

## D WHAT DETERMINES EURO AREA BANK PROFITABILITY?

*Banks are key components of the euro area financial system. Understanding the interplay between banks and their operating environment assists in identifying sources of risk and vulnerability within the system. This Special Feature attempts to examine the empirical importance of bank-specific, market structure and macro-financial factors on euro area banks' financial performance over the last decade or so.*

### INTRODUCTION

Healthy and sustainable banking sector profitability is vital for maintaining the stability of the financial system. Even if solvency is robust, weak profitability can, by weakening the capacity of the system to absorb adverse disturbances, sow the seeds of future vulnerabilities. This Special Feature empirically examines factors that may drive profitability, measured by return on equity (ROE), among a panel of large banks in the euro area, based on individual banks' annual accounting data over the period 1993-2004. It builds on previous work in this area by trying to incorporate bank-specific, market structure and macroeconomic factors simultaneously in an empirical model and over a longer time period than previous studies.

The main findings are that bank profits tend to be persistent over time, though the inclusion of different explanatory variables weakens the statistical significance of this finding. Growth in total assets is positively related to profitability. Banks' equity capital appears to be positively related to profitability, although the evidence for this is somewhat mixed, depending on the control variables included. Finally, the macroeconomic environment, as captured by real GDP growth, positively influences bank profitability, a finding reported by banks themselves.<sup>1</sup> Overall, the results point to a need to improve understanding of the interplay between the

macroeconomic environment and the banking sector.

The reminder of this Special Feature is organised as follows: first a brief review of the relevant literature is provided; then, it provides an overview of the data and empirical methodology; and finally, it summarises the results and conclusions.

### FACTORS INFLUENCING BANK PROFITABILITY

Banks' earnings, or profitability, are one of the main indicators used to make assessments of the health of individual banks and, at the aggregate level, the banking system as a whole.<sup>2</sup> The question as to what determines bank profitability can, of course, be approached from several different angles. For simplicity, these factors are discussed under three main headings: bank-specific factors; market structure factors; and macro-financial factors identified in the previous work in the area.<sup>3</sup>

#### BANK-SPECIFIC FACTORS

Banks may differ in terms of their competitive strategy, efficiency, asset and liability diversification, and the way they manage capital and credit risk. The strategy and internal operations of an international bank whose balance sheet is measured in billions of

1 See Box 12 "Survey on major EU banks' perception of risks in the year ahead" in this Review.

2 A complementary approach, not employed in this Special Feature, utilises measures of profitability derived from equity markets, and relates these to bank-specific and business cycle variables. See L. Baele, R. Vander Vennet and O. De Jonghe (2004), "Bank Risks and the Business Cycle", University of Ghent, *Department of Economics Working Paper* No 264. Other approaches use banks' equity and debt prices as inputs in order to calculate forward-looking market indicators and measures of contagion risk from one bank to another; see for example R. Gropp, J. Vesala and G. Vulpes (2005), "Equity and Bond Market Signals as Leading Indicators of Bank Fragility", *Journal of Money, Credit and Banking*, forthcoming.

3 More expansive reviews can be found in A. Berger (1995), "The Relationship between Capital and Earnings in Banking", *Journal of Money, Credit and Banking*, 27 (2), May; J. Goddard, P. Molyneux and J. Wilson (2004), "Dynamics of Growth and Profitability in Banking", *Journal of Money, Credit and Banking*, 36 (6); and C. Northcott (2004), "Competition in Banking: A Review of the Literature", *Bank of Canada Working Paper* No 24.

euro is unlikely to be similar to a community-based savings bank with a balance sheet measured in millions. However, size does not necessarily say anything about the banks' relative profitability. Rather, profits are more likely driven by the *competitive strategy* chosen by the respective banks. Size, in balance sheet terms, may be a poor proxy for strategy, which more often tends to be determined by the bank's corporate ownership model.<sup>4</sup>

This may be an important consideration for the euro area, given that the euro area banking sector is composed of a fairly diverse group of institutions, both in terms of size and ownership structure. Indeed, banks in the euro area range from large bank holding companies and commercial banks to small savings, cooperative and mortgage banks. In addition, there is a large number of specialised government-owned banks. This complicates the analysis of profitability in the euro area banking sector when using bank-specific characteristics such as size and ownership as explanatory factors.

Just as productivity is an important determinant of macroeconomic performance, *efficiency* at the firm level is an obvious driver of bank profitability. When measuring efficiency in banking, one typically tries to gauge how a particular set of prices and quantities of inputs and outputs vary, in accordance with the banks' chosen strategy, and how this impacts on bank profitability.

Findings from the literature suggest that among certain bank categories, such as commercial banks, large banks tend to be more efficient than smaller ones. This result however may not hold for banks with other types of ownership structures, such as savings banks. Owing to the differing sample periods, variables and estimation techniques adopted in the various studies, it is difficult to draw any general conclusions concerning the efficiency of the European banking sector as a whole.<sup>5</sup>

A recent additional line of research is concerned with the effects of *diversification* on bank profitability. The intuition here is that more diverse sources of income may contribute to smoother/higher profitability. One of the ways that diversification has been measured in the empirical literature is to use off-balance sheet items as a proxy for non-interest income. Some evidence has been found that bank profitability is positively related to the extent of off-balance sheet business. Such conclusions need to be qualified, however, since the benefits of diversification may be outweighed by the exposure to non-interest income activities. These may be more volatile and less profitable than income generated through lending.<sup>6</sup>

Adequate *management of bank capital* can also be important in determining bank profitability because it potentially has a bearing on the availability of funding for future lending decisions. The empirical literature focusing on issues of a regulatory nature, such as capital adequacy, has found, based on US data, that capitalisation and profitability are positively related. It is also a key determinant of bank credit ratings, thereby directly affecting the costs of funding faced by banks. Higher capitalisation contributes to higher earnings, mainly through a reduction in interest rates

4 See R. DeYoung and T. Rice (2004), "How Do Banks Make Money? A Variety of Business Strategies", *Federal Reserve Bank of Chicago Economic Perspectives*, Q4. One notable exception in the European context is Y. Atlumbas and D. Marques Ibanez (2004), "Mergers and Acquisitions and Bank Performance in Europe: The Role of Strategic Similarities", *ECB Working Paper* No 398.

5 See P. Schure, R. Wagenvoort and D. O'Brien (2004), "The Efficiency and Conduct of European Banks: Developments after 1992", *Review of Financial Economics*, 13. For a comprehensive overview of the relationship between competition, efficiency and profitability, see J. Bikker and J. Bos (2004), "Trends in Competition and Profitability in the Banking Industry: A Basic Framework", *DNB Working Paper* No 18.

6 On the topic of off-balance sheet items and profitability, see J. Goddard, P. Molyneux and J. Wilson (2004), "The Profitability of European Banks: A Cross-sectional and Dynamic Panel Analysis", *Manchester School*, 77 (3). For the downside of diversification, see K. Sitroh and A. Rumble (2005), "The Dark Side of Diversification: The Case of US Financial Holding Companies", *Journal of Banking and Finance*, forthcoming.

charged on deposits not covered by deposit insurance, such as interbank deposits. The optimal management of bank capital manages to balance this constraint against that of foregoing profitable and riskier lending activities. Studies based on EU banks also find tentative evidence of a positive relationship between capitalisation and profitability, though the significance of this relationship varies across the countries in the sample.<sup>7</sup>

For banks, unexpected losses are deducted from capital and expected losses from credit risk are managed through the use of loan loss provisions. Most institutions set aside a predetermined amount to cover expected losses, and other amounts to cover losses related to specific loans. Increased provisions reduce profitability by increasing expenses on banks' profit and loss accounts. Some empirical evidence suggests that banks may under-provision during business cycle upturns, and delay provisioning until the downturn has set in.<sup>8</sup>

### THE ROLE OF MARKET STRUCTURE

The particular structure of the market in which banks operate may also influence bank profitability in two main ways. The first is that more market power, as proxied by concentration measures, tends to be associated in most industries with high levels of profitability, as firms collude to extract rents. The second explanation stresses the importance of potential competition, which depends on the barriers to entry to various banking markets. This could imply that market power as proxied by concentration may not matter as much as the threat of entry by new competitors.<sup>9</sup>

Work based on euro area micro data has found evidence for both of these hypotheses, albeit for particular banking products.<sup>10</sup> In the present context where different types of banks and countries are being considered, market structure measures may be important in explaining some of the cross-sectional variation in profitability across countries, as

well as the finding in the empirical literature that profits tend to be highly persistent.

### MACRO-FINANCIAL FACTORS

The *macroeconomic environment* may also impact on bank profitability through its effects on net income, on credit risk through the repayment abilities of borrowers, and on the value of collateral, all of which may vary with the economic cycle.

For example, deteriorating macroeconomic fundamentals, possibly combined with declining asset prices, could cause loan losses for banks. These losses may induce banks to reduce lending, which in turn further exacerbates asset price declines, possibly resulting in financial instability.<sup>11</sup> The incentives banks face over the business cycle may also change. Banks could also be tempted to assume greater risks if their franchise or charter value is threatened by loan losses initially caused by a macroeconomic downturn.

This suggests that macroeconomic variables may be important in this context. Indeed, empirical work on the causes of financial distress has focused on identifying common patterns in macroeconomic variables before the onset of banking crisis episodes. In some instances, this may take the form of a decline in the GDP growth rate below its trend value, particularly if the macroeconomic downturn

7 For the US, see Berger (1995), *op. cit.*, who also finds that this relationship breaks down for the period 1990-1992, possibly because banks overshot their optimal capital ratios. For Europe, see Goddard et al., (2004), *op. cit.*

8 See L. Laeven and G. Majnoni (2003), "Loan Loss Provisioning: Too Much, Too Late?" *Journal of Financial Intermediation*, Vol. 12.

9 In the euro area, individual bank behaviour and market structure may also have been affected by important regulatory changes, such as the introduction of the First Banking Directive in 1993 and additional directives since then such as the Large Exposures Directive (92/121/EEC), the Capital Adequacy Directive (C152/6/EEC), and the Investment Services (93/22/EEC) Directive, which came into force in 1994, 1996 and 1996 respectively.

10 See R. Gropp and S. Corvoisier (2002), "Bank Concentration and Retail Interest Rates", *Journal of Banking and Finance*, Vol. 26 (11).

11 See G. von Peter (2004), "Asset Prices and Banking Distress: A Macroeconomic Approach", *BIS Working Paper* No 167.

was preceded by strong credit growth combined with rapid growth in property prices.<sup>12</sup>

#### DATA AND METHODOLOGY

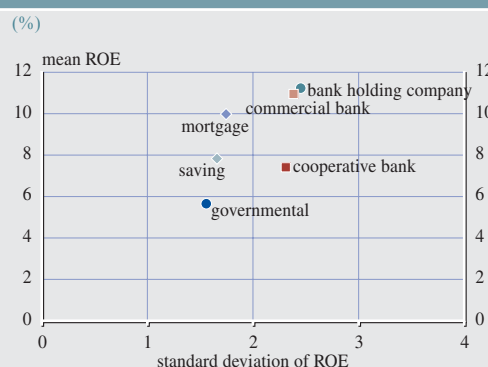
Euro area banks of differing ownership types operate and compete with each other in various market segments across the euro area. Therefore, this analysis relies on the classification provided in a private sector dataset which, in turn, is based on information provided by banks in their annual reports.<sup>13</sup> This section provides an overview of the various measures of financial performance of euro area banks, before moving on to describe the empirical methodology and results.

#### MEASURES OF FINANCIAL PERFORMANCE

Variations in accounting measures of financial performance by ownership type may emerge between the various types of banks for several reasons. For example, commercial banks generate a higher return, given their focus on for-profit activities, but possibly at the cost of greater variability in returns. Mutually owned institutions or government-owned banks may have additional objectives to that of maximising profit, such as economic or social development goals for specific geographic regions.<sup>14</sup> One widely used measure of performance is ROE, which is defined in this study as the post-tax net income a bank has made during a given year, divided by the average shareholder equity during that year. The advantage of using this measure is that it captures income that the bank generates from traditional intermediation activities and from off-balance sheet activities, such as trading activity, and the provision of risk management solutions to clients.<sup>15</sup>

Chart D.1 plots the average ROE for various types of euro area financial institutions in the sample against its standard deviation. Bank holding companies and commercial banks show nearly identical ROE over the sample period, but with greater variability than other ownership types, indicating that higher return

**Chart D.1 Euro area banks' mean and standard deviation ROE**



Sources: Bureau van Dijk (Bankscope) and ECB calculations.  
Note: The sample period covers the period 1993-2004. The means and standard deviations are calculated for each group of banks across euro area Member States.

strategies are also associated with greater risk in returns. Moreover, the level and variability of profits experienced by these type of banks may be influenced by the experience of subsidiaries within the group. By contrast, cooperative banks and government-owned lending institutions show a much lower variability in return but a mean return only half of that recorded by bank holding companies and commercial banks.

12 See ECB (2005), "Indicators of financial distress in mature economies", *Financial Stability Review*, June, pp. 126-131; and C. Borio and P. Lowe (2002), "Asset Prices, Financial and Monetary Stability: Exploring the Nexus", *BIS Working Paper* No 114.

13 The individual bank accounting information used in this feature as well as the type of bank is drawn from Bankscope, a private sector database produced by Bureau van Dijk. Data for large euro area banks were selected and subsidiaries operating in the euro area were excluded, as were subsidiaries of foreign banks operating in the euro area. Observations lying in the 1st and 99th percentiles were discarded, as were institutions with implausible values such as a loans-to-total assets ratio of greater than 100%. Data are deflated using the GDP deflator for each country.

14 It is worth noting that for the US, there is relatively little agreement in the literature on whether ownership type matters for profitability. See J. Hughes, W. Lang, L. Mester, C. Moon and M. Pagano (2003), "Do Bankers Sacrifice Value to Build Empires? Managerial Incentives, Industry Consolidation, and Financial Performance", *Journal of Banking and Finance*, Volume 27 (3).

15 As a robustness check, profit before tax and country dummies were used to ensure that differences in corporate tax were not driving results. Both produced very similar results to those presented in this Special Feature. In addition, as the estimation is carried out in differences, it should not be affected to any large extent by different corporate taxes.

Three main reasons can be identified for these differences. First, some banks may benefit from a *diversification* effect if their sources of income are not concentrated on one particular market. Second, some institutions may be more *efficient* in terms of producing a given amount of output at minimum cost or maximising profit. Third, differences in the level and *management of capital* may lead to differing financial performances.<sup>16</sup>

The degree to which a bank is diversified may affect its ability to generate revenues through the business cycle. More diversified banks may be able to maintain consistent profitability over the business cycle because they are not reliant on any one particular market. However, as noted in some of the banking literature, diversity may also increase exposure to more volatile revenue sources without achieving any significant increase in profitability. Two measures of diversity are considered: one based on income, the other on assets.

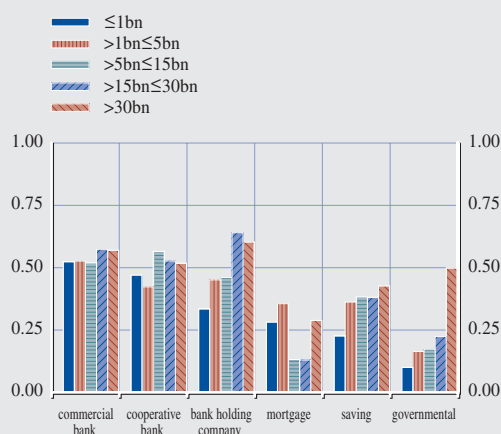
Income diversity attempts to gauge a bank's reliance on income from traditional intermediation versus more fee-based

activities. Chart D.2 shows one diversity measure by size and type for euro area banks.<sup>17</sup> According to this measure, commercial banks and bank holding companies are the most diversified, while government-owned and mortgage banks are the least diversified. It is notable that, on the basis of this measure, cooperative banks seem to be nearly as diversified as commercial banks, though this

16 It is possible that accounting ratios may also differ across countries due to differences in national taxation policy, possible earnings smoothing and variations in national accounting practices that are particularly related to the treatment of goodwill. (See Special Feature E on the effects of IFRS in this Review for further detail.) These differences are sometimes cited as a reason to use only market-based indicators. These indeed have some advantages. They are forward-looking, available at a higher frequency, and reflect relevant information on individual institutions. Market indicators based on equity prices, on the other hand, suffer from the drawback that equity investors may be willing to assume more risk and share in the benefits of a bank's management taking more risk than depositors. A more practical problem is that market indicators are typically only available for large listed banks. The availability of market indicators is a particular problem for euro area banks, as of the 300 or so banks used in this study, only 72 were in 2004 quoted institutions, limiting the coverage of the sample across countries and overtime. Gropp, Vesala, and Vulpes (2005), op. cit., use a sample of 84 EU15 banks.

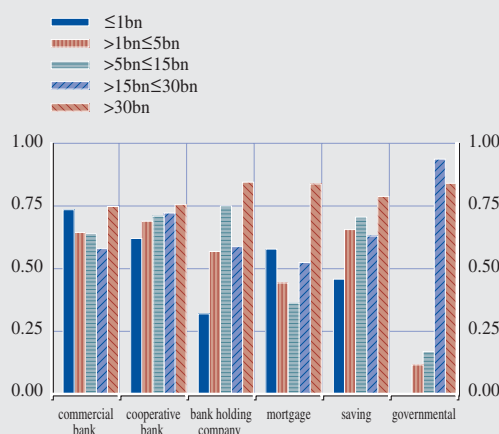
17 These diversity measures are based on R. Levine and L. Laeven (2005), "Is There a Diversification Discount in Financial Conglomerates?", University of Minnesota, mimeo.

Chart D.2 Euro area banks' mean income diversity by size group



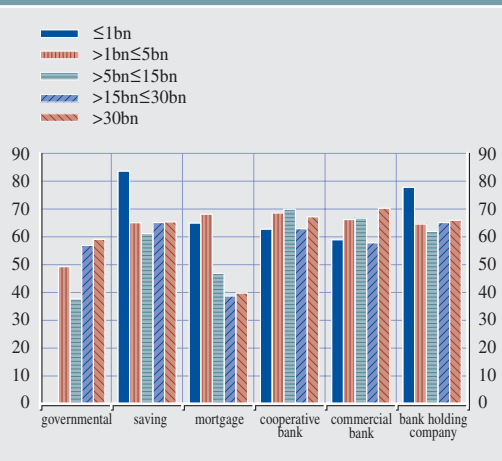
Sources: Bureau van Dijk (Bankscope) and ECB calculations.  
 Note: The sample period covers the period 1993-2004. Income diversity is calculated as 1-absolute value [(net interest income minus non-interest income)/(total operating income)]. A score of 0 indicates no diversity.

Chart D.3 Euro area banks' mean asset diversity by size group



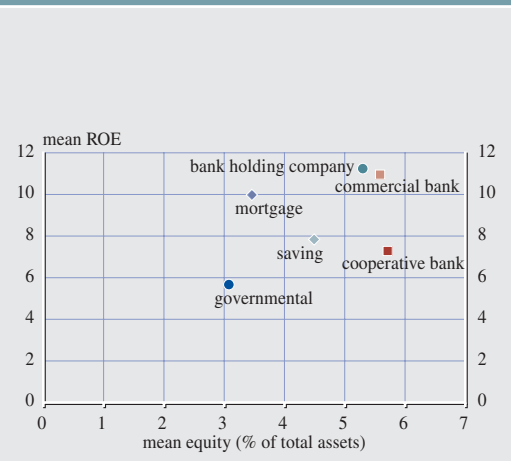
Sources: Bureau van Dijk (Bankscope) and ECB calculations.  
 Note: The sample period covers the period 1993-2004. Asset diversity is calculated as 1-absolute value [(loans minus other earning assets)/(total earning assets)]. A score of 0 indicates no diversity.

**Chart D.4 Euro area banks' mean cost income ratio by size group**



Sources: Bureau van Dijk (Bankscope) and ECB calculations. Note: The sample period covers the period 1993-2004.

**Chart D.5 Euro area banks' mean return on equity and capital ratios**



Sources: Bureau van Dijk (Bankscope) and ECB calculations. Note: The sample period covers 1993-2004.

conclusion depends both on the size and type of institution.

Asset diversity looks at the specialisation of the institution in terms of the intermediation activities it undertakes, and is based on balance sheet variables. For example, a high value of asset diversity indicates a better balance between loans and other assets. Chart D.3 suggests that asset diversity roughly increases with size. Commercial banks, bank holding companies and cooperative banks seem all quite diversified according to this measure.

The productive efficiency of banks may also influence profitability. One proxy commonly used to measure efficiency is the ratio of operating costs to income. As Chart D.4 shows, in some cases smaller institutions appear to be less efficient. However, no clear pattern can be identified in terms of mean levels of efficiency over the sample period.

Finally, capital management could affect profitability, and the literature suggests a positive relationship, given that retained profits, after subtracting operating costs and provisions, can be added to banks' reserves to boost capital if they are not paid out in dividends to

shareholders or used to cover unexpected losses. Chart D.5 plots the mean ROE and mean equity-to-total asset ratio for euro area banks. The chart suggests a slight positive relationship between capitalisation and profitability, although this appears to vary across bank type.

### ECONOMETRIC ANALYSIS

The estimation method adopted in this study is that of a dynamic panel data model. Panel data models combine a cross-section component (many banks observed at one point in time) with a time dimension (the same banks observed over different years). The cross-section nature of the panel controls for bank-specific factors and how these vary across banks. The addition of a time dimension allows other external factors – such as market structure and macroeconomic developments – potentially to impact on bank profitability.

A dynamic panel model builds on this by including a lag of the dependant variable as an additional right-hand-side variable. This has the advantage of allowing short-run dynamics to be explored. The main hypothesis to be tested is that that ROE is related to bank-specific characteristics such as lagged ROE

(+), size (+), capital (+), off-balance sheet items (+), provisions (-), and diversity measures (+ or -).

All these variables are treated as endogenous in the estimations, taking into account the potential relationship between the independent variables and the error term. Bank specialisation, market structure characteristics (concentration, Herfindahl index, (both +), and macroeconomic variables (real GDP growth, real property prices (both +)) are treated as exogenous in the estimations.

The estimation period covers the period 1993-2004, using an unbalanced panel of data based on 329 banks with a minimum of five years of consecutive data. Given the sign and significance of lagged profits, the results from the baseline model suggest first of all that the change in profits is persistent (see Table D.1).<sup>18</sup> This is a common finding based on the results of previous studies. On the basis of the sample considered, the change in profitability is also influenced by capital. This may be due to retained profits added back to capital; alternatively, well-capitalised banks may be able to pursue a wider range of business, including off-balance sheet business, owing to their higher creditworthiness.

Loan loss provisions have the expected (negative) sign, but the coefficient is

insignificant. The positive and significant role for real GDP growth tends to confirm the view that macroeconomic developments are important for bank profitability. For example, the cyclical effect of real GDP growth could be overwhelming the provisioning cycle. Finally, the change in the size variable also has a positive effect, suggesting that profitability is positively related to an increase in the inflation-adjusted size of a bank's balance sheet.<sup>19</sup>

Given that the estimation method takes into account bank-specific differences, it is not surprising that the variables measuring banks' specialisation are insignificant. Finally, concentration measures – such as the ratio of

18 After taking lags and differencing, this left approximately 1,400 bank-year observations available for estimation, depending on the independent variables used. The one step standard errors are used for inference. The estimations were carried out using the Arellano and Bond GMM estimator. The one step standard errors are used for inference. The diagnostic tests referred to in Table 1 are the Sargan test for the validity of over-identifying restrictions, and tests for first and second order autocorrelation. For more details, see M. Arellano and S. Bond (1991), "Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations", *Review of Economic Studies*, 58.

19 As an additional robustness check on the estimations, the system GMM estimator of Blundell and Bond (1998) was used; the results were similar to those presented here. For more details, see R. Blundell and S. Bond (1998), "Initial Conditions and Moment Restrictions in Dynamic Panel Models", *Journal of Econometrics*, 87; and R. Blundell and S. Bond (1999), "GMM Estimation with Persistent Panel Data: An Application to Production Functions", *IFS Working paper 99/4*.

Table D.1 Empirical results

variable	sign	significance	sign	significance	sign	significance
lagged profit	+	yes	+	yes	+	no
capital	+	yes	+	yes	+	yes
off-balance sheet	+	no	+	no	+	no
size	+	yes	+	yes	+	yes
real GDP growth	+	yes	+	yes	+	yes
loan loss provisions	-	no	-	no		
specialisation dummies			+	no		
concentration					+	no
diagnostic tests	yes		yes		yes	

Source: ECB calculations.

Note: The diagnostic tests' "yes" refers to non-rejection of both the Sargan test for the validity of over-identifying restrictions and tests for second order autocorrelation. Significance denotes results that are significant at a 10% level or lower.

the five largest banks' assets to the assets of each country's banking system and the Herfindahl index – were positively signed but insignificant. Given that market structure changes only slowly over time, the lack of variation in these variables within countries and over time is probably the reason for its statistical insignificance. In this case, a reduced sample owing to the unavailability of market structure indicators before 1997 may also be a contributing factor. While these measures are standard indicators of market structure, it cannot be ruled out that alternative measures may reveal a different relationship. Investigation of this topic is beyond the scope of this Special Feature. The inclusion of the variable leads to the lagged profit variable becoming marginally insignificant, thus pointing towards some relationship between market structure and profitability.

Alternative specifications were tried as robustness checks. Two main types of checks were carried out: ones based on bank-specific factors, and ones based on macroeconomic factors.

The inclusion of asset and income diversity measures weakens the significance of the lagged profit variable, perhaps indicating that the previous findings of profit persistence may be due in part to an omitted variables

problem.<sup>20</sup> Although the data were screened carefully before estimation, idiosyncratic events relating to certain banks could have driven the results. To check this, dummy variables based on data from Gropp et al. (2004) were therefore used to control for this. The results were unchanged. To control for the possibility that mergers or takeovers could be responsible for the role that growth in size appears to play, dummy variables were constructed for banks that were involved in M&As. Their inclusion did not however affect the results, probably because only a small number of observations in the sample were affected.

One country in the sample experienced a banking crisis at the beginning of the sample, and an interaction dummy for the country and real GDP growth was used in the estimation. While the dummy was significant, the overall effect on the results was similar to those reported in Column 3 of Table D.2 below. Finally, an experiment was carried out to replace real GDP growth with real residential property prices; however, the variable proved to be insignificant.

<sup>20</sup> Additional instrument lags for the independent variables were also used in this instance. The lagged profit variable continued to remain insignificant.

**Table D.2 Empirical results**

variable	sign	significance	sign	significance	sign	significance
lagged profit	+	no	+	no	+	yes
capital	+	no	+	yes	+	yes
off-balance sheet	.	.	.	.	.	.
size	+	yes	+	yes	.	yes
real GDP growth	+	yes	+	yes	.	.
income diversity	-	no	-	-	.	.
asset diversity			-	no		
real property prices					-	no
diagnostic tests	yes		yes		yes	

Source: ECB calculations.

Note: The diagnostic tests' "yes" refers to non-rejection of both the Sargan test for the validity of over-identifying restrictions, and tests for second order autocorrelation. Significance denotes results that are significant at a 10% level or lower.



## CONCLUDING REMARKS

This Special Feature set out to review various factors identified in the literature that may affect bank profitability. Based on micro data, stylised facts concerning euro area bank profitability were presented. Finally, an econometric analysis based on a dynamic panel data approach was carried out to identify factors that could influence bank profitability in the euro area.

Both macroeconomic and bank-specific factors appear to have a role to play, with real GDP growth and bank size being the most important determinants. A positive but weaker relationship was found between bank equity capital and profits. It is important to note that the estimation method takes into account the potentially endogenous nature of the relationship between lagged profits and capital. On the other hand, the regression model is a reduced form model and not derived from a structural economic model. This means that it is difficult to identify the exact nature of the links between size, capital and profitability based on the current approach.

Overall, for the purposes of financial stability monitoring, the results point towards a need to analyse and understand better the interplay between bank-specific factors and the macroeconomic environment before any firm policy conclusions can be drawn. Additional work in two particular areas could prove valuable in this regard. First, the relationship between size and profitability could be analysed further in order to determine whether this operates via economies of scale and scope. Second, further analysis of the empirical effects of income and asset diversification on bank profitability could improve understanding of the overall effect of growth in non-interest income on bank profitability and stability.