Box 6
Cost efficiency of euro area banks

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Improving operating efficiency is key if euro area banks are to raise their profitability to sustainable levels. The FSR has been consistently reporting on the basis of accounting indicators, such as the cost-to-income ratio (CIR) and the cost-to-assets ratio, that, on aggregate, euro area banks' cost efficiency has deteriorated somewhat since 2010. While the improving cyclical environment is supporting bank profitability, raising it to levels that can ensure banks are able to provide financing to the real economy in a sustainable manner would benefit from improving their cost efficiency.

This box uses frontier analysis to estimate banks' cost efficiency, focussing on the parameters that are under the effective control of management.[41] This approach is a useful complement to the accounting indicators typically used to assess efficiency in the banking sector.[42] A cost function is used to estimate banks' relative ability to convert inputs into outputs while minimising costs. The most efficient bank is the one that incurs the lowest cost to generate a given amount of output at predetermined input prices. An advantage of this technique is that the resulting measure of cost efficiency controls for the fact that banks produce different outputs (loans and investments) and pay different prices for inputs (financial capital, labour and fixed assets), thereby allowing a better comparison across banks of different size, ownership structure, specialisation, etc. The bank on the frontier represents best practice in the banking sector and the remaining banks are measured against this benchmark.[43] Importantly, the technique distinguishes persistent inefficiency from time-varying inefficiency.

The analysis is based on a comprehensive set of euro area banks. The sample consists of commercial, cooperative and savings banks from 17 euro area countries over the period from 2006 to 2015 gathered from Bankscope.[44] After removing institutions with unreliable or low quality data and institutions that might have been misclassified, the resulting sample is an unbalanced panel of between 1,727 and 2,248 banks, depending on the year.[45]

The scope for efficiency gains by emulating best performers is sizeable (Chart A). The relative cost efficiency of the median euro area bank fluctuated between 82% and 83% over the period from 2006 to 2015. These findings suggest that if the median bank operated on the efficiency frontier, it could produce the same level of output at only 82% to 83% of its current costs.[46] In other words, about 17-18% of costs can be attributed to cost inefficiency relative to the most cost-efficient bank. Looking across bank specialisations, overall efficiency is lower for commercial banks than for cooperative and saving banks on account of lower persistent inefficiency in the latter two (see below). There is also wider dispersion of efficiency within the commercial bank category than in the other categories.

41 The analysis is based on Kumbhakar, S.C., L. Gudbrand and J.B. Hardaker (2014), "Technical efficiency in competing panel data models: a study of Norwegian grain farming", Journal of Productivity Analysis, Vol. 41, Issue 2, pp. 321–337. It is assumed that banks use funds (liabilities), labour and fixed assets to produce loans and investments. To control for risk and technical change, the equity ratio and a time trend are included as semi fixed inputs. The function used is a standard trans-log cost function with the price of labour used to normalize the dependent variable and all input prices.

42 While very easy to compute, caution is needed when using accounting indicators as a measure of efficiency. The average cost for a bank is highly dependent on the business model of the institution, its size and various country-specific factors which are outside the control of bank management. The CIR captures simultaneously several aspects of bank performance, such as productivity, efficiency and various bank-specific and country-specific factors. The CIR is also affected, at least indirectly, by credit risk, which distorts the estimation of efficiency.

43 Efficiency scores in frontier analysis are relative in nature and are scaled to the best-performing bank. An additional caveat with measures based on frontier analysis is that it approximates total banking activities with loans and investments, while in reality banks offer a variety of products.

44 In this analysis, banks are classified as commercial if they are active mainly in retail, wholesale and private banking (i.e. universal banks), while savings and cooperative banks are mainly active in retail banking (the latter having a cooperative ownership structure).

45 The following types of bank were dropped from the sample: banks that recorded a change in the gross value of total assets of more than 50% in a particular year; banks which have less than one third of their total assets in the form of gross loans (in order to remove institutions that do not perform maturity transformation or do not provide loans to the economy); and very small banks, i.e. those with average assets for the whole period of below €50 million.

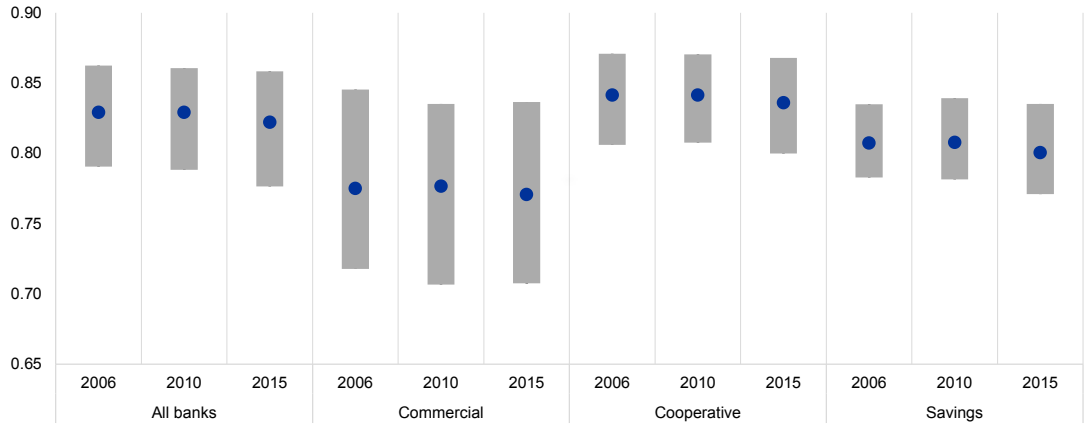
46 Overall bank efficiency is computed as the product of persistent (time invariant) and residual (time variant) efficiency. Efficiency scores are computed on the basis of a common frontier across bank categories.

Chart A

Overall efficiency has declined slightly in the euro area banking sector

Overall efficiency by bank specialisation

(percentages; 25th, 50th and 75th percentile for all banks and each bank specialisation)



Sources: Bankscope and ECB calculations.

The results also suggest that the relative efficiency of the median bank has decreased over time, as the overall efficiency score fell by about 0.8 percentage points between 2010 and 2015. The decline in efficiency is observed across all three categories of bank. The results also confirm previous findings in the FSR suggesting that progress to date in the area of cost efficiency gains remains limited.

Chart B

Persistent inefficiency is the largest component of overall inefficiency

Persistent efficiency by bank specialisation

(percentages; 25th, 50th and 75th percentile for all banks and bank specialisation)

Sources: Bankscope and ECB calculations.

The largest contribution to bank inefficiency comes from persistent inefficiency (see Charts B and C). In fact, persistent efficiency scores point to inefficiency levels in banks of between 11.9% and 20.4% (across time and business models), whereas the results for time-varying inefficiency

suggest that the median bank uses only between 3.6% and 4.4% of its resources (across time and business models) inefficiently as a result of time-varying factors.[47] Looking at the evolution of time-varying efficiency across bank specialisations, the largest decline can be seen in commercial banks between 2010 and 2015.

Chart C

Time-varying efficiency has declined, particularly for commercial banks

Time-varying efficiency by bank specialisation

(percentages; 25th, 50th and 75th percentile for all banks and each bank specialisation)

Sources: Bankscope and ECB calculations.

These results suggest that long-term structural factors, such as location, client structure, macroeconomic environment, regulation, etc., play a significantly bigger role in bank efficiency than time-varying factors.[48] They also underline the importance to improve structural efficiency. Options could include (further) branch network and staff rationalisation, increased digitalisation (particularly in the case of countries where the distribution of banking products remains overly reliant on branch networks) and mergers and acquisitions both within countries and at the euro area level (to achieve economies of scope and scale).

[47] Looking across business models, there seems to be little difference in time-varying efficiency, while the differences are larger for persistent efficiency (which is lower for commercial banks than for cooperative and savings banks). This is probably due to the fact that commercial banks (which are larger institutions) are more difficult to manage. At the same time, the methodology utilises two outputs (namely loans and other earning assets), while commercial banks tend to also be involved in other activities (such as derivatives trading, asset management, etc.) that are not counted as outputs in this framework but still generate additional costs.

[48] Likely reasons for this finding are that there are large sunk costs associated with starting a bank and several years of deposit base formation are required to succeed in the business. Moreover, it tends to be very costly to restructure a bank (downsize the number of staff, merge with another institution, etc.) and banks have a heavy reliance on information technologies, which can take a long time to put in place.