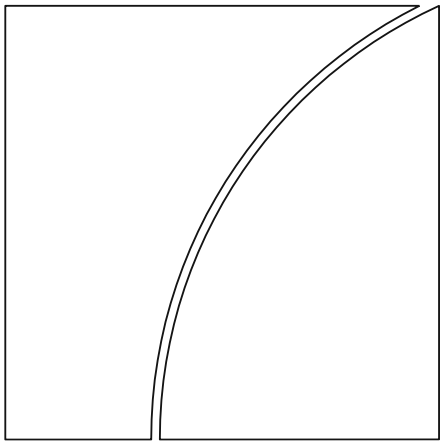

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Monetary and Economic Department

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JEL classification: G21, G28, C25

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Profitability, valuation and resilience of global banks – a tight link

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November 2023

Abstract

We derive a tight link between the profitability, valuation and resilience of global systemically important banks (G-SIBs). We measure profitability using return on equity (ROE), valuation with the price-to-book ratio and resilience through the capital headroom above regulatory requirements ("management buffer"). We find that price-to-book ratios increase in analysts' ROE forecasts and in banks' management buffers. We also document that low-valued G-SIBs maintain management buffers by reducing risk-weighted assets and cater to investors by paying out their entire profits. However, the resilience of low-valued G-SIBs could prove precarious as they frequently incur substantial losses that trigger significant negative stock-market reactions.

JEL classification: G21, G28, C25.

Keywords: Financial stability; price-to-book ratio; banking regulation

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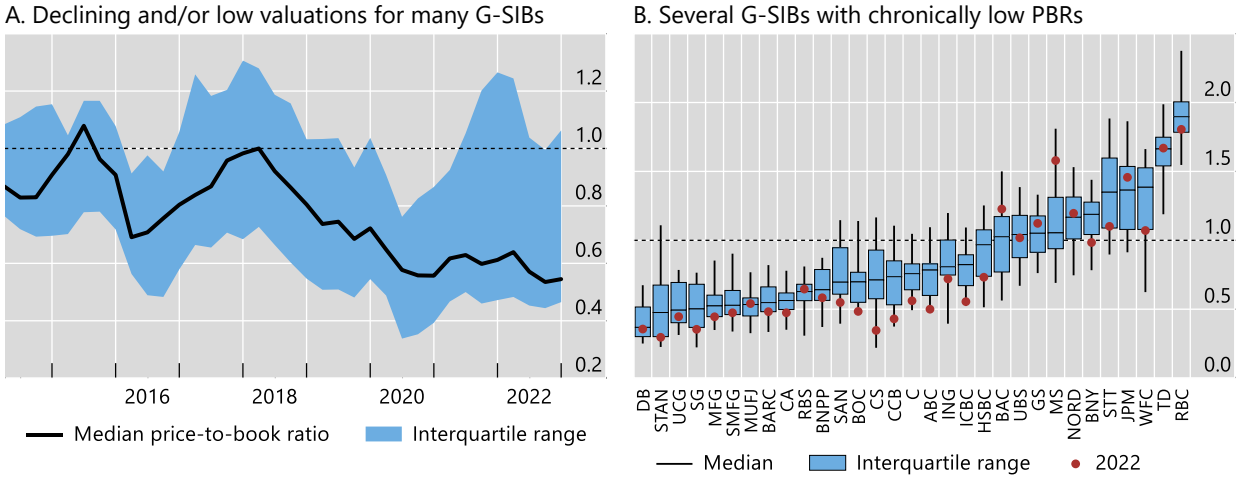
1 Introduction

Equity valuations have signalled persistent concerns about a number of global systemically important banks (G-SIBs). Price-to-book ratios (PBRs) – ie the market value of equity relative to its accounting, or book, value – have been trending down for many G-SIBs and have remained at deeply low levels for some of them during most or all of the past decade (Graph 1). A low PBR indicates, among other things, investor scepticism about the capacity of a bank's business model to create value from the underlying assets and liabilities (eg Ikeda et al (2021), Bogdanova et al (2018)). At a macro level, such scepticism could signify an inefficient allocation of capital across financial intermediaries.

G-SIBs' PBRs: downward trend amid cross-sectional dispersion

In ratios Graph 1



Panel A: Median price-to-book ratio (PBR) and the interquartile range for 31 G-SIBs for the period. *Panel B:* The boxplots depict the minimum, 25th percentile, median, 75th percentile and maximum, of each bank's PBR from Q1 2014 to Q4 2022. The dots represent each bank's average PBR in 2022. Bank labels are based on Bloomberg tickers and spelled out in Appendix Table A1.

PBRs below 1 generate challenges that could have systemic implications. One challenge relates to generating equity capital internally, by retaining earnings. Incumbent shareholders would prefer that profits be paid out rather than reinvested in an underperforming balance sheet (eg Gordon (1959), Acharya et al (2017), Adrian et al (2018)). As an alternative, a low-valued bank could attempt to shrink its operations, which typically involves divestitures or the closure of business lines. By reducing risk-weighted assets (RWA), such actions help raise the bank's capital ratio, to meet regulatory requirements and maintain a buffer above these requirements for precautionary reasons. When adjustments are necessary at short notice,

however, the bank may need to raise capital externally, which would dilute the ownership of incumbent shareholders and could trigger an unfavourable market reaction.

Financial stability concerns may come to the fore if investors shun a G-SIB in distress. The failure of Credit Suisse in March 2023 is a case in point. With the banks' PBR having declined to less than 0.2 in early March amid significant funding outflows, a merger and public backstops became necessary to contain systemic repercussions (Böni et al (2023)).

This paper delves into the drivers of G-SIBs' subdued market valuations and assesses their implications for the banks' strategic balance sheet adjustments and capital planning in the context of rising regulatory requirements. We study 31 G-SIBs using quarterly data from 2014 to 2022.[1] This period has been marked by the phase-in of more stringent capital requirements, introduced in the aftermath of the Great Financial Crisis (GFC). Hand-collected data reveal that the Common Equity Tier 1 (CET1) requirement increased by nearly 60% on average as a percentage of RWA, from around 6.5% in 2014 to more than 10% in 2022.[2]

Our first set of results have to do with the drivers of PBR. We find that PBRs increase with (i) analysts' forecasts of banks' return on equity (ROE), despite large forecasting errors, (ii) the headroom of banks' capital ratios above regulatory requirements, or "management buffers" (in line with Dick-Nielsen et al (2023), and (iii) bank-level time-invariant factors. These three drivers jointly account for 86% of the variability in PBR, with the share being higher for advanced economy G-SIBs and lower for their Chinese peers.

We also look under the hood of ROE forecasts – which are the main drivers of PBRs, consistent with investors being forward-looking. We find that they increase with the latest realised ROEs and decrease with provisions, suggesting that credit losses are seen as eroding profits in a persistent manner. Adding fixed effects to control for bank-level time-invariant factors results in a specification that explains 90% of the variability in ROE forecasts.

Second, we document stark differences in how banks meet rising capital requirements. While high-valued G-SIBs raised their CET1 capital ratios by retaining earnings, this was not the case of their low-valued peers. In order to put a floor on their stock prices, low-valued

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[1] To underscore the *structural* nature of low PBR banks' challenges, we stop the sample period before the quarter of Credit Suisse's failure (Q1 2023). For a discussion of the role that bank valuation played during that quarter, see BIS (2023).

[2] This comparison does not account for the increased stringency in the post-GFC calculation of capital and risk-weighted assets, which has further added to the boost in capital requirements during the sample period (Cecchetti (2015)).

G-SIBs tended to distribute (almost) all of their profits as dividends. This echoes Calomiris and Nissim (2014), who point to the rising importance of dividends in signalling banks' financial strength post-GFC. Low-valued G-SIBs met regulatory requirements by downsizing business lines in order to reduce RWA.

While the retrenchment of low-valued G-SIBs could be socially beneficial in the long run, it need not always be an implementable strategy. To the extent that this retrenchment involves a shift in the provision of financial services from less to more profitable business models (CGFS (2018), Caparusso et al (2019), Goel et al (2021)), it should ultimately enhance long-term intermediation efficiency. It should also strengthen the overall resilience of the financial system by reducing the risk-taking of those G-SIBs that are particularly exposed to adverse profitability shocks (see next finding). However, in cases where a retrenchment requires longer than the available timeframe or would involve fire sales with systemic repercussions (Greenwood et al (2015)), low-valued banks may need to address capital depletion by raising equity in challenging market conditions. We find that this is indeed the case.

Namely, we find that stock-market valuations – but not CDS spreads – reflect and are responsive to adverse ROE materialisations. G-SIBs with particularly low valuations tend to face significantly higher frequencies of substantial losses (deeply negative ROEs) than high-valued peers. In an ex-ante sense, this suggests that stock-market investors detect and penalise banks at risk of losses. Ex post, i.e. following adverse ROE reports, low-valued G-SIBs are the only ones to consistently experience significant drops in equity prices, consistent with the reluctance of incumbent shareholders to see a further dilution of their stakes. In such an environment, it would be challenging for low-valued banks to raise equity in order to counteract the effect of adverse ROE on their capital. By contrast, the concurrent adjustments to CDS spreads are negligible. A possible reason is that – during our sample period – CDS investors took comfort in the post-GFC increase in G-SIBs' capital ratios.

Related literature. Our paper relates to several strands of the banking literature. One strand addresses the drivers of bank valuations since the GFC. Calomiris and Nissim (2014) associate the decline in US banks' PBRs with the decline in the value of customer relationships and other intangibles. Similarly, Sarin and Summers (2016) relate the decline in major US G-SIBs' PBRs to a loss in the banks' franchise value. Atkeson et al (2018) point to the reduction in implicit government guarantees as a complementary driver of this decline. By contrast,

Chousakos and Gorton (2017) and Dick-Nielsen et al (2023) propose respectively tighter regulation and a reduction in banks' management buffers as key drivers of the same PBR development. Bogdanova et al (2018), using a global sample, point to non-performing loans, ROE, non-interest expenses and dividends as the main valuation drivers.

Another strand of related research studies how banks adjust their balance sheets in reaction to increasing capital requirements. For instance, Couaillier (2023), Gropp et al (2019), and Berger et al (2008), demonstrate that more weakly capitalised banks react more promptly and strongly to stricter regulatory targets and typically prioritize adjustments to their balance sheets over raising capital through retained earnings. This finding aligns with Kashyap et al (2010), who emphasize the significant impact of external capital-raising frictions on banks' responses to heightened requirements. Furthermore, Goel et al (2021) highlight that a bank's capacity to generate capital is essential for its response to changes in capital requirements. Cohen and Scatigna (2016), in turn, document that more profitable banks expanded by more their lending activities in the face of rising post-GFC capital requirements. Similarly, Goel et al (2020) illustrate theoretically that banks' internal capital reallocation in response to regulatory shifts reflects the relative profitability of their business units.

Our contribution stems from the combination of our findings, which underscores a tight link between G-SIBs' profitability, valuation and resilience. A higher ROE (a measure of profitability) and a larger management capital buffer (a measure of resilience) both raise valuation, as captured by the PBR. At the same time, low-valued G-SIBs strike a delicate balance in catering to both investors and regulators. The resilience of these banks is precarious as they frequently incur large losses and thus face a high risk of having to raise equity in particularly challenging markets. Ultimately, to identify pockets of vulnerability in the banking sector, it is necessary to account for valuations and profitability in addition to management buffers.

Roadmap. The remainder of this paper is organised in five sections. Section 2 provides an overview of the datasets. In Section 3, we study the drivers of G-SIBs' PBRs and look under the hood of the strongest one – ROE forecasts. In Section 4, we explore how the PBR has shaped the way in which banks manage their balance sheets in the face of rising capital requirements and investor demands. In Section 5, we investigate how the propensity to experience particularly large losses varies with the PBR and study the equity and credit market responses to adverse earnings releases. We conclude with policy lessons in Section 6.

2 Data

Our sample is quarterly, from 2014 to 2022 and covers 31 publicly listed banks that were classified as G-SIBs for most or all of this period.[3] The data are at the bank level, with summary statistics reported in Table 1 (panel A).

Summary statistics — Table 1

	Obs	P25	P50	P75	Mean	StDev
A. Quarterly bank-level characteristics						
Price-to-book ratio	1,116	0.57	0.78	1.09	0.87	0.40
Forecast ROE (%)	1,093	6.70	8.67	11.51	9.27	3.63
ROE realised (%)	1,116	5.88	8.70	11.44	7.94	7.86
CET1 capital ratio (%)	1,116	11.30	12.28	13.81	12.70	1.95
Transitional management buffer (%)	1,036	2.13	3.40	4.96	3.73	2.29
Fully-loaded management buffer (%)	1,108	1.78	2.68	3.90	3.00	1.94
Loans (% of total assets)	1,010	33.40	38.89	52.85	41.12	14.00
Cash (% of total assets)	1,082	10.64	14.39	18.56	14.93	6.61
Deposits (% of total funding)	1,086	49.22	65.57	78.03	63.11	17.94
Provisions (% of loans)	1,010	0.02	0.09	0.22	0.13	0.15
Leverage (log of total assets-to-equity)	1,076	2.52	2.73	3.07	2.78	0.33
Total assets (log)	1,086	13.78	14.34	14.72	14.23	0.65
Dividends (4Q rolling, % of equity)	1,106	0.65	1.07	1.57	1.21	0.78
B. Daily market data						
Excess equity returns (%)	23,980	–3.53	0.00	3.03	–0.07	6.63
Excess CDS spread (%)	23,980	–5.47	–0.43	3.04	–0.86	10.97

The sample period is from the first quarter of 2014 to the fourth quarter of 2022. *Price-to-book ratio* = quarterly average of banks' daily price-to-book ratio; *Forecast ROE* = median of equity analysts' forecast of banks' return on equity (ROE) in per cent over the next twelve months, as per the last day of each quarter; *ROE realised* = quarterly realised return on equity, annualised in per cent; *CET1 capital ratio* = Common Equity Tier 1 (CET1) capital as a percentage share of risk-weighted assets; *Transitional management buffer* = percentage difference between the CET1 capital ratio and all disclosed CET1 capital requirements at the time of reporting; *Fully-loaded management buffer* = percentage difference between the CET1 capital ratio and the fully-loaded (ie after completion of the phase-in) CET1 capital requirements; *Loans* = total gross loans as a percentage share of total assets; *Cash* = cash and cash equivalents as a percentage share of total assets; *Deposits* = customer deposits as a percentage share of total assets; *Provisions* = loan loss provisions as a percentage share of total gross loans; *Leverage* = natural logarithm of the ratio of total assets to common equity; *Total assets* = natural logarithm of total assets; *Dividends* = four-quarter trailing average of dividend payments as a percentage share of common equity; *Excess equity returns* = daily log difference in banks' equity price minus the daily log difference in the MSCI All Country World United States Dollar equity index (cumulated for up to 25 business days in the analysis); *Excess CDS spread* = daily log difference in banks' 5-year on the run US dollar credit default swap (CDS) spread minus the daily log difference in the Markit CDX.NA.IG index (cumulated for up to 25 business days in the analysis).

Two key variables are PBR and ROE forecasts. We work with the quarterly average of daily PBR, which we obtain from Refinitiv Eikon Datastream. The same data source provides

[3] The sample includes two former G-SIBs (Natwest Group and Nordea) and excludes one current G-SIB (Groupe BPCE) as it is not publicly listed and thus does not have a PBR.

equity analysts' *one-year* forecasts of banks' ROE – the standard industry reference.[4] When we refer to an ROE forecast below, we mean the median value across analysts in a given quarter.[5]

In addition, our data comprises capital ratios and requirements. We obtain the ratio of Common Equity Tier 1 (CET1) capital to risk-weighted assets (RWA) from S&P Capital IQ. CET1 capital provides loss absorption as a going concern and is therefore of direct relevance to equity holders. In turn, we draw on banks' regulatory disclosures and annual reports for their CET1 capital requirements. These comprise the so-called Pillar 1 requirements under Basel III, which include the regulatory minima, the capital conservation buffer, the countercyclical capital buffer (which varies across countries and time) and the G-SIB buffer (which vary across G-SIBs). We also include so-called Pillar 2 (or supervisory) requirements, e.g. the stress capital buffer for US G-SIBs, the systemic risk buffer for EU G-SIBs and any additional bank-specific CET1 requirements publicly disclosed in banks' reports. Subtracting the overall CET1 regulatory requirements from banks' reported CET1 capital ratio, we obtain a *proxy* for banks' "management buffer".[6] Since our sample period covers the phase-in of Basel III, we calculate two versions of the managements buffer.[7] One is a *transitional* management buffer, based on the requirements in effect at particular points in time. The other is a *fully-loaded* management buffer, assuming that banks and markets behave as if all requirements have been phased in.[8]

We obtain quarterly balance sheet and earnings information – which can influence equity investors' perceptions of risk and future income streams – from S&P Capital IQ. Two of the variables are: loans (as a share of total assets), which reflects the bank's business model, and loan loss provisions (as a share of loans), capturing variations in banks' exposure to credit risk. We also use the log of total assets-to-equity as a measure of leverage, which affects mechanically ROE for given return-on-assets. In addition, we consider cash and cash equivalents (as a share of total assets), and deposits (as a share of total funding) to factor in

[4] The accounting literature use analysts' forecasts to estimate banks' expected ROE. See, for example, Dick-Nielsen et al (2022) for a discussion and a recent application.

[5] Two clarifications are in order. First, analysts differ in terms of the dates on which they post their forecasts within a quarter. Second, longer-horizon forecasts, while more relevant for equity valuations in principle, tend to be provided by fewer analysts. Across those analysts in our sample who provide longer-term forecasts and across G-SIBs, the median correlation between one-year and two-year ROE forecasts, is 0.93.

[6] Our measure of the management buffer incorporates undisclosed supervisory "guidance" in some jurisdictions.

[7] While the phase-in of Basel III was already initiated in 2013, the start of our sample is determined by the availability of detailed information on banks' CET1 capital requirements, which for most G-SIBs starts in 2014.

[8] Our measure of the management buffer accords with the findings in Couaillier (2021), who argues that in setting capital ratio targets, banks treat buffer requirements as regulatory minimum requirements.

differences in banks' liquidity positions and funding profiles. Total assets (in logs) accounts for potential investor perceptions that some banks are "too big to fail". And the four-quarter rolling average of dividend payments (as a share of common equity) captures banks' distribution policy. From S&P Capital IQ, we also retrieve data on the share of G-SIBs' equity held by governments and state-affiliated entities.

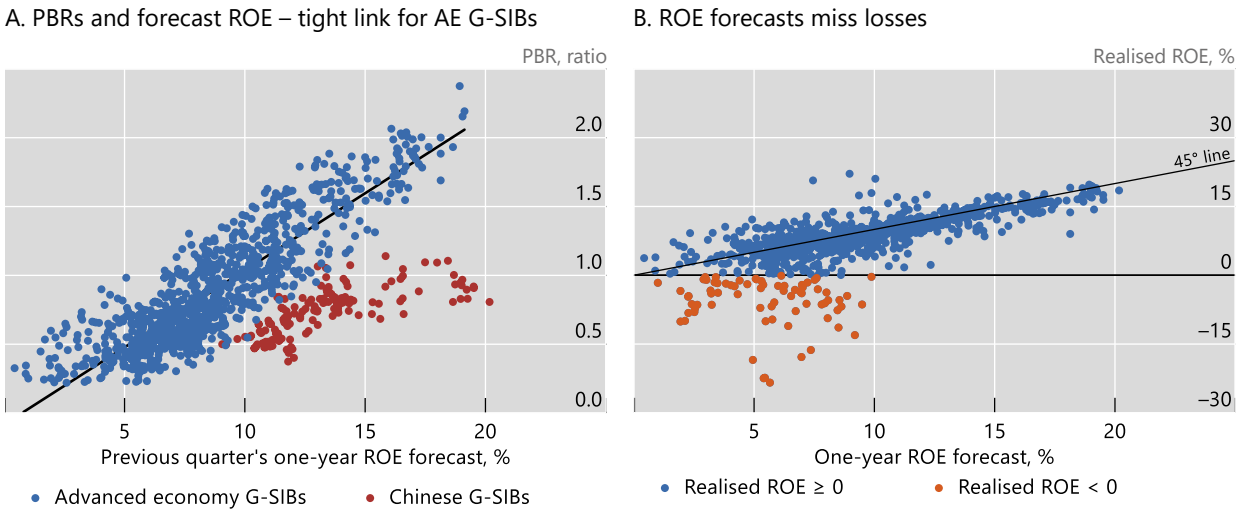
To study market pricing effects, we obtain daily data on banks' stock prices and 5-year US dollar credit default swap (CDS) spreads from Bloomberg, Datastream and Markit (Table 1, Panel B). We calculate daily returns based on log changes. From these, we obtain excess returns by subtracting the corresponding log changes of equity and CDS indices – i.e. *MSCI All Country World US Dollar* and 5-year US dollar CDS spreads on non-financial investment grade US corporates (*Markit CDX.NA.IG*), respectively.

3 Drivers of bank valuation dispersion

3.1 The importance of ROE forecasts and management buffers

G-SIBs' PBRs correlate remarkably closely with analysts' ROE forecasts. We see this by juxtaposing the average PBR of each bank over quarter *t* and the one-year ROE forecast formed in quarter *t-1* (Graph 2.A).

PBRs and forecast ROE are tightly linked despite large forecast errors — Graph 2



Panel A: Bank-quarter observations. The line represents the linear fit for advanced economy (AE) G-SIBs. *Panel B:* Realised ROE is cumulated over a four-quarter period, starting after the quarter in which the one-year ROE forecast is formed.

This finding tallies with the long-standing notion that equity investors value sustainable dividends and that a higher ROE is perceived to improve the capacity to deliver such dividends (eg Gordon (1959), Allen and Michaely (2003)). It is nevertheless remarkable in the light of the large forecast errors relative to realised ROE (Graph 2.B). These deviations reveal analysts' tendency to overestimate future ROE (67% of the dots in Graph 2.B are below the 45-degree line) and, in particular, systematic misses of large losses (orange dots).

To study more formally the drivers of G-SIBs' PBRs, we estimate a panel regression:

$$PBR_{i,t} = \beta_R\, ROE_{i,t-1} + \beta_B\, Buffer_{i,t-1} + \beta\, Controls_{i,t-1} + \alpha_i + \varepsilon_{i,t} \quad , \qquad (1)$$

where $PBR_{i,t}$ is the average of bank *i*'s daily price-to-book ratios in quarter *t*. In turn, $ROE_{i,t-1}$, stands either for the forecast ROE or the realised ROE, or the two variables used simultaneously as regressors. We lag these regressors by one quarter to address potential endogeneity issues.

We use three alternative measures of the (lagged) management buffer, $Buffer_{i,t-1}$. Two of these are the transitional and fully-loaded variants. The third one is an orthogonalized buffer, which we set equal to the residuals of a regression of banks' transitional management buffer on their CET1 capital ratio. For this, we follow Dick-Nielsen et al (2023), who hypothesise that only those changes in the buffer that are unrelated to changes in regulatory requirements should matter for equity holders.

The lagged bank-level $Controls_{i,t-1}$ account for additional time-varying bank characteristics (Table 1, panel A). These were introduced and motivated in the previous section as well as commonly used in the related literature (eg Calomiris and Nissim (2014), Bogdanova et al (2018), Dick-Nielsen et al (2023)). Finally, α_i stands for bank fixed effects. In all regressions, we cluster the standard errors by bank and quarter to account for cross-sectional and serial correlation.

The first regression results confirm the tight link between PBRs and forecast ROE (Table 2). Banks with a more favourable profitability outlook benefit from higher PBRs (column (1)). The impact is both statistically and economically significant. A one standard deviation increase in forecast ROE (i.e. about 3.6 percentage points) is associated with the PBR rising by about 0.3. While there is also a positive relationship between PBR and realised ROE

(column (2)), the relationship with forecast ROE dominates (column (3)). This is consistent with investors being forward-looking and filtering out non-recurring gains or losses.[9]

Estimating bank price-to-book ratios — Table 2

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Forecast ROE	0.080***		0.082***	0.064***	0.059***	0.058***	0.059***
	(0.015)		(0.015)	(0.007)	(0.008)	(0.008)	(0.007)
ROE (realised)		0.020***	–0.001	0.000	0.001	0.001	0.001
		(0.007)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Management buffer				0.021***	0.018***	0.021***	0.005
				(0.006)	(0.006)	(0.007)	(0.007)
Loans (% of assets)					–0.005	–0.005	–0.006
					(0.004)	(0.004)	(0.004)
Cash (% of assets)					–0.008**	–0.007**	–0.010***
					(0.003)	(0.003)	(0.003)
Deposits (% of funding)					0.001	0.001	0.0003
					(0.002)	(0.002)	(0.002)
Provisions (% of loans)					–0.125	–0.128	–0.137
					(0.141)	(0.138)	(0.147)
Leverage (log)					0.108	0.073	0.126
					(0.120)	(0.124)	(0.137)
Total assets (log)					–0.175	–0.155	–0.183
					(0.134)	(0.134)	(0.132)
Dividend ratio (trailing)					–0.010	–0.008	–0.014
					(0.015)	(0.015)	(0.017)
Buffer calculation				Transitional	Transitional	Orthogonalized	Fully loaded
Bank fixed effects				Yes	Yes	Yes	Yes
Adjusted R2	0.520	0.155	0.520	0.863	0.871	0.872	0.865
Observations	1,062	1,085	1,062	982	864	864	860

*/**/*** indicates statistical significance at the 10/5/1% level. OLS regressions with robust standard errors, clustered by bank and quarter. The dependent variable is the average quarterly price-to-book ratio. All independent variables are lagged by one quarter. The transitional capital buffer, used in columns (4) to (5), is equal to the percentage difference between the CET1 capital ratio and the transitional CET1 requirement. The orthogonalized capital buffer (column (6)) is equal to the residual of a regression of the transitional buffer on the CET1 capital ratio. The fully-loaded capital buffer, used in column (7), is equal to the percentage difference between the CET1 capital ratio and the fully-loaded CET1 requirements (i.e. after the completion of the Basel III phase-in).

The transitional management buffer is also an important driver of PBRs. Its coefficient is strongly statistically significant, as reported in Table 2, column (4). The economic significance is non-negligible: a one standard deviation increase in this buffer (i.e. about 2.3 percentage points), is associated with an increase in the PBR of about 0.05. We obtain this result in the presence of bank fixed effects and find that it is robust to including the control variables

[9] Non-recurring gains or losses could stem from the sale of businesses or portfolios, fines or penalties, or restructuring charges.

(column (5)) and using the orthogonalized buffer (column (6)). This suggests that banks' market value is supported by keeping the bank further away from breaching a regulatory requirement, consistent with the findings in Dick-Nielsen et al (2023). Together with bank fixed effects, the transitional management buffer improves the goodness-of-fit from 52% to 86%. By contrast, we obtain an insignificant coefficient for the fully loaded buffer (column (7)). The long phase-in period of the regulatory reforms, which provided banks ample time to adjust their balance sheet and capital ratio to meet the new requirements, makes the fully loaded buffer a noisy indicator of distance to a regulatory breach.

The only significant control is the cash ratio. Its negative sign is consistent with more conservative liquidity management lowering profitability and, thus, the PBR. Specifically, we estimate that a one standard deviation increase in the cash ratio, i.e. roughly 6.6 percentage points, is associated with a decline in the PBR by about 0.05.

3.2 Alternative cuts of the data

In this subsection, we implement alternative cuts of the data, motivated by (i) Chinese G-SIBs standing out as regards the relationship between forecast ROEs and PBRs (Graph 2.A) and (ii) a pronounced downward trend in some banks' PBR (as implied by Graph 1).

We re-run our regression, focusing only on advanced economy (AE) G-SIBs or on Chinese G-SIBs at a time. As foreshadowed by the scatterplot in Graph 2.A, we find that ROE forecasts are strongly related to PBRs in the case of AE G-SIBs (Table 3, column (1)) but much less so in the case of Chinese G-SIBs (column (2)). In addition, Chinese G-SIBs' PBR are less sensitive to management buffers and decline with the relative size of the loan book. These findings are confirmed by a specification that allows AE and Chinese G-SIBs to differ with respect to the coefficient of the above variables (column (3)).

To abstract from trends in PBR, which can generate spurious results, we also estimate the richest regression specification in terms of *year-on year changes* (Table 3, column (4)).[10] We find that the explanatory power of forecast ROE is robust to this modification. And so is the effect of the management buffer, even though not in the case of Chinese G-SIBs.

[10] We opt for year-on-year changes because the key regressors tend to change little within a year. Using quarter-on-quarter changes delivers similar results for the ROE forecasts but the other variables become insignificant.

Price-to-book ratios: Chinese G-SIBs and regressions year-on-year changes Table 3

	(1)	(2)	(3)	(4)
Forecast ROE: AE G-SIBs	0.065***		0.065***	0.065***
	(0.009)		(0.009)	(0.012)
Forecast ROE: CN G-SIBs		0.012	0.016*	0.040*
		(0.006)	(0.010)	(0.017)
Management buffer: AE G-SIBs	0.020***		0.020***	0.022*
	(0.006)		(0.006)	(0.011)
Management buffer: CN G-SIBs		0.011	0.013*	0.002
		(0.009)	(0.007)	(0.008)
Loans (% of assets): AE G-SIBs	–0.005		–0.005	0.000
	(0.005)		(0.005)	(0.007)
Loans (% of assets): CN G-SIBs		–0.015**	–0.023**	–0.041
		(0.004)	(0.010)	(0.023)
ROE (realised)	0.001	0.003	0.001	–0.001
	(0.001)	(0.005)	(0.001)	(0.002)
Cash (% of assets)	–0.005	0.014	-0.005	0.000
	(0.004)	(0.013)	(0.004)	(0.006)
Deposits (% of funding)	0.0005	0.001	0.001	–0.001
	(0.002)	(0.010)	(0.002)	(0.004)
Provisions (% of loans)	–0.122	–0.324	–0.125	–0.107
	(0.150)	(0.240)	(0.142)	(0.165)
Leverage (log)	0.156	–1.136	0.153	–0.197
	(0.129)	(0.799)	(0.126)	(0.220)
Total assets (log)	–0.244	–0.214*	–0.251	0.115
	(0.178)	(0.085)	(0.171)	(0.241)
Dividend ratio (trailing)	–0.012	–0.055*	–0.014	0.018
	(0.017)	(0.020)	(0.016)	(0.010)
Regression	Levels	Levels	Levels	Q4 to Q4 difference
Sample	AE G-SIBs	Chinese G-SIBs	All G-SIBs	All G-SIBs
Bank fixed effects	Yes	Yes	Yes	Yes
Adjusted R2	0.874	0.816	0.874	0.290
Observations	800	64	864	209

*/**/*** indicates statistical significance at the 10/5/1% level. OLS regressions with robust standard errors, clustered by bank and quarter. The dependent variable is the average quarterly price-to-book ratio (PBR) in columns (1) to (3) and the year-end to year-end difference in the PBR in column (4), respectively. The management buffer is equal to the percentage difference between the CET1 capital ratio and the transitional CET1 requirement. Sample: the regression in column (1) comprises only advanced economy (AE) G-SIBs, the one in column (2) comprises only Chinese (CN) G-SIBs, whereas the regressions in columns (3) and (4) are based on all G-SIBs, respectively.

3.3 Unpacking ROE forecasts

We now look under the hood of the strongest driver of PBRs: ROE forecasts. In particular, we check whether bank characteristics that have been used in prior research to explain PBRs (eg Bogdanova et al (2018), Calomiris and Nissim (2014)) also serve to explain bank analysts' ROE forecasts. Specifically, we estimate the following equation:

$$ROE^{f}_{i,t} = \beta_R\, ROE_{i,t-1} + \beta_B\, Buffer_{i,t-1} + \beta_P\, PBR_{i,t-1} + \beta\, Controls_{i,t-1} + \alpha_i + \varepsilon_{i,t}\,, \qquad (2)$$

where $ROE^{f}_{i,t}$ represents analysts' one-year forecast ROE for bank i at the time of quarter t. We consider as explanatory variables the first lags of realised ROE, management buffers, PBRs and the controls used in equation (1).

Drivers of forecast ROE — Table 4

	(1)	(2)	(3)
ROE (realised)	0.071***		0.050**
	(0.023)		(0.018)
Management buffer	0.040		–0.029
	(0.060)		(0.048)
Loans (% of assets)	0.007		0.024
	(0.039)		(0.027)
Cash (% of assets)	–0.044		0.024
	(0.038)		(0.028)
Deposits (% of funding)	0.028		0.020*
	(0.018)		(0.011)
Provisions (% of loans)	–3.732***		–2.772***
	(0.737)		(0.813)
Leverage (log)	3.137**		2.085*
	(1.295)		(1.020)
Total assets (log)	–2.431		–1.068
	(1.544)		(0.975)
Dividend ratio (trailing)	0.469**		0.226*
	(0.186)		(0.121)
Price-to-book ratio		6.672***	5.102***
		(0.459)	(0.507)
Bank fixed effects	Yes		Yes
Adjusted R2	0.840	0.556	0.904
Observations	865	1,063	865

*/**/*** indicates statistical significance at the 10/5/1% level. OLS regressions with robust standard errors, clustered by bank and quarter. The dependent variable is the median of equity analysts' forecast ROE over a 12-month horizon as of the last day of each quarter. All independent variables are lagged by one quarter. The management buffer, used in columns (1) and (3), is equal to the percentage difference between the CET1 capital ratio and the transitional CET1 capital requirements.

The estimation results reveal that forecast ROE summarises in itself a number of PBR drivers (Table 4). Of the included bank-level characteristics, lagged realised ROE, provisions, leverage and the dividend payout ratio stand out with their explanatory power. The positive coefficient on realised ROE (column (1)) suggests perceived persistence in profitability and is consistent with the positive effect of realised ROE on PBRs that Bogdanova et al (2018) find in the absence of controls for forecast ROE. In turn, higher provisions depress PBR, consistent with concerns that credit-related losses will continue eroding profits. The positive coefficient of higher leverage reflects the fact that this variable raises ROE mechanically, all else the same. Finally, we find a positive effect of the dividend ratio, which accords with the findings in Calomiris and Nissim (2014), who argue that higher payouts signal higher profits down the road.

Importantly, the regression results provide indirect evidence of entrenched persistence in PBR. Lagged PBR exhibits strong and robust explanatory power as regards forecast ROE, which, in turn – as we saw above – explains to a large extent future PBR (Table 4, column (2)). On its own, lagged PBR accounts for 56% of the variability in ROE. Together with bank-level characteristics, it raises the goodness-of-fit to 90% (column (3)).

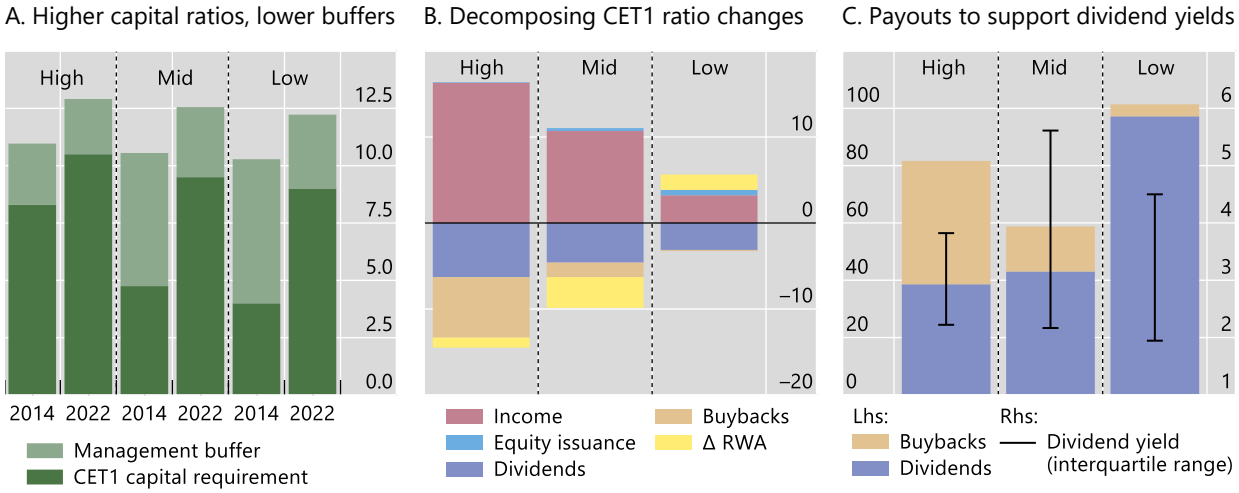
4 Bank capital management and distributions

Irrespective of their valuation and profitability, all G-SIBs operated as going concerns during our sample period (2014–22), which implies that they all succeeded in meeting their regulatory requirements and in satisfying their investors. In studying the evolution of regulatory capital and payouts to shareholders, we divide G-SIBs into three groups, based on a summary statistic of their valuation over the sample period – the bank-level average PBR. The first group comprises high-valued banks, with average PBR above 1, which implies a viable business model. At the other extreme is a group of chronic underperformers, or low-valued GSIBs, with average PBR below 0.6. Denoting the remaining banks as mid-valued ones, we obtain groups of 10, 9 and 12 G-SIBs, respectively. We expect capital management and payouts to differ starkly between high-valued and low-valued banks, as the former (latter) would face low (high) cost of equity relative to ROE according to the Gordon (1959) model; or more generally, would have strong incentives (disincentives) to reinvest earnings (eg Acharya et al (2018)).

Our sample period features a steady increase in regulatory capital requirements that affected many banks, G-SIBs in particular. Notably, the capital conservation buffer and the G-SIB buffer were phased in from 2016 to 2019 as part of the Basel III regulatory reforms.[11] Adding stress-test-based or discretionary Pillar 2 requirements, the *publicly disclosed* CET1 capital-to-RWA requirement increased by 3.5 percentage points for the median G-SIB (an increase of almost 60%), while rising by more than 7 percentage points (or almost doubling) for some banks between 2014 and 2022.[12] The correlation between these changes and the corresponding change in PBRs is insignificant, thus casting doubt on arguments that more stringent capital requirements have driven the decline in G-SIBs' franchise values (Baker and Wurgler (2015), Chousakos and Gorton (2017), Couaillier and Henricot (2023)).

Balancing regulatory constraints and market demands

In per cent — Graph 3



Banks are grouped by their average PBR over the period from 2014 to 2022: high: PBR > 1; mid: PBR of 0.6 to 1; low: PBR < 0.6.

Panel A: Medians of G-SIBs' transitional CET1 capital requirements and CET1 capital held in excess of transitional requirements (management buffer) as a share of RWA. Based on a balanced sample of 28 G-SIBs for which transitional requirements are available for both 2014 and 2022. *Panel B:* The bars represent the contribution to the change in banks' CET1 capital ratio from 2014 to 2022 due to: (i) income, defined as cumulative comprehensive income net of capital adjustments (eg changes in deferred tax assets or goodwill); (ii) cumulative gross equity issuance; (iii) cumulative dividends on common shares; (iv) cumulative buybacks; and (v) changes in RWA. *Panel C:* The bars (left-hand scale) depict cumulative buybacks and dividends from 2014 to 2022 as a share of cumulative comprehensive income, net of the same adjustments as in Panel B. The whiskers (right-hand scale) plot the interquartile range of quarterly dividend yields, defined as the dividend payment divided by the corresponding stock price, for each group of banks.

Even though bank capital ratios were sufficient already in 2014 to meet the requirements in 2022, they rose over the nine years for each of the three groups, as G-SIBs maintained a

[11] See the Basel III transitional arrangements available at https://www.bis.org>basel3>b3_trans_arr_1728.pdf

[12] For US banks, the majority of high-valued G-SIBs in the sample, published stress-test-based capital requirements notably increased before 2014.

management buffer (Graph 3.A). Among the low-valued G-SIBs, the median bank's buffer was about one-third larger in 2022 than that of the median high-valued G-SIB: 3.2 percentage points vs 2.4 (light green bars).[13] However, relative to its starting value in 2014, the median bank's buffer fell by nearly 50% for the low-valued group, contributing to the decline in PBRs.[14]

We next decompose the changes in CET1 capital ratios as follows (Graph 3.B):

$$\Delta\left(\frac{CET1}{RWA}\right) = \frac{income + gross\ equity\ issuance - (dividends + buybacks)}{RWA_{2014}} - \gamma\,\Delta RWA \quad , \qquad (3)$$

with Δ representing the difference between values in 2022 and 2014 and $\gamma = \frac{CET1_{2022}}{RWA_{2014} \times RWA_{2022}}$. The first term on the right-hand side of (3) reveals how income streams (comprehensive income net of capital adjustments),[15] gross equity issuance and distributions to shareholders (dividends and buybacks) affected banks' capital ratios while keeping RWA unchanged. In turn, the second term reveals how adjustments to RWA changed the capital ratio while holding capital constant.[16]

The stark profitability differences across the three G-SIB groups shaped how they managed their balance sheets while meeting the increase in capital requirements. With income streams in excess of total distributions to shareholders, high- and mid-valued G-SIBs grew their RWA and still improved their capital positions. With their smaller income streams, low-valued G-SIBs were effectively the only ones with material net issuance of equity.[17]

Low-valued banks also stood out in that the rise in their CET1 capital ratios was partly due to shrinking RWA.[18] Concretely, RWA increased by 8% and 23%, respectively, for high- and mid-valued banks and fell by 14% for low-valued banks from 2014 to 2022. Keeping all else

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[13] It is unlikely that the low-valued banks' PBRs stem from the negative effect of higher regulatory capital on leverage and thus ROEs. For one, the overall CET1 capital ratios are similar across bank groups (Graph 3.A). In addition, the results in Table 2 reveal that leverage did not drive PBRs. Probably most importantly, there is a close correspondence between G-SIBs' ROE and their return-on-assets, which is independent of leverage. For the G-SIBs in our sample, the pairwise correlation coefficient for ROE and return-on-assets is 0.6, which is statistically significant at the usual confidence levels.

[14] Dick-Nielsen et al (2023) study US banks and argue that the shrinkage in management buffers has prevented banks' equity risk from falling despite the overall increase in capital ratios (see also Sarin and Summers (2016)).

[15] Comprehensive income includes several accounting items, such as investment revaluation, adjustments to the fair value of own debt and derivatives. We deduct capital adjustments, such as the writedown of goodwill, as they are not factored into comprehensive income but may reduce banks' available CET1 capital.

[16] Note that $-\gamma\,\Delta RWA = \frac{CET1_{2022}}{RWA_{2022}} - \frac{CET1_{2022}}{RWA_{2014}}$.

[17] Low-valued banks' gross (net) equity issuance amounted to $31 billion ($24 billion) from 2014 to 2022, equivalent to 0.6% (0.5%) of their total RWA in 2014. High- and mid-valued banks had a combined gross equity issuance equivalent to $47.1 billion, whereas their net issuance totalled –$542 billion.

[18] In addition to raising the capital ratio, balance sheet shrinkage can also contribute to reducing G-SIBs' regulatory capital surcharges (eg Goel et al (2021)).

the same, the reduction in the latter banks' RWA raised their average capital ratio by around 1.8 percentage points, or 75% of the total increase.

Profitability differences notwithstanding, banks from all groups distributed substantial shares of their income in the form of dividends or share buybacks (Graphs 3.B and 3.C). Buybacks were a distinguishing feature of the high-valued group, consistent with smaller needs to reassure investors with a stable dividend stream. By contrast, low-valued banks resorted mostly to dividend payouts, often as high as or in excess of their income streams. This is in line with research showing that banks' dividend payout ratios are disproportionately higher at low PBRs (Gambacorta et al (2023)) – at such PBRs, investors prefer payouts over retained earnings (Blume (1980)). It also tallies with the theoretical implications in Acharya et al (2017), who show how low franchise values can incentivise banks to pay out an excessively large share of their income to shareholders.

While it is unclear whether high dividends were successful in convincing investors of low-valued banks' financial strength (eg Calomiris and Nissim (2014), Forti and Schiozer (2015)), they did put a floor under share prices. This transpires from the comparable dividend yields across G-SIB groups (Graph 3.C whiskers). Through this lens, low-valued banks' dividend policy reflects a market-imposed constraint, rather than a discretionary choice between paying out profits and reinvesting them in order to grow the balance sheet.

5 Adverse quarters and market responses

5.1 Frequency of adverse quarters

Equity investors would also consider the risk that profitability will deviate from forecasts and the extent to which this may happen. In a sign that G-SIB valuations reflect this risk, we find that low PBRs go hand-in-hand with a high frequency of particularly unfavourable *realised* ROEs down the road.[19]

To illustrate, we first pool ROEs over time and across banks and denote bank-quarter pairs in the left tail of the resulting distribution as "adverse quarters". Specifically, a quarter is defined to be adverse if (i) the quarter-on-quarter (QoQ) decline in the bank's ROE exceeds

[19] In principle, a higher ROE volatility could be due to higher leverage. That said, a comparison of returns-on-assets across the G-SIBs we consider implies that differences in ROE volatility stem predominantly from differences in net income volatility.

the sample standard deviation of the pooled QoQ ROE changes and (ii) the ROE is below the particular bank's average ROE from 2014 to 2022. This yields a total of 46 adverse quarters between Q1 2014 and Q4 2022, equivalent to around 4% of the bank-quarter observations. During these quarters, the median ROE decline was 16.7 percentage points, leading to a median ROE level of –10.9%, compared with +8.9% for all other quarters.

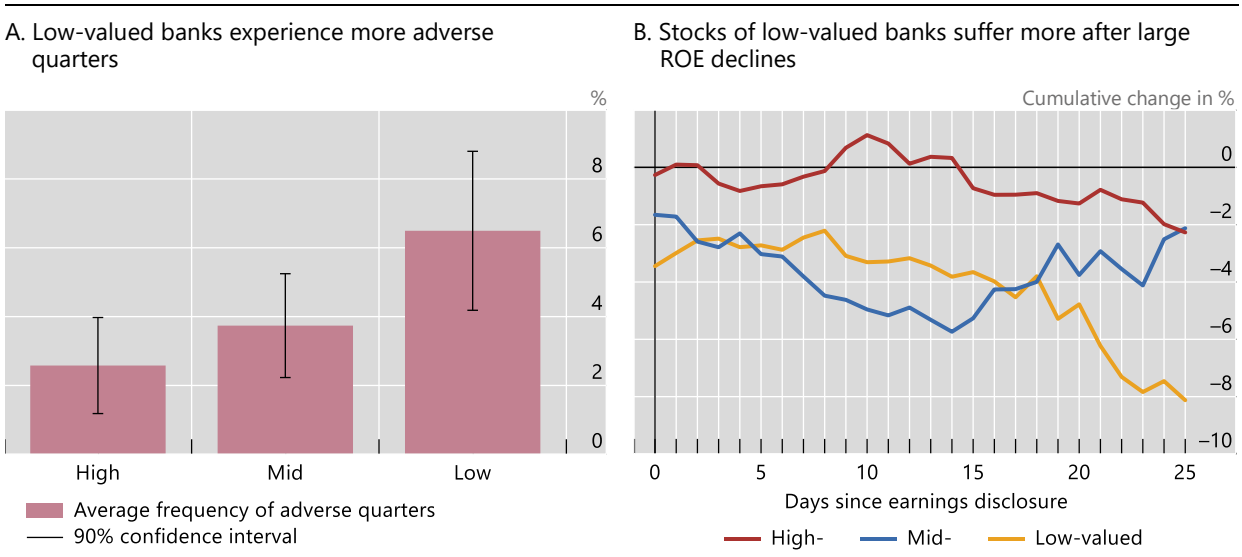
Next, we allocate bank-quarter pairs to three groups, according to the PBR. We use the same cut-offs as above – 0.6 and 1 – for *low*-, *mid*- and *high*-valued groups. But, in order to take into account recent valuations – as they arguably reflect the relevant risk perceptions – we apply these cut-offs to a bank's PBR in the previous quarter. This yields 308, 428 and 349 bank-quarter observations in the low-, mid- and high-valued groups, respectively.

Finally, we estimate the following logistic regression:

$$logit(\,P\,(Adverse\ quarter_{i,t} = 1 \mid PBR_{i,t-1})) = \alpha + \beta_{high}\,PBR_{high,t-1} + \beta_{mid}\,PBR_{mid,t-1} + \beta_{low}\,PBR_{low,t-1} + \varepsilon_{i,t} \qquad (4)\,,$$

where *Adverse Quarter*$_{i,t}$ is a binary variable that is equal to one for adverse quarters (and zero otherwise) and *PBR*$_{j,t-1}$, $j \in$ *(high, mid, low)* indicates the PBR grouping in the previous quarter.

Adverse results and market responses — Graph 4



Panel A: The bars depict the average frequency of adverse quarters for each group of banks and the corresponding 90% confidence interval based on the logistic regression in equation (2). The difference between the average frequency of adverse quarters of low- and high-valued banks is statistically significant at the 95% confidence level. Banks are grouped by their PBR in the quarter preceding the adverse quarter: high: PBR>1; mid: PBR of 0.6 to 1; low: PBR<0.6. *Panel B:* Cumulative excess returns, averaged by bank group, for the 25 business days following the disclosure of an adverse earnings report. Banks are grouped by their PBR 10 days before the disclosure date based on the same cutoff levels as in Panel A.

Estimating this regression reveals that low PBRs are associated with a significantly higher probability of experiencing an adverse quarter (Graph 4.A). At around 7% (i.e. about three adverse quarters over the 9 years of observation), adverse quarters are on average more than three times as frequent for low-valued than for high-valued banks. A standard t-test reveals that the difference between the two frequencies is statistically significant at the 95% confidence level.

5.2 Market responses

Stock market participants are particularly sensitive to adverse results of low-valued G-SIBs. Graph 4.B plots cumulative excess stock returns over the 25 business days following the day of an earnings report in an adverse quarter. These returns are averaged within three PBR groups, based on the PBR ten days before the earnings report and the above cutoff values of 0.6 and 1. While the percentage fall in share prices is largest on impact for the low-valued banks, it is the cumulative fall for these banks after 25 business days that truly stands out. The regularity is consistent with market participants being concerned that, if a deeply negative ROE necessitates remedial actions, these would be much costlier for a low-valued bank.

To assess the robustness of this observation, we estimate the following regression for periods of various lengths – measured in number of days *d*, starting on the day after the release of banks' earnings reports:

$$
\begin{aligned}
&Cumulative\ excess\ return_{i,d,t} \\
&\quad = \alpha_i + \beta_{high}\, PBR_{high,t} \times Adverse\ Quarter_{i,t} \\
&\quad + \beta_{mid}\, PBR_{mid,t} \times Adverse\ Quarter_{i,t} + \beta_{low}\, PBR_{low,t} \times Adverse\ Quarter_{i,t} \\
&\quad + \beta\, Controls_{it} + \varepsilon_{i,d,t}\ . \qquad (5)
\end{aligned}
$$

The dependent variable is bank *i*'s cumulative return in excess of the corresponding return on a global equity index over the *d* business days in focus after the release of earnings results for quarter *t*. For each of the 985 earnings releases in our sample, we consider the market response for $d \leq 25$. $PBR_{j,t}$, *where* $j \in$ *(high, mid, low),* indicates the grouping in Graph 4.B, which accounts for the latest valuations and avoids potential endogeneity issues. We interact the group identifiers with the binary variable $Adverse\ Quarter_{i,t}$, which is equal to one for quarters *t* with an adverse earning reports and zero otherwise. The controls include bank fixed effects, the

Q-on-Q change in realised ROE and the transitional management buffer in quarter *t*. The latter accounts for how close a reported loss pushes banks to breaching regulatory requirements.

The release of adverse results is associated with significantly negative excess returns for low-PBR G-SIBs. In line with Graph 4.B, Table 5 reports that the excess returns of these banks drop by 2.5 percentage points on the day following an adverse earnings release. The effect is highly persistent, with the drop amounting to as much as 4.2 and 7.9 percentage points on the 20th and 25th business day after the release, respectively. This finding contrasts with the statistically insignificant effects in the case of high- and mid-valued G-SIBs. In addition, a deeper decline in reported ROE reduces excess returns, whereas a higher management buffer supports them, even though the effects are statistically significant only at some horizons.

Equity market impact of disclosing adverse quarter results — Table 5

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
High-valued bank	0.810	0.863	0.226	–0.137	0.285	–0.161	–1.424
	(0.825)	(0.666)	(0.696)	(0.902)	(1.009)	(1.584)	(1.574)
Mid-valued bank	–0.973	–1.770*	–2.000	–1.657	–1.955	–2.329	–1.410
	(0.724)	(0.979)	(1.383)	(1.452)	(1.566)	(2.494)	(3.555)
Low-valued bank	–2.531***	–2.073***	–2.077**	–2.479**	–2.120*	–4.148*	–7.895**
	(0.882)	(0.752)	(0.836)	(1.123)	(1.064)	(2.265)	(3.330)
ΔROE	0.023	0.027	0.029	0.026	0.038*	0.051	0.028
	(0.017)	(0.016)	(0.019)	(0.018)	(0.020)	(0.040)	(0.038)
Management buffer	0.072	0.089*	0.114**	0.118*	0.086	0.109	0.198*
	(0.045)	(0.051)	(0.051)	(0.069)	(0.083)	(0.106)	(0.103)
Days after disclosure	1	2	3	4	5	20	25
Bank fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R2	0.019	0.019	0.020	0.017	0.018	0.014	0.019
Observations	985	985	985	985	985	934	899

*/**/*** indicates statistical significance at the 10/5/1% level. OLS regressions with robust standard errors, clustered by bank. The dependent variable is the bank's cumulative excess return (relative to the global stock market) in the 1 to 25 business days following the disclosure of the bank's quarterly results. ΔROE is equal to the percentage point difference between the reporting quarter's ROE and the previous quarter's ROE. The management buffer is equal to the percentage point difference between the CET1 capital ratio and the (transitional) CET1 capital requirement. Banks are grouped by their price-to-book ratio (PBR) ten days before the disclosure of their earnings results. High-PBR banks had a PBR>1, mid-PBR banks a PBR of 0.6 to 1, and low-PBR banks a PBR of less than 0.6, respectively.

These results suggest that low-valued banks would find it particularly challenging to raise new equity on the market after large losses, ie when particularly in need. It is thus hardly surprising that, in a few instances, G-SIBs have been compelled to seek public-sector investors. Concretely, five of the 27 advanced economy G-SIBs had more than 5% of their outstanding

shares in the hands of governments and state-affiliated entities at end-2022. While for some of these banks the capital raising took place during the GFC – revealing the persistence of public stakes – three of them raised equity from government entities after 2014. Out of the six issuances by the latter banks, the first two occurred when the entity was in the mid- and the subsequent four when it was in the low-valued category. In the process, the share of public-sector holdings in total outstanding shares increased by 3, 6 and 16 percentage points for the three G-SIBs. This is consistent with private investors' reluctance to invest in the equity of a G-SIB with PBR below 1 because of concerns over the sustainability of its business model.

Credit markets, by contrast, remained largely unfazed when G-SIBs made adverse ROE announcements. In equation (3), we substitute excess equity returns with log excess changes in CDS spreads. We find that, in the aftermath of a sub-par ROE release, the CDS spreads of high-valued G-SIBs actually tend to decline and those of mid-valued ones to increase, but in each case the results are statistically significant only at specific horizons (Table 6).

CDS market impact of disclosing adverse quarter results — Table 6

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
High-valued bank	–1.018	–0.795	–1.038	–0.635	–0.563	–1.826	–0.505
	(0.716)	(1.362)	(1.270)	(1.314)	(1.396)	(2.332)	(2.488)
Mid-valued bank	0.126	2.297*	2.307	2.035	3.864	13.353**	10.198
	(0.888)	(1.214)	(1.638)	(1.937)	(2.363)	(4.927)	(7.349)
Low-valued bank	0.535	0.653	2.378	–0.713	1.337	2.752	3.776
	(0.766)	(0.721)	(2.359)	(1.769)	(2.245)	(5.567)	(6.974)
ΔROE	–0.003	–0.002	–0.007	–0.012	–0.017	–0.019	0.004
	(0.018)	(0.017)	(0.021)	(0.025)	(0.030)	(0.040)	(0.055)
Management buffer	–0.074*	–0.085*	–0.131	–0.133	–0.173*	–0.217	–0.404**
	(0.039)	(0.050)	(0.078)	(0.085)	(0.098)	(0.153)	(0.171)
Days after disclosure	1	2	3	4	5	20	25
R2	0.002	0.005	0.008	0.005	0.011	0.016	0.008
Observations	985	985	985	985	981	934	899

*/**/*** indicates statistical significance at the 10/5/1% level. OLS regressions with robust standard errors, clustered by bank. The dependent variable is the bank's cumulative excess log change in CDS spreads (relative to the North American investment grade CDS index) in the 1 to 25 business days following the disclosure of the bank's quarterly results. ΔROE is equal to the percentage point difference between the reporting quarter's ROE and the previous quarter's ROE. Buffer is equal to the difference between the CET1 capital ratio and the (transitional) CET1 capital requirement. Banks are grouped by their price-to-book ratio (PBR) ten days before the disclosure of their earnings results. High-PBR banks had a PBR>1, mid-PBR banks a PBR of 0.6 to 1, and low-PBR banks a PBR of less than 0.6, respectively.

In contrast to the results on stock prices, the reaction of the CDS spreads of low-valued G-SIBs is consistently insignificant. A possible reason for these findings is that – over the

sample period – investors in CDS spreads – which refer to senior unsecured debt – generally took comfort in G-SIBs' high capital ratios (recall Graph 3.A). Indeed, the importance of capital buffers for such investors transpires from the penultimate line in Table 6: The impact of ROE announcements on CDS spreads tends to be lower for banks with higher management buffers.

6 Conclusion

As the adjustment and downsizing of unprofitable business models take time, prevailing low valuations have had important systemic repercussions. The most recent example relates to Credit Suisse. It had exhibited persistently sub-par valuations, and its investors had experienced a series of setbacks, some amid more general tensions in the banking sector. When this G-SIB's counterparties started cutting back in March 2023, public authorities sought to mitigate the systemic fallout by providing extraordinary liquidity backstops to facilitate a merger with another G-SIB. In earlier cases, governments have taken direct stakes (IMF (2017)). Thus, more generally, public ownership of credit intermediaries has become a structural feature of countries where the banking system suffers from chronically weak profitability.

Recognising the tight link between profitability, valuations and resilience, bank supervisors and other public authorities could facilitate the transition of low-valued banks to more sustainable business models. For instance, structural reforms to speed up the resolution of non-performing loans and accelerate corporate restructuring of insolvent borrowers could support banks in addressing legacy issues (eg Andrews and Petroulakis (2019)). In some regions, the removal of impediments to cross-jurisdictional mergers and acquisitions could also help reduce overcapacity in the banking sector (eg de Guindos (2019)). In addition, public authorities could provide incentives to raise the investment of earnings in restructuring efforts and support sector-wide initiatives to reap efficiency gains from digitalisation. The benefits would be large as banks with profitable business models are essential for ensuring confidence in the global financial system and for providing reliable funding to the real economy.

References

Acharya, V, H Le and H S Shin (2017): "Bank capital and dividend externalities", *Review of Financial Studies*, vol 30, no 3, pp 988–1018.

Adrian, T, J Kiff and H S Shin (2018): "Liquidity, leverage, and regulation ten years after the Global Financial Crisis", *Annual Review of Financial Economics*, vol 10, pp 1–24.

Allen, F and R Michaely (2003): "Payout policy", *Handbook of the economics of finance*, vol 1A, pp 337–429.

Andrews, D and F Petroulakis (2019): "Breaking the shackles: zombie firms, weak banks and depressed restructuring in Europe", *ECB Working Paper Series*, no 2240, February.

Atkeson, A, A d'Avernas, A Esifeldt and P-O Weill (2018): "Government guarantees and the valuation of American banks", *NBER Macroeconomics Annual*, vol 33 (1), pp 81–145.

Baker, M and J Wurgler (2015): "Do strict capital requirements raise the cost of capital? Bank capital regulation and the low risk anomaly", *American Economic Review*, vol 105 (5), pp 315–20.

Bank for International Settlements (BIS) (2023): *Annual Economic Report*, Chapter 1.

Berger A, DeYoung R, Flannery M, Lee D, Öztekin, O (2008): "How do large banking organizations manage their capital ratios?" *Journal of Financial Services Research*, vol 34, pp 123–49.

Blume, M (1980): "Stock returns and dividend yields: some more evidence," *Review of Economics and Statistics*, vol 62, no 4, pp 567–77.

Böni, P, T Kröncke and F Vasvari (2023): "The UBS-Credit Suisse merger: Helvetia's gift", *mimeo*.

Bogdanova, B, I Fender and E Takáts (2018): "The ABCs of bank PBRs", *BIS Quarterly Review*, March, pp 81–95.

Calomiris, C and D Nissim (2014): "Crisis-related shifts in the market valuation of banking activities", *Journal of Financial Intermediation,* vol 23 (3), pp 400–35.

Caparusso, J, Y Chen, P Dattels, R Goel and P Hiebert (2019): "Post-crisis changes in global bank business models: a new taxonomy", *IMF Working Paper*, WP/19/295.

Cecchetti, S (2015): "The road to financial stability: capital regulation, liquidity regulation, and resolution", *International Journal of Central Banking*, vol 11 (3), pp 127–39.

Chousakos, K and G Gorton (2017) "Bank health post-crisis", *NBER Working Paper*, no 23167.

Cohen B and M Scatigna M (2016): "Banks and capital requirements: channels of adjustment", *Journal of Banking & Finance*, vol 69 (S1), pp 56–69.

Committee on the Global Financial System (CGFS) (2018): *Structural changes in banking after the crisis*, January.

Couaillier, C (2021): "What are banks' actual capital targets?", *ECB Working Paper Series*, no 2618, December.

Couaillier, C and D Henricot (2023): "How do markets react to tighter bank capital requirements?", *Journal of Banking & Finance*, vol 151, 106832.

De Guindos, L (2019): "Challenges for bank profitability", speech at OMFIF City Lecture, London, 1 May.

Dick-Nielsen, J, J Gyntelberg and C Thimsen (2022): "The cost of capital for banks: evidence from analyst earnings forecasts", *Journal of Finance*, vol 77 (5), pp 2577–611.

Dick-Nielsen, J, G Zhuolu and D Lando (2023): "Bank equity risk", *mimeo*.

Forti, C and R Schiozer (2015): "Bank dividends and signalling to information sensitive depositors", *Journal of Banking & Finance*, vol 56, pp 1–11.

Gambacorta, L, T Oliviero and H S Shin (2023): "Low price-to-book ratios and bank dividend payout policies", *Economic Policy*, forthcoming.

Goel, T, U Lewrick and A Mathur (2021): "Does regulation only bite the less profitable? Evidence from the too-big-to-fail reforms", *BIS Working Papers*, no 922.

Goel T, U Lewrick, N Tarashev N (2020): "Bank capital allocation under multiple constraints", *Journal of Financial Intermediation*, vol 44, 100844.

Gordon, M (1959): "Dividends, earnings and stock prices," *Review of Economics and Statistics*, vol 41, no 2, Part 1, pp 99–105.

Greenwood, R, A Landier and D Thesmar (2015): "Vulnerable banks", *Journal of Financial Economics*, vol 115 (83), pp 471–85.

Gropp R, Mosk T, Ongena S, Wix C (2019): "Banks response to higher capital requirements: evidence from a quasi-natural experiment", *Review of Financial Studies*, vol 32 (1), pp 266–299.

Ikeda, Y, W Kerry, U Lewrick and C Schmieder (2021): "Covid-19 and bank resilience: where do we stand?", *BIS Bulletin*, no 44, July.

International Monetary Fund (IMF) (2017): *Global Financial Stability Report*, April.

Kashyap A, Stein J, Hanson S (2010): "An analysis of the impact of `substantially heightened' capital requirements on large financial institutions", mimeo, University of Chicago and Harvard Business School.

Sarin, N and L Summers (2016): "Understanding bank risk through market measures", *Brookings Papers on Economic Activity,* Fall, pp 57–109.

Appendix

List of banks — Table A1

Ticker	Bank
ABC	Agricultural Bank of China Limited
BAC	Bank of America Corporation
BARC	Barclays PLC
BNPP	BNP Paribas SA
BNY	The Bank of New York Mellon Corporation
BOC	Bank of China Limited
C	Citigroup Inc.
CA	Crédit Agricole S.A.
CCB	China Construction Bank Corporation
CS	Credit Suisse Group AG
DB	Deutsche Bank AG
GS	The Goldman Sachs Group, Inc.
HSBC	HSBC Holdings plc
ICBC	Industrial and Commercial Bank of China Limited
ING	ING Groep N.V.
JPM	JPMorgan Chase & Co.
MFG	Mizuho Financial Group, Inc.
MS	Morgan Stanley
MUFJ	Mitsubishi UFJ Financial Group, Inc.
NORD	Nordea Bank Abp
RBC	Royal Bank of Canada
RBS	NatWest Group plc
SAN	Banco Santander S.A.
SG	Société Générale S.A.
SMFG	Sumitomo Mitsui Financial Group, Inc.
STAN	Standard Chartered PLC
STT	State Street Corporation
TD	The Toronto-Dominion Bank
UBS	UBS Group AG
UCG	UniCredit S.p.A.
WFC	Wells Fargo & Company

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