

PB 16-19 Systemic Implications of Problems at a Major European Bank

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Following the financial crisis in the United States and Europe, in the last several years banks on both sides of the Atlantic have been subjected to stronger supervision and regulation as well as tougher requirements on capitalization. Yet recent events suggest that vulnerabilities may remain in some of the largest financial institutions, especially in Europe. Over the past year, equity markets have severely punished the share price of Deutsche Bank,¹ the third largest bank in Europe.² Although the system does not appear to be back at the brink of a Lehman-style crisis,³ it is timely to consider the implications of the recent difficulties of this global systemically important bank (G-SIB).

Areas of lingering concern about the large banks, especially in Europe, include opacity in valuation of assets, especially for derivatives, and possible understatement

of risk-weighted assets in internal risk models. Potential shocks from legal fines have been highlighted by the fine imposed by the US Department of Justice on Deutsche Bank because of the sale of questionable mortgage-backed securities before the recent crisis. Another problem has been market destabilization from selloffs of contingent debt issued to meet the new rules on total loss-absorbing capacity (TLAC) imposed by the Basel III regulatory reforms. Hovering over all of these concerns is the seeming additional evidence that Europe lags the United States in restoring bank stability.

A broad implication of Deutsche Bank's difficulties is that they provide further support for additional bank capital beyond Basel III targets established in 2010 and to be fully phased in by 2019 (BCBS 2010). Higher equity capital

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provides a larger cushion against insolvency in the face of shocks. With equity providing a larger share of the TLAC target of 18 percent of risk-weighted assets under Basel III, an additional benefit would be the resulting reduction in the need for contingent (additional tier 1) capital, which has proven to be a source of market instability when investors fear writedowns on (or conversions of) such obligations. But low market valuations mean that banks would need to raise additional equity over time through retained earnings rather than immediately through new issuance when share prices are depressed. This problem is currently more severe for large banks in Europe than for those in the United States. Banks may also need to change their basic business models and downsize their balance sheets gradually until share prices rise toward book values.

Deutsche Bank warrants special attention for systemic reasons because of its size and extensive interconnections

1. Deutsche Bank has been a supporter of the Peterson Institute for International Economics.

2. The bank is the sixth largest in the world if the top state-owned banks in China and Japan are excluded, after Mitsubishi UFJ, HSBC, JP Morgan Chase, BNP Paribas, and Bank of America (Relbanks 2016).

3. Lehman Brothers was only one-third the size of Deutsche Bank.

with financial institutions through its investment and investment banking units.⁴ In June 2016 the International Monetary Fund found that among G-SIBs, the bank was “the most important net contributor to systemic risks” (IMF 2016a, 29). It is important to recognize, however, that this diagnosis did not turn on any weaknesses in the bank’s balance sheet or capitalization but on its high degree of “connectedness” with other financial institutions.⁵

The proximate cause of the recent pressure on Deutsche Bank was the mid-September announcement by the US Department of Justice of a \$14 billion fine for misleading investors in the selling of risky mortgage-backed securities. Previous such fines had amounted to \$16.5 billion at Bank of America in 2014 and \$5 billion at Goldman Sachs in April 2016.⁶ Some accounts suggest the Royal Bank of Scotland could face even higher fines for such activities.⁷ Such penalties feature prominently in the category of “operational risk,” for which banks need to hold capital in addition to that for “credit risk” on loans and “market risk” on traded assets marked to fair value.

At its late-September low, Deutsche Bank’s stock price had fallen 63 percent from its late-2015 high and 77 percent from its post–Great Recession high in early 2014.⁸ The price fell about 25 percent from its level on September 9 before the announcement of the \$14 billion (€12.4 billion) fine, which by itself would represent 20 percent of Deutsche Bank’s shareholder equity of €62.7 billion at the end of 2015 (Deutsche Bank 2015, i). But the gap between market value and book value was much larger. On September 29 the ratio of share price to book value stood at only 0.23,

compared with about 0.6 for euro area peers BNP Paribas and Banco Santander, and 0.6 for Citigroup, 0.9 for Goldman Sachs, and 1.0 for JP Morgan. Market capitalization of Deutsche Bank stood at only €14.1 billion. Even with the modest recovery by late October, the price-to-book ratio for Deutsche Bank remained at only 0.29.⁹

A price-to-book ratio of only 0.2 to 0.3 for a G-SIB cannot be a good sign for the financial system. In the most optimistic interpretation, such a ratio might simply represent the fickleness of stock market valuations. The pessimistic interpretation would be that the market has priced the bank’s equity correctly and that the book value is out of date. If the market is wrong and book value right, it would be in the shareholders’ interest systematically to downsize both sides of the balance sheet and use the profits from sale of assets at prices higher than expected by the market to repurchase shares.

Figure 1 shows the path of market price to book value ratios for six G-SIBs over the past decade. Before the Great Recession, the ratios were in the range of about 1.5 to 2.5. Thereafter, the ratios have tended to be in the range of 0.5 to 1. Anemic price-to-book ratios have not been unique to Deutsche Bank, but over the past year the bank’s relative weakness on this measure has become more acute. For example, in this period the ratio has fallen from about 0.8 to 0.7 for Banco Santander and Citigroup and has not fallen for BNP Paribas. Having dropped from 0.55 to 0.29 over the same period, the ratio for Deutsche Bank has declined much further and stands markedly below those of most of its peers.¹⁰

From the systemic standpoint, there may be some comfort in the fact that whereas contagion from Deutsche Bank in early 2016 depressed share prices of other major banks as well, the most recent round of pressure on the bank has not further reduced the prices of other major bank stocks. In both January–February and September the decline for Deutsche Bank was prompted by the specter of losses to additional tier 1 (AT1) bonds that count toward TLAC.¹¹ Thus, in early 2016 when it became a concern that the bank’s net loss of €6.8 billion in 2015 might cause it to miss a coupon payment on these obligations, the price of its largest AT1 bond issue (€1.75 billion) fell from 95 cents to 70 cents. After recovering to an average of about 80 cents

4. My colleague Jacob Kirkegaard argues that because of the bank’s size, the German government would step in if necessary to provide support and could do so under the “severe disturbance in the economy” clause of the EU Bank Recovery and Resolution Directive. He therefore maintains that “there is no real risk of a sudden collapse that might thrust the European banking system back to the acute crisis of 2012.” Jacob Kirkegaard, “What Deutsche Bank’s Troubles Tell Us about the Health of Europe’s Banking System,” Realtime Economic Issues Watch blog, Peterson Institute for International Economics, September 30, 2016, <https://piie.com/blogs/realtime-economic-issues-watch/what-deutsche-banks-troubles-tell-us-about-health-europes>.

5. The IMF study applied the net spillover method of Diebold and Yilmaz (2014), which decomposes vector autoregression estimates from market data to discern spillover of shocks imposed by a firm on others (“to-spillover”) and shocks imposed on the firm by others (“from-spillover”).

6. J. Weston Phippen, “Deutsche Bank’s Refusal to Settle with the DOJ,” *Atlantic*, September 16, 2016.

7. Andrew MacAskill and Lawrence White, “RBS’s worst-case legal bill could hit \$27 billion,” Reuters, October 10, 2016.

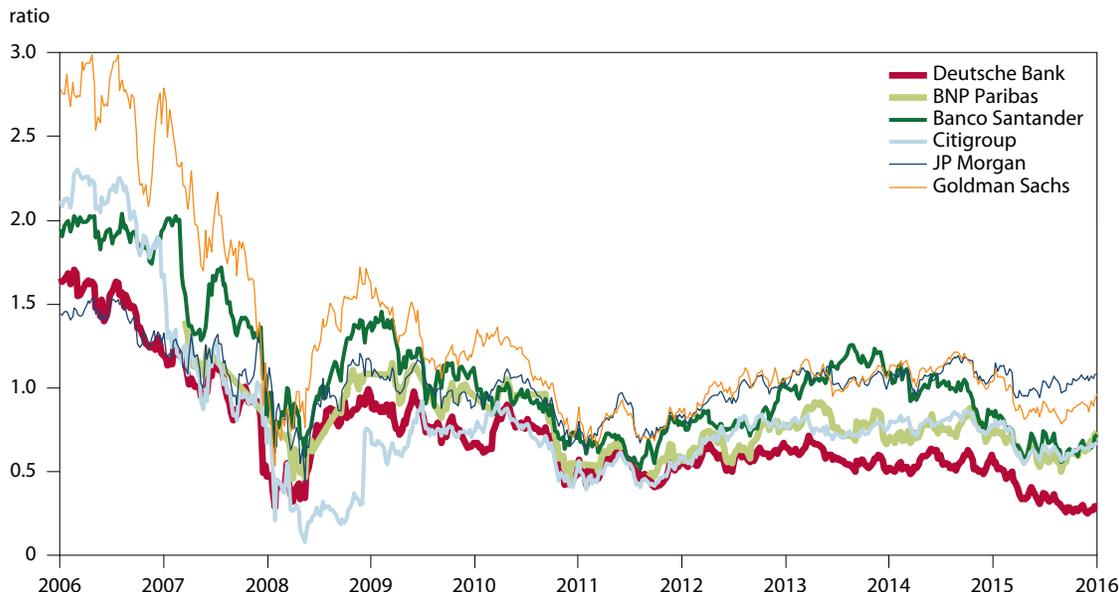
8. Share prices were \$11.48 on September 29 but had recovered somewhat to \$14.56 by October 26. Prices are available at <http://finance.yahoo.com>.

9. All data are from Bloomberg.

10. All data are from Bloomberg.

11. AT1 bonds include subordinated debt that can be written down under certain circumstances (the principal form held by Deutsche Bank) and contingent convertible (CoCo) bonds that convert into equity under certain circumstances.

Figure 1 Ratio of market price to book value for selected large US and European banks, October 27, 2006 to October 26, 2016



Source: Bloomberg.

in March through August, the price fell to 73 cents in late September before partially recovering.¹²

Another pattern evident in figure 1 is that the US G-SIBs have tended to do better than those in Europe. Table 1 confirms this pattern for 14 European and 8 US G-SIBs.¹³ The average price-to-book ratio as of late October was 0.66 for the European banks but 1.04 for the US banks. More than half of the European banks had a ratio below 0.66, whereas none of the US banks did. Among the European G-SIBs, only Unicredit Group rivaled Deutsche Bank for the lowest ratio.

The outcome for European banks is poorer for two principal reasons. First, the divergent phases of US and euro

area monetary policies seem likely to be partly responsible. Recourse to negative interest rates as well as further quantitative easing likely have worsened outcomes in the euro area compared with the United States. Banks cannot easily negotiate negative interest rates for depositors, a key source of their funding, and quantitative easing flattens the yield curve. Because banks are in the business of maturity transformation, the flatter yield curve erodes profits in the main business line (although there may be offsetting gains from faster growth of the economy and capital gains on long-term assets).

A second reason for the divergence may be that market voting shows greater confidence that US banks have improved their capitalization and economic strength compared with European banks. In the United States, G-SIBs must hold 6 percent of total assets in capital. European banks have not been subject to a corresponding leverage ratio, and the new European requirement soon to be introduced under Basel III is expected to be only 3 percent (EBA 2016). In the United States, the Collins Amendment to the Dodd-Frank Wall Street Reform and Consumer Protection Act requires that risk-weighting of assets be no more lenient than the Basel standard model weight for the asset category. European banks have been able to rely on internal model weights even if they are lower. US banks appear to have made more progress cleansing their books of weak loans than have European banks.¹⁴ European banks reportedly paid out nearly €200

12. Jenny Strasburg, "Deutsche Bank Reports First Full-Year Loss Since Crisis," *Wall Street Journal*, January 28, 2016; and Börse Berlin, www.boerse-berlin.com/index.php/Bonds?isin=DE000DB7XHP3. Under German GAAP accounting, and in particular section 268, paragraph 8 of the German Commercial Code, certain items are blocked from being distributable under the concept of available distributable items (ADI). (The blocked items in this clause are associated with valuation of potential tax liabilities; Küting et al. 2011, 2.) Thus, at year-end 2014, dividend potential before the amount blocked was €7.5 billion but ADI was only €2.0 billion; at end-2015 the corresponding amounts were €6.5 billion and €234 million, respectively. After an adjustment of about €800 million for certain interest expenses, the amounts available to cover AT1 interest were €2.9 billion at end-2014 and €1.1 billion at end-2015 (Deutsche Bank 2016b).

13. The G-SIB list also currently includes three Chinese and three Japanese banks (FSB 2015). Data are not available for the privately held Groupe BPCE.

14. Thus, from 2009 to 2015, nonperforming loans fell from 5 percent of gross loans to 1.5 percent in the United States but

Table 1 Ratio of share price to book value for European and US G-SIBs, October 26, 2016

European G-SIB	Ratio	US G-SIB	Ratio
Nordea	1.24	State Street	1.44
UBS	0.96	Wells Fargo	1.29
ING Bank	0.94	Bank of New York Mellon	1.27
HSBC	0.79	JP Morgan	1.08
BNP Paribas	0.73	Goldman Sachs	0.96
Banco Santander	0.72	Morgan Stanley	0.93
Credit Suisse	0.63	Citigroup	0.69
Standard Chartered	0.58	Bank of America	0.67
Barclays	0.53		
Groupe Credit Agricole	0.54		
Société Générale	0.49		
RBS	0.43		
Unicredit Group	0.30		
Deutsche Bank	0.29		
Average	0.66		1.04

G-SIB = global systemically important bank

Source: Bloomberg.

billion in dividends in 2007–14, whereas their accumulated retained earnings remained almost unchanged during that period.¹⁵ In contrast, for the eight US banks listed in table 1, total shareholder equity rose from \$738 billion at the end of 2008 to \$1,044 billion in 2014.¹⁶

From a systemic viewpoint, one of the worst side-effects of the low market valuations of major bank stocks is that they make it extremely costly to raise capital through the issuance of new equity. If the true value of the equity is \$100 per share but the current market price is only \$50, then issuing new shares amounting to 10 percent of the amount outstanding will impose a value loss of 4.5 percent on existing shareholders.¹⁷ Under these circumstances, banks are very reluctant to raise capital through new issuance. The alternative of building up capital through accumulation of

remained flat at 4 percent in France, and rose from 4 to 6 percent in Spain and from 9 to 18 percent in Italy (IMF 2016b). In Germany nonperforming loans did ease from 3.3 percent in 2009 to 2.3 percent in 2014 (ibid). But Deutsche Bank “lack[s] a solid base in Germany’s highly fragmented banking system” and “is mainly a global investment bank....” Martin Wolf, “Deutsche Bank Offers a Tough Lesson in Risk,” *Financial Times*, October 4, 2016.

15. Boris Groendahl, “Euro Banks Splurged on Dividends Even in Crisis Years, BIS Says,” Bloomberg, April 7, 2016.

16. Data obtained from banks’ annual reports.

17. With N shares outstanding initially, the initial true value of equity is \$100N. The new issuance raises \$50 x 0.1N, bringing aggregate true value to \$105N but reducing per share value from \$100 to \$105/1.1 = \$95.5.

retained earnings is far more attractive but also considerably slower.

Returning to Deutsche Bank, it is useful to consider the degree of capital adequacy as a possible explanation for low market valuation. At the end of 2015, total assets were €1,629 billion (Deutsche Bank 2015, 64). The €62.7 billion in shareholder equity amounted to 3.8 percent of total assets, a seemingly low level. However, under International Financial Reporting Standards (IFRS) accounting, derivatives are included in assets, whereas under US Generally Accepted Accounting Principles (GAAP) only their value after netting out is included. Deutsche Bank had €515.6 billion in market (not “notional”) value of derivatives on the asset side, and €494.1 billion on the liability side, for a net of +€21.5 billion. (Notional value was far larger, at €41.9 trillion [Deutsche Bank 2015, 157]). So a GAAP approach using netting would place total assets at €1,629 billion – €516 billion + €22 billion = €1,135 billion. That implies the GAAP-consistent ratio of shareholder equity to assets would be 5.5 percent, a more comfortable level.

However, the sharp decline in the bank’s shares implies that the market distrusts the accounts, in magnitudes that go well beyond the potential Justice Department fine. One place to look for a major gap between market valuation and book value would seem to be derivatives, which can be difficult to value (e.g., requiring internal model valuation using market inputs, level 2 assets, or using strictly hypothesized inputs, level 3 assets). Deutsche Bank has a reputation for being especially active in derivatives. Its €42 trillion notional value of derivatives compares with \$56 trillion each for Citigroup and JP Morgan and \$52 trillion for Goldman Sachs.¹⁸ Using €1.14 trillion for Deutsche Bank’s assets on a derivatives-netted rough GAAP-equivalent basis, the ratio of notional value of derivatives to GAAP assets is 37:1. The corresponding ratios are about 23:1 for JP Morgan (assets \$2.4 trillion), 31:1 for Citigroup (assets \$1.8 trillion), and 60:1 for Goldman Sachs (assets \$860 billion). By implication, if derivatives are the problem, one might want to keep an eye on Goldman Sachs (and perhaps also Morgan Stanley, with \$31 trillion notional derivatives¹⁹ and assets of \$808 billion, for a ratio of 38:1).

If derivatives were the core problem for Deutsche Bank, what degree of overoptimism in accounting would have to be present to make the recent market price trough accurate? The gap in equity between accounting and market valuation reached €62.7 billion – €14.1 billion = €48.6 billion.

18. Dakin Campbell, “Citigroup Overtakes JPMorgan as top U.S. Derivatives Dealer,” Bloomberg, June 29, 2015.

19. Pam Martens and Russ Martens, “Who is Morgan Stanley and Why Its \$31 Trillion in Derivatives Should Concern You,” *Wall Street on Parade*, January 21, 2016.

Considering that there are about €500 billion on both the asset and liability sides of derivatives, that implies about 5 percent excessive optimism in accounting valuations on both sides (abstracting from the Justice Department fine). As a rough approximation, this exercise suggests that a 5 percent excessive optimism in pricing derivatives overstates net assets by about 0.12 percent of notional value (= 50/42,000).

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If Deutsche Bank is just the tip of the iceberg for possible problems in derivatives, it could be informative to apply this parameter to other large banks. For JP Morgan and Citigroup a corresponding 5 percent overoptimism in valuations would result in an overstatement of net assets of about \$67 billion each, compared with \$230 billion shareholder equity in Citi and \$220 billion in JP Morgan. For Goldman Sachs, the overstatement would amount to about \$62 billion, compared with shareholder equity of \$75 billion. The implied hit to equity would be the highest at Goldman Sachs (83 percent); a near comparable level of 75 percent at Deutsche Bank; but considerably more moderate levels at Citi and JP Morgan (about 30 percent each). Of course, market valuations could be interpreted as making the judgment that at these institutions, the quality of the derivatives portfolio is considerably higher than that at Deutsche Bank.

Unlike Lehman Brothers, Deutsche Bank is solvent and has access to central bank support. Ironically, to the extent that the derivatives activity of the large US banks occurs mainly in the nondepository subsidiaries of their bank-holding companies, there are relatively strict limits on what the depository subsidiary can lend to them, and liquidity support would have to go through the now-constrained Federal Reserve Article 13 (3) rather than in the form of direct discount lending (Scott 2016).

Basel III's leverage ratio is 3 percent of exposure, which includes derivatives only after netting. Suppose we use the €1,135 billion figure as the exposure basis for the leverage ratio for Deutsche Bank; that implies an equity capital target of €34 billion. If recent market price troughs were accurate, the implication would be that Deutsche Bank would need to raise €19.9 billion in new equity (34 – 14.1). But regula-

tory decisions are not, and should not be, based on current stock market values. Even so, a potential need for Deutsche Bank to raise €20 billion in new capital if the market's recent pessimism proves right may serve as a meaningful cautionary benchmark.

At present, Deutsche Bank has not been forced to write down its AT1 bonds, nor has it even reached the point of missing a coupon payment on them. Some press reports place their total at €4.6 billion.²⁰ However, this amount appears to refer only to issues in 2014. If issues in 2007–08 are included, the total rises to €10.9 billion.²¹ They are subject to a writedown if certain capital thresholds are not met.²² But even if their value were written down by half, they would provide only about one-fourth of a €20 billion hypothetical gap.

These instruments do seem to raise questions. Their coupons are in the range of 6 to 8 percent (Deutsche Bank 2016a). They are perpetuals (i.e., they have no maturity date). Considering that the current interest rate on 30-year AAA European sovereign debt stands at only 0.8 percent (ECB 2016), their risk spread even at par is extremely high. At a market price of only 70 cents on the euro, what I call the loss equivalent probability would stand at a remarkable 92 percent, meaning only an 8 percent chance of paying face value and a 92 percent chance of paying nothing at all.²³ These odds are more characteristic of gambling than long-term investing.

The illustrations above assume that Deutsche Bank's problems entirely lie in derivatives. The problems, however, may be more dispersed, perhaps reflecting the greater scope for mischief in the European banks' reliance on internal models in determining risk weights. It is worth considering that 78 percent of Deutsche Bank's derivatives are interest rate-related (Deutsche Bank 2015, 157). On one hand, that might be a source of comfort: One would think interest rate

20. John Glover, "Deutsche Bank CoCo Holders See What Regulators Mean by Risk," Bloomberg, February 11, 2016.

21. Valuing those issued in dollars at 90.9 euro cents. Deutsche Bank (2016a) reports the total for 2014 issues at €5.0 billion and the total for 2007–08 issues at €5.9 billion.

22. Thus, on a perpetual of \$1.5 billion at 7.5 percent issued in December 2014, there is a pro-rata writedown on all AT1 instruments if Deutsche Bank's common equity tier 1 ratio to risk-weighted assets falls below 5.125 percent (Deutsche Bank 2014). For a list of the AT1 obligations, see Deutsche Bank (2016a).

23. For a perpetual, the loss equivalent probability is simply $s/(s+i)$, where s is the spread and i is the risk-free rate. The calculation assumes a coupon of 700 basis points and treats the 30-year AAA sovereign as the risk-free perpetual rate. See Cline and Barnes (1997, 37). At a price of 70, a coupon of 700 basis points yields 1,000 basis points. With a risk-free rate of 80 basis points, the spread is 920 basis points and the loss equivalent probability is $LEP = 920/1000$.

swaps would be much more plain vanilla than some other derivatives, and hence much less vulnerable to mispricing. On the other hand, one might also worry that the shift to a negative interest rate regime in the euro area might not help Deutsche Bank's derivatives position related to interest rates. Another 15 percent of derivatives are currency-related, again perhaps a source of comfort because they are not necessarily esoteric. Importantly, of the non-level 1 fair-value assets, by far the largest amount is level 2 (about €700 billion on the asset side and €550 billion on the liability side), where market data inputs determine model results. The less reliable level 3 valuations are much smaller, €32 billion on the asset side and €10 billion on the liability side (Deutsche Bank 2015, 296).

Deutsche Bank is not insolvent and would not be even if the full \$14 billion fine were levied.

One interpretation of these decompositions would be that Deutsche Bank's problems may not be primarily in derivatives. The contrast between the low price-to-book ratio for Deutsche Bank and the near-unity ratio for even-more-derivatives-dependent Goldman Sachs might also be interpreted as indicating that derivatives may not be the primary source of Deutsche Bank's problem. An alternative interpretation is that because of the opacity of derivatives there is downside risk for market perception once there is some negative shock and that contrasts with other high-derivative institutions reflect the absence of such shocks at those institutions as much as, or more than, inherent reliability of derivatives valuation. On balance, it would seem prudent for regulators to take special care with asset valuations in derivatives, which might be playing a significant role in the Deutsche Bank case in view of the illustrative calculations.

Part of the problem seems to be a decline in franchise value as Deutsche Bank's business model is increasingly in doubt. Sarin and Summers (2016) have suggested that the general malaise in market valuations of banking sector stocks likely reflects this influence. The CEO of Credit Suisse recently stated that European banks are "not really investable as a sector" because of legal liability and regulatory uncertainties, and more fundamentally because of "a lot of doubt...[about whether there is] a viable business model."²⁴ Deutsche Bank may simply be an unusually severe case of such doubts.

Deutsche Bank is not insolvent and would not be even if the full \$14 billion fine were levied. The bank's share prices have risen about 27 percent above their late-September low. In early October the bank was able to issue \$4.5 billion in new senior debt, albeit at a relatively expensive spread of 290 basis points above US Treasuries.²⁵ The bank's recent predicament, nonetheless, should help focus policymakers' minds on the broad question of whether banking sector reform after the financial crisis is on track. The new shocks from large legal fines add to concerns about capital adequacy. Low stock market prices may further reflect doubts about asset valuations, especially for derivatives, and about risk-weightings using internal models.

The overall implication of Deutsche Bank's difficulties is support for the desirability of additional bank capital beyond Basel III targets, consistent with the finding in Cline (2016) that optimal capital requirements would be in the range of 7 to 8 percent of total assets (corresponding typically to 12 to 14 percent of risk-weighted assets), or about one-third higher than the G-SIB target in Basel III. A higher equity capital component in TLAC would also make it possible to reduce the role of contingent convertible instruments in the TLAC target, a salutary shift in view of the experience of their market contagion risks. However, the predominance of equity prices below book value could mean it would take time to phase in more ambitious equity capital targets, through accumulation of retained earnings rather than new issuance. Another implication is that it remains unclear whether fundamental changes will be necessary in the large banks' business models, or whether instead their equity price performance will tend to recover even without such changes as more normal monetary policies return and memories of Great Recession traumas fade. Still another implication is that shareholders would benefit from a gradual downsizing of large banks with extremely low price to book ratios—so long as the book valuations are correct and that in this process it could be salutary to use the resulting profits to repurchase shares until their prices reach much closer to book value.

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