9,684 | 11,375 | | 33.22 | | 34,247 |
| | *Std. Dev.* | *8,640* | | | *7.88* | | *43,940* |
| 1995-1996 | *Mean* | 9,833 | 11,781 | | 33.24 | | 35,444 |
| | *Std. Dev.* | *10,503* | | | *7.56* | | *53,384* |
| 1996-1997 | *Mean* | 10,061 | 11,753 | | 38.24 | | 30,734 |
| | *Std. Dev.* | *11,202* | | | *7.82* | | *43,173* |
| 1997-1998 | *Mean* | 12,360 | 14,270 | | 44.04 | | 32,401 |
| | *Std. Dev.* | *17,082* | | | *7.79* | | *53,503* |
| 1998-1999 | *Mean* | 15,397 | 17,545 | | 49.61 | | 35,366 |
| | *Std. Dev.* | *22,915* | | | *8.08* | | *60,202* |
| 1999-2000 | *Mean* | 18,157 | 21,303 | | 49.89 | | 42,703 |
| | *Std. Dev.* | *27,144* | | | *8.76* | | *72,604* |
| 2000-2001 | *Mean* | 17,067 | 20,121 | | 44.83 | | 44,880 |
| | *Std. Dev.* | *22,076* | | | *8.90* | | *67,972* |
| 2001-2002 | *Mean* | 15,337 | 17,419 | | 43.67 | | 39,889 |
| | *Std. Dev.* | *23,558* | | | *8.39* | | *70,821* |
| 2002-2003 | *Mean* | 15,899 | 18,467 | | 44.90 | | 41,130 |
| | *Std. Dev.* | *26,538* | | | *8.02* | | *82,620* |
| 2003-2004 | *Mean* | 19,134 | 21,392 | | 45.86 | | 46,651 |
| | *Std. Dev.* | *29,950* | | | *7.71* | | *80,172* |

**TABLE A.2.8: Margin effect decomposition: Spanish financial cooperatives**
(average results, thousands of 1993 euros)

| | | Margin effect | Margin effect (product) | = | $\frac{[\bar{p} - (\sum \bar{w}x_{CE})/y]}{\bar{p}}$ (percentages) | × | $(y^{t+1} - y^t)\,\bar{p}$ |
|---|---|---|---|---|---|---|---|
| 1994-1995 | *Mean* | 1,468 | 1,353 | | 34.68 | | 3,900 |
| | *Std. Dev.* | *2,551* | | | *9.84* | | *6,657* |
| 1995-1996 | *Mean* | 1,487 | 1,410 | | 35.26 | | 3,998 |
| | *Std. Dev.* | *2,662* | | | *9.41* | | *6,905* |
| 1996-1997 | *Mean* | 1,460 | 1,375 | | 43.35 | | 3,172 |
| | *Std. Dev.* | *2,912* | | | *9.46* | | *5,995* |
| 1997-1998 | *Mean* | 1,508 | 1,447 | | 49.94 | | 2,897 |
| | *Std. Dev.* | *3,107* | | | *8.88* | | *6,001* |
| 1998-1999 | *Mean* | 1,485 | 1,434 | | 55.94 | | 2,563 |
| | *Std. Dev.* | *2,977* | | | *9.08* | | *5,266* |
| 1999-2000 | *Mean* | 2,057 | 1,973 | | 57.12 | | 3,454 |
| | *Std. Dev.* | *5,257* | | | *9.26* | | *8,826* |
| 2000-2001 | *Mean* | 2,435 | 2,397 | | 52.54 | | 4,563 |
| | *Std. Dev.* | *6,516* | | | *8.89* | | *12,182* |
| 2001-2002 | *Mean* | 2,059 | 2,032 | | 52.13 | | 3,899 |
| | *Std. Dev.* | *4,880* | | | *8.61* | | *9,101* |
| 2002-2003 | *Mean* | 3,182 | 2,990 | | 54.62 | | 5,473 |
| | *Std. Dev.* | *8,520* | | | *8.55* | | *13,978* |
| 2003-2004 | *Mean* | 2,227 | 2,224 | | 56.90 | | 3,909 |
| | *Std. Dev.* | *5,989* | | | *8.82* | | *10,486* |

**TABLE A.2.9: Cost efficiency = efficient cost/actual cost**
(average results in percentages)

| | | Commercial banks | Savings banks | Financial cooperatives | All institutions |
|---|---|---|---|---|---|
| 1994 | *Mean* | 79.36 | 74.55 | 75.03 | 76.04 |
| | *Std. Dev.* | *12.13* | *8.34* | *11.63* | *10.92* |
| 1995 | *Mean* | 79.59 | 75.71 | 75.60 | 76.78 |
| | *Std. Dev.* | *11.57* | *7.90* | *10.45* | *10.14* |
| 1996 | *Mean* | 75.27 | 73.77 | 69.98 | 72.74 |
| | *Std. Dev.* | *13.01* | *8.62* | *10.76* | *11.01* |
| 1997 | *Mean* | 70.87 | 69.13 | 63.94 | 67.63 |
| | *Std. Dev.* | *14.73* | *9.51* | *11.44* | *12.23* |
| 1998 | *Mean* | 66.14 | 64.96 | 58.92 | 62.90 |
| | *Std. Dev.* | *16.55* | *10.11* | *12.30* | *13.36* |
| 1999 | *Mean* | 60.89 | 60.05 | 53.15 | 57.43 |
| | *Std. Dev.* | *18.95* | *10.91* | *13.56* | *14.87* |
| 2000 | *Mean* | 68.14 | 65.32 | 57.65 | 63.08 |
| | *Std. Dev.* | *17.79* | *11.04* | *13.46* | *14.83* |
| 2001 | *Mean* | 72.20 | 69.22 | 61.40 | 66.97 |
| | *Std. Dev.* | *17.23* | *10.18* | *12.03* | *13.80* |
| 2002 | *Mean* | 69.39 | 68.40 | 57.30 | 64.18 |
| | *Std. Dev.* | *18.21* | *10.02* | *11.69* | *14.25* |
| 2003 | *Mean* | 66.76 | 66.54 | 53.32 | 61.19 |
| | *Std. Dev.* | *21.24* | *10.08* | *11.85* | *15.54* |
| 2004 | *Mean* | 66.34 | 66.06 | 51.64 | 60.17 |
| | *Std. Dev.* | *22.17* | *10.11* | *12.11* | *16.18* |

**TABLE A.2.10: Real cost-efficient margin** $[\bar{p} - (\sum \bar{w}x_{CE})/y]$
(average results in percentages)

| | | Commercial banks | Savings banks | Financial cooperatives | All institutions |
|---|---|---|---|---|---|
| 1994 | *Mean* | 2.39 | 3.14 | 3.34 | 3.01 |
| | *Std. Dev.* | *1.95* | *0.83* | *1.10* | *1.37* |
| 1995 | *Mean* | 2.48 | 2.96 | 3.20 | 2.92 |
| | *Std. Dev.* | *1.50* | *0.74* | *1.02* | *1.14* |
| 1996 | *Mean* | 2.59 | 2.99 | 3.40 | 3.03 |
| | *Std. Dev.* | *1.53* | *0.72* | *0.92* | *1.12* |
| 1997 | *Mean* | 2.63 | 2.86 | 3.20 | 2.93 |
| | *Std. Dev.* | *1.43* | *0.63* | *0.75* | *0.99* |
| 1998 | *Mean* | 2.57 | 2.70 | 3.01 | 2.79 |
| | *Std. Dev.* | *1.56* | *0.56* | *0.68* | *0.99* |
| 1999 | *Mean* | 2.44 | 2.41 | 2.76 | 2.56 |
| | *Std. Dev.* | *1.56* | *0.53* | *0.63* | *0.96* |
| 2000 | *Mean* | 2.19 | 2.15 | 2.52 | 2.31 |
| | *Std. Dev.* | *1.31* | *0.52* | *0.59* | *0.86* |
| 2001 | *Mean* | 1.92 | 1.96 | 2.37 | 2.11 |
| | *Std. Dev.* | *1.14* | *0.47* | *0.53* | *0.75* |
| 2002 | *Mean* | 1.79 | 1.74 | 2.17 | 1.93 |
| | *Std. Dev.* | *1.02* | *0.40* | *0.57* | *0.70* |
| 2003 | *Mean* | 1.69 | 1.52 | 1.89 | 1.71 |
| | *Std. Dev.* | *1.03* | *0.34* | *0.44* | *0.63* |

**TABLE A.2.11: Real actual margin** $[\bar{p} - (\sum \bar{w}x)/y]$
(average results in percentages)

| | | Commercial banks | Savings banks | Financial cooperatives | All institutions |
|---|---|---|---|---|---|
| 1994 | *Mean* | 0.44 | 0.99 | 1.22 | 0.93 |
| | *Std. Dev.* | *1.47* | *0.51* | *0.64* | *0.96* |
| 1995 | *Mean* | 0.58 | 1.00 | 1.26 | 0.98 |
| | *Std. Dev.* | *1.26* | *0.46* | *0.63* | *0.86* |
| 1996 | *Mean* | 0.55 | 1.07 | 1.23 | 0.99 |
| | *Std. Dev.* | *1.32* | *0.39* | *0.59* | *0.87* |
| 1997 | *Mean* | 0.71 | 1.07 | 1.16 | 1.00 |
| | *Std. Dev.* | *1.22* | *0.33* | *0.49* | *0.76* |
| 1998 | *Mean* | 0.64 | 0.98 | 1.09 | 0.93 |
| | *Std. Dev.* | *1.43* | *0.33* | *0.45* | *0.85* |
| 1999 | *Mean* | 0.53 | 0.85 | 0.99 | 0.82 |
| | *Std. Dev.* | *1.62* | *0.34* | *0.41* | *0.92* |
| 2000 | *Mean* | 0.49 | 0.78 | 0.89 | 0.74 |
| | *Std. Dev.* | *1.46* | *0.32* | *0.39* | *0.85* |
| 2001 | *Mean* | 0.43 | 0.74 | 0.85 | 0.70 |
| | *Std. Dev.* | *1.62* | *0.31* | *0.35* | *0.90* |
| 2002 | *Mean* | 0.31 | 0.65 | 0.65 | 0.57 |
| | *Std. Dev.* | *1.50* | *0.26* | *0.37* | *0.81* |
| 2003 | *Mean* | 0.21 | 0.55 | 0.55 | 0.46 |
| | *Std. Dev.* | *1.50* | *0.19* | *0.31* | *0.78* |

**TABLE A.2.12: Actual unit cost minus cost-efficient unit cost**
(average results in percentages)

| | | Commercial banks | Savings banks | Financial cooperatives | All institutions |
|---|---|---|---|---|---|
| 1994 | *Mean* | 1.94 | 2.15 | 2.12 | 2.08 |
| | *Std. Dev.* | *1.45* | *0.78* | *1.10* | *1.11* |
| 1995 | *Mean* | 1.90 | 1.96 | 1.94 | 1.94 |
| | *Std. Dev.* | *1.36* | *0.70* | *0.90* | *0.99* |
| 1996 | *Mean* | 2.04 | 1.91 | 2.17 | 2.05 |
| | *Std. Dev.* | *1.34* | *0.70* | *0.87* | *0.98* |
| 1997 | *Mean* | 1.91 | 1.80 | 2.04 | 1.92 |
| | *Std. Dev.* | *1.23* | *0.63* | *0.76* | *0.89* |
| 1998 | *Mean* | 1.93 | 1.72 | 1.91 | 1.86 |
| | *Std. Dev.* | *1.34* | *0.58* | *0.68* | *0.89* |
| 1999 | *Mean* | 1.91 | 1.57 | 1.77 | 1.74 |
| | *Std. Dev.* | *1.64* | *0.56* | *0.65* | *1.00* |
| 2000 | *Mean* | 1.70 | 1.38 | 1.63 | 1.57 |
| | *Std. Dev.* | *1.64* | *0.51* | *0.64* | *1.01* |
| 2001 | *Mean* | 1.50 | 1.23 | 1.52 | 1.41 |
| | *Std. Dev.* | *1.48* | *0.48* | *0.58* | *0.90* |
| 2002 | *Mean* | 1.48 | 1.08 | 1.52 | 1.36 |
| | *Std. Dev.* | *1.71* | *0.42* | *0.65* | *1.00* |
| 2003 | *Mean* | 1.48 | 0.97 | 1.34 | 1.25 |
| | *Std. Dev.* | *1.91* | *0.37* | *0.45* | *1.02* |

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