Box 5

Recent developments in banks' price-to-book ratios and their determinants

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The market valuations of euro area banks have remained low since the global financial crisis, lagging behind those of many international peers. Price-to-book (P/B) ratios offer a yardstick of bank franchise value, where a P/B ratio greater than one suggests that a bank can generate market value commensurate to the value of its tangible assets. In this way, a P/B ratio lower than unity suggests investor concern about shareholder value, and manifests itself in a higher cost of capital should the bank opt to issue additional equity. This box investigates the determinants of P/B ratios, assessing to what extent bank and country-specific factors have contributed to hampering their recovery.

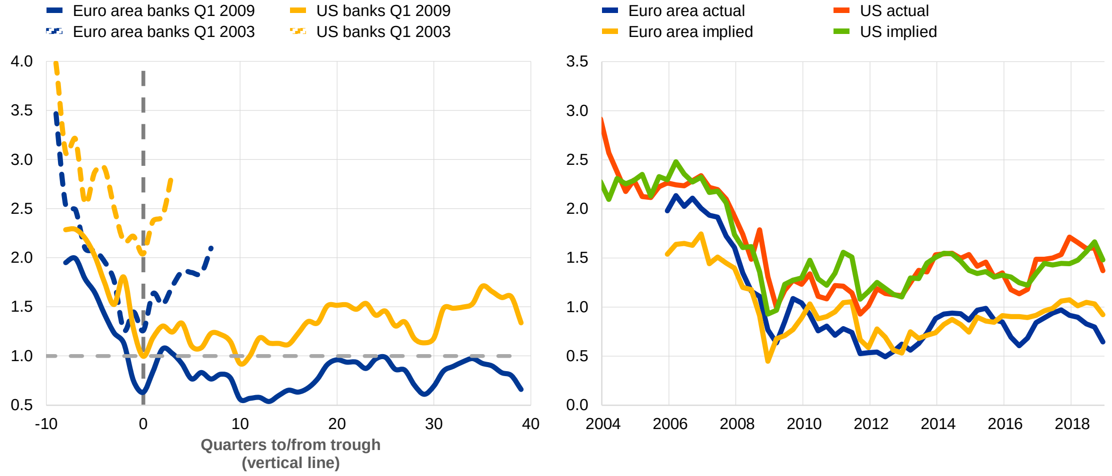
P/B ratios of euro area banks have remained below one for over eight years now. Prior to the global financial crisis, the long-term weighted average of the P/B ratios of euro area and US banks stood at around 2 and 2.4, respectively. While this ratio decreased strongly after the recession of the early 2000s, its subsequent recovery was quick, taking four and eight quarters in the United States and the euro area, respectively (see **Chart A**, left panel). During the 2008-09 crisis, however, both US and euro area banks' P/B ratios fell to much lower levels, although those of US banks dropped below one for a shorter period of time.

Chart A

Market valuations of euro area banks have not recovered from the global financial crisis

P/B ratios before and after previous and most recent troughs (left panel); actual and model-implied P/B ratios in the euro area and the United States (right panel)

(left panel: Q4 2000-Q4 2005, Q1 2006-Q4 2018; right panel: Q1 2004-Q4 2018)



Sources: Bloomberg and ECB calculations.
Notes: 70 globally active banks, equally divided into EA and US institutions. The left panel shows: (i) the recovery of the P/B ratio of EA and US banks after the minimum value reached in Q1 2003 (dashed lines); and (ii) the evolution of the ratio after the trough reached in Q1 2009 (solid lines). The right panel shows market capitalisation-weighted actual and model-implied P/B ratios for EA and US banks.

This box takes a multi-country empirical approach to investigate the path of P/B ratios in the last decade. A fixed effects panel econometric model extends Calomiris and Nissim (2014)[26] by introducing a multi-country set-up and includes variables capturing bank-specific characteristics, market sentiment and the macroeconomic environment. The explanatory variables are drawn from the existing literature on the determinants of the P/B ratio. The sample used is composed of 70 globally active banks, equally divided into euro area and US institutions. In particular, the top 35 listed banks by total assets are selected for each geographical area; eight global systemically important banks are included in each group. The analysis relies on quarterly data and spans the period from the first quarter of 2000 to the fourth quarter of 2018. The role played by complex assets is instead discussed in **Box 7**.

The model results suggest that bank market valuations can be explained by bank profitability developments, the degree of management and operational efficiency, the amount of regulatory capital and the macroeconomic outlook. Stronger expected economic growth and higher profitability ratios are associated with higher P/B ratios, while higher bank capital is associated with lower ratios. In addition, while weaker operational efficiency and management quality, approximated by cost-to-income ratios, reduces bank valuations, its effect appears to be stronger for US than euro area banks. At the same time, high non-performing loan (NPL) ratios depress the P/B ratios of all banks. Most of the signs and magnitudes of the estimated coefficients are in line with the

[26] Calomiris, C. W. and Nissim, D., "Crisis-related shifts in the market valuation of banking activities", *Journal of Financial Intermediation*, Vol. 23(3), 2014, pp. 400-435.

literature[27]. The model explains nearly 50% of the total variation in P/B ratios. Accordingly, the implied P/B ratios stemming from the model appear to fit the evolution of actual ratios rather well (see **Chart A**, right panel).

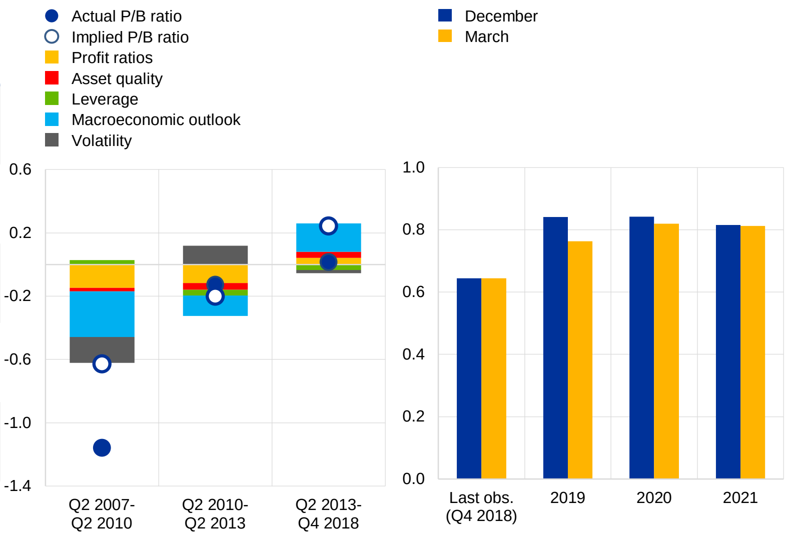
Chart B

The contribution of the economic outlook and profitability has turned positive in the past five years, although the weakened economic environment is challenging the recovery in bank valuations

Selected determinants and signs used in the econometric specification (left panel), change of the implied P/B ratio of euro area banks and main contributors (middle panel) and projected ratios (right panel)

(middle panel: percentage points; right panel: percentages)

Selected determinants:	Coefficient sign:
Weaker asset quality	-
Weaker management/ operational efficiency	-
Higher stock market volatility	-
Higher profit ratios	+
Positive macro outlook	+
Loan-to-deposit ratio	+



Sources: Bloomberg and ECB calculations.

The post-crisis weakness in euro area banks' P/B ratios has evolved, initially associated with weak growth and later with faltering bank profitability. In the first phase of the crisis, the fall in market valuations can be explained mainly by macroeconomic conditions (see **Chart B**, middle panel, light blue bar), with a large unexplained drop that may have corrected the pre-crisis deviation of the ratios from fundamentals. During the sovereign debt crisis, however, weak bank profitability played a more decisive role in depressing P/B ratios (yellow bar). During the more recent period, P/B ratios have increased, albeit to a smaller extent than what the model would have predicted. This recovery can be attributed to the improved macroeconomic outlook, the strengthening of bank profitability and the resolution of NPLs (red bar), marginally offset by continued capital increases (green bar).

The ongoing economic slowdown will however make the recovery in bank valuations more challenging going forward. As the macroeconomic cycle and outlook turn, one of the main factors

[27] The literature has already acknowledged the changing role of capital (and thus leverage) in supporting (depressing) bank valuations. The results presented here however may suggest the existence of an additional explanation: bank market returns have been depressed, on the one hand, by the dilution of insider equity and, on the other, by the reduction in the value of government guarantees. See Aiyar, S., Calomiris, C. W. and Wieladek, T., "Does macro-prudential regulation leak? Evidence from a UK experiment", *Journal of Money, Credit and Banking*, Vol. 46, 2014, pp. 181-214; Atkeson, A. G., d'Avernas, A., Eisfeldt, A. L. and Weill, P. O., "Government Guarantees and the Valuation of American Banks", NBER Working Paper No 24706, 2019; Bogdanova, B., Fender, I. and Takáts, E., "The ABCs of bank PBRs: What drives bank price-to-book ratios?", *BIS Quarterly Review*, March 2018; and Changarath, V., Ferguson, M. and Yong, K., "Do Capital Standards Promote Bank Safety? Evidence from Involuntary Recapitalizations", *Banking & Finance Review*, Vol. 9(2), 2017, pp. 1-34.

supporting the recovery in P/B ratios will wane when banks need it most, adding further market pressure for some banks. According to December 2018 projections, P/B ratios of euro area banks were expected to increase to 0.85 in 2019, largely stabilising thereafter. Downward revisions in GDP between December 2018 and March 2019 implied that P/B ratios would only recover marginally in the next year (see **Section 3.2** for a more detailed discussion on the scenarios and bank profitability developments). These conditional forecasts are obtained by projecting forward GDP expectations and bank profitability with scenario inputs and by keeping the other exogenous variables fixed at their last available value (i.e. the fourth quarter of 2018). The limited recovery in market valuations is concerning as it points to continued doubts on the part of analysts about the ability of euro area banks to earn a return on equity corresponding to their cost of equity.