

## Box 11

### COMBINING INFORMATION ON BANK PERFORMANCE

A common way of assessing the performance of an individual bank is to compare its accounting data or its share price with similar indicators computed for a peer group. For example, the set of indicators concerning banks' profitability that is regularly monitored in the ECB Financial Stability Review comprises a mix of both accounting-based and market-based indicators that are aggregated to form peer group averages and various measures of dispersion. The headline or main accounting ratios that are frequently used include return on equity (ROE) and return on risk-weighted assets (RORWA), as well as various other measures such as loan impairment

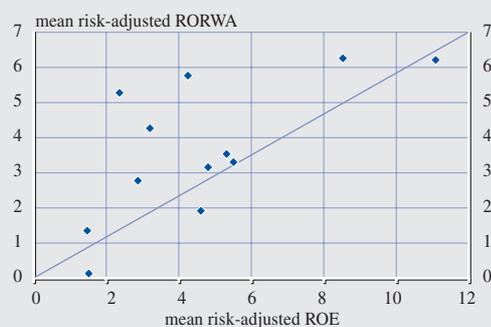
charges, cost-to-income ratios and capital ratios.<sup>1</sup> These indicators attempt to gauge various aspects of banking sector performance – including overall profitability, asset quality, efficiency and regulatory capital. To arrive at a more comprehensive assessment, this information is complemented with information extracted from market indicators such as banks’ stock prices, price-earnings ratios as well as derived measures such as risk-neutral density functions and distance-to-default indicators. The main difference between the two sets of indicators is that accounting data are based on realised or actual outcomes, whereas market data are based on investors’ expectations of future bank performance.<sup>2</sup> These expectations are formed by summarising all available information on the outlook for banks. This Box compares the information that can be gauged from these two sources, and it provides an example where they may be fruitfully combined. The main finding is that pooling information from both sources may provide useful insights for financial stability analysis.

One way of improving the information content of accounting-based indicators is to relate them to the volatility of banks’ income sources. Indeed, raw accounting data may not fully incorporate the risks incurred by banks. This means that if individual banks take on different levels of risk, raw accounting data on returns will not be strictly comparable. One possible way of risk-adjusting the accounting return measures is to normalise them with the standard deviation of net bank income. Chart B11.1 plots the ROE of LCBGs against the RORWA where both have been normalised by the standard deviations of the ratio in an attempt to adjust for risk. If both of these risk-adjusted performance indicators reflected similar aspects of bank performance, they would be perfectly correlated and the observations would be distributed along a diagonal line. Although the relationship is close, for some LCBGs, it can be seen that there is less than a perfect correlation, indicating that the two indicators are measuring different aspects. For example risk-weighted assets, the numerator of RORWA – and a figure required for regulatory

1 This sample in this box is based on the methodology described in the Special Feature article “Identifying large and complex banking groups for financial system stability assessment” contained in this Review. The sample period is based on the availability of adequate data for all of the banks in the sample.  
2 Various other measures such as Sharpe and Treynor ratios are possible. For a comprehensive review of performance measures, see J. W. B. Bos, J. A. J. Draulans, D. van den Kommer and B. Verhoef (2006), “An International Scorecard for Measuring Bank Performance: The Case of Dutch Banks”, *De Nederlandsche Bank Occasional Paper*, 4 (2).

**Chart B11.1 Mean risk-adjusted ROE and RORWA for large and complex banking groups in the euro area**

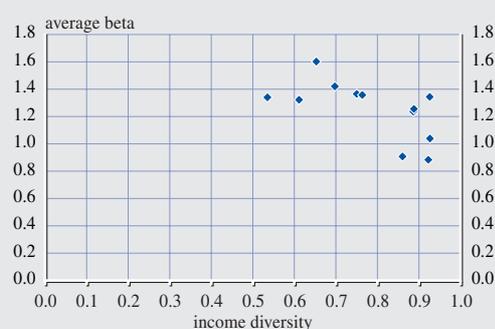
(2000 - 2005, %)



Sources: Individual institutions’ financial reports and ECB calculations.  
Note: Mean ROE and mean RORWA are risk-adjusted by dividing by their standard deviation over the period 2000-2005.

**Chart B11.2 Annual average beta and income diversity**

(2000 - 2005)



Sources: Individual institutions’ financial reports and ECB calculations.  
Note: Average beta is estimated annually and averaged. The income diversity measure is calculated as  $1 - \text{abs}(2X - 1)$ , where X equals the share of interest income in total operating income.

capital requirement calculations – may be a broader and more obvious measure of the credit and other risks facing banks than the numerator in the ROE. Here, RORWA is normalised to make it comparable with ROE.

Accounting data still suffer from the drawback that the obtained measure remains backward-looking. In addition, risk adjustments based on accounting data can be sensitive to the sample period chosen. This would suggest that no single profitability measure will capture all aspects, so that it may be useful to monitor trends in several profitability measures – some based on accounting data and others based on market information – in order to provide a more comprehensive picture of profitability performances. Since stock markets are forward-looking, have a long-run horizon, and incorporate information rather quickly, they may price-in changes or differences in diversification strategies very quickly, thereby providing timely indicators. Securities prices should in principle also incorporate a much wider information set than that available from banks' financial statements – including information on the sources of income growth and diversity – as well as information concerning the banks' strategy and business mode.

To illustrate how information from the two sources can be combined, it is of interest to consider how the income diversity of banks can affect their overall risk. As mentioned in Section 4.1, many LCBGs have attempted to reduce their income volatility by diversifying geographically and functionally (i.e. by expanding their non-interest income activities). This raises the issue of whether diversified financial institutions possess a better return-risk profile compared with less diversified banks.<sup>3</sup> Looking at headline accounting-based performance measures may not immediately reflect changes in diversification strategies owing to their backward-looking nature and to the fact that it may take time for benefits to accrue.

In order to determine the relationship between income diversity and risk, it is necessary to compute proxies for both. One way of measuring the risk of a bank is with a market model that distinguishes the effects on bank stock prices of firm-specific risk elements and those relating to the overall market environment, or macroeconomic risk. Such a model can provide a measure of systematic risk, which is commonly known as the equity beta.<sup>4</sup> Because changes in the state of the economy or in the banking sector environment, including the degree of leverage, geographic or functional diversification, or regulation may have a bearing on this systematic risk component, an empirical methodology which takes account of possible time variation may be particularly useful.<sup>5</sup> In order to allow for time-variation in the coefficients of LCBGs over the recent past, the factor exposures and bank-specific volatility were estimated for each individual year using daily bank stock returns, and then averaged to account for possible time-variation in the equity beta measure. Measures of income diversity can be calculated based on

3 See K. J. Stiroh and A. Rumble (2005), "The Darkside of Diversification: The Case of US Financial Holding Companies", *Journal of Banking and Finance*, forthcoming.

4 Beta is a measure of systematic risk that describes the sensitivity of an equity security to movements in the overall market. A beta value of greater than one indicates that the stock price in question will ordinarily move by more than the market return. The estimation of the betas and the idiosyncratic risk components was carried out using a two-factor model. The factors used for explaining excess stock returns are the euro area stock market index and long-term (ten year) government bond prices, both of which were obtained from Datastream. This specification assumes that the macro-factors can be approximated by developments in the market index. In practice, for euro area banks, this seems to be the case as shown for example in Box 12 of ECB (2005), *Financial Stability Review*, June.

5 See L. Baele, O. De Jonghe and R. van der Venet (2006), "Does the Stock Market Value Bank Diversification?", *Journal of Banking and Finance*, forthcoming; W. Ferson and C. Harvey (1991), "The Time Variation of Economic Risk Premiums", *Journal of Political Economy*, 99, pp. 385-415; and T. Santos and P. Veronesi (2004), "Conditional Betas", *NBER Working Paper*, No 10413.

the detail available in banks financial accounts. One advantage of combining both accounting and market measures can be seen from Chart B11.2. It shows that on the one hand, the average estimated betas tend to be higher than one and, on the other hand, that, for the banks under consideration there is a possible negative relation between average revenue diversity and the average estimated market betas i.e. higher income diversity is typically associated with lower systematic risk.

To sum up, both groups of performance indicators have their relative strengths. Since they measure different aspects of banking sector risk-return trade-offs, thereby complementing one another, it is useful to monitor trends in both.