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Perspectives on  
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2  
Why value value?

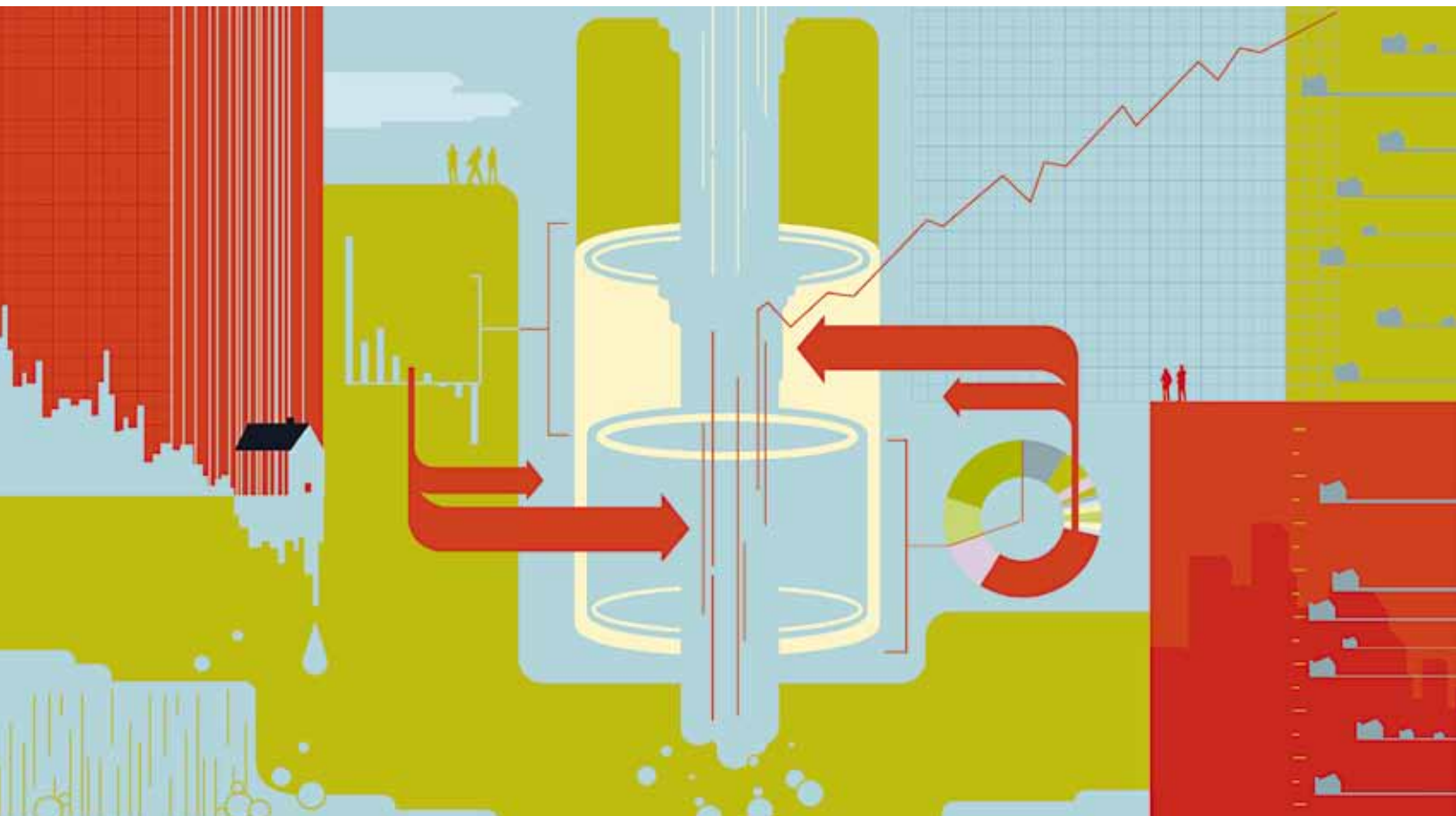
9  
Thinking longer  
term during a  
crisis: An interview  
with Hewlett  
Packard's CFO

14  
Equity analysts:  
Still too bullish

18  
Board directors and  
experience: A  
lesson from private  
equity

20  
A better way to  
measure bank risk

24  
A new look at carbon  
offsets





# A better way to measure bank risk

**One capital ratio tops others in foreshadowing distress—and it's not the one that's traditionally been regulated.**

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In response to the global banking crisis, regulators and policy makers worldwide have united behind efforts to increase financial institutions' minimum capital requirements and to limit leverage, hoping to reduce the likelihood of future bank distress.<sup>1</sup> As of this writing, the debate over proper capital requirements continues, with major implications for the industry and the economy—yet there have been few specifics on which ratios should be targeted or at what levels.

To shed some light on the discussions, we analyzed the global banking crisis of 2007 through 2009<sup>2</sup> to identify relationships that different types of capital and capital ratios have to bank distress.<sup>3</sup> Our analysis is observational, based

on historical data, and not a real-world experiment, which would have required randomly selected financial institutions to hold different capital levels to gauge their effects. As a result, the findings do not definitively establish how institutions might perform in the future if minimum capital ratios were changed, but we believe that the evidence we provide is a valuable input for current policy discussions.

We found that one capital ratio—the ratio of tangible common equity (TCE)<sup>4</sup> to risk-weighted assets—outperforms all others as a predictor of future bank distress. We also found that requiring a minimum leverage ratio would not have offered any insights that couldn't have been found



by studying the right capital ratio. And, not surprising, we found that a higher bar on capital requirements, while reducing the likelihood of bank distress, comes at an increasing cost.

**One capital ratio outperforms the rest**

Among the various ratios, the one that offers the greatest clarity into the likelihood of bank distress actually measures TCE (the portion of equity that is neither preferred equity nor intangible assets) against risk-weighted assets, or RWA (Exhibit 1). TCE, like Tier 1<sup>5</sup> capital, can absorb losses because it offers banks the contractual flexibility either to eliminate repayments entirely or to defer them for extended periods of time. It can also absorb losses whether or not a bank remains a going concern. Moreover, our analysis found that the measures most commonly regulated currently—those based on the combined Tier 1 plus Tier 2<sup>6</sup> capital levels—are the least useful, in part because banks can seldom use Tier 2 capital to absorb a loss if they are to continue operating. For example, unrealized gains on securities may be unavailable

in times of severe economic stress, and subordinated debt may trigger default if payments are deferred.

In addition, banks have successfully arbitrated capital ratios traditionally watched by regulators through the banks’ increasing use of non-common-equity instruments, such as cumulative preferred stock and trust-preferred securities, that qualify for treatment as Tier 1 capital but could be issued at lower cost than common equity. This practice weakens the ability of an institution to absorb losses and the ability of regulations to limit its riskiness.

**Leverage ratios add little benefit**

Our analysis also found that an additional leverage ratio would not have offered any insight into the likelihood of bank distress beyond that provided by the TCE/RWA ratio. The same number of banks are affected (and the same amount of distress avoided) whether or not limits are placed on leverage.

Exhibit 1  
**From the analysis**

The TCE/RWA capital ratio outperformed every other metric in predicting how many banks were likely to become distressed.

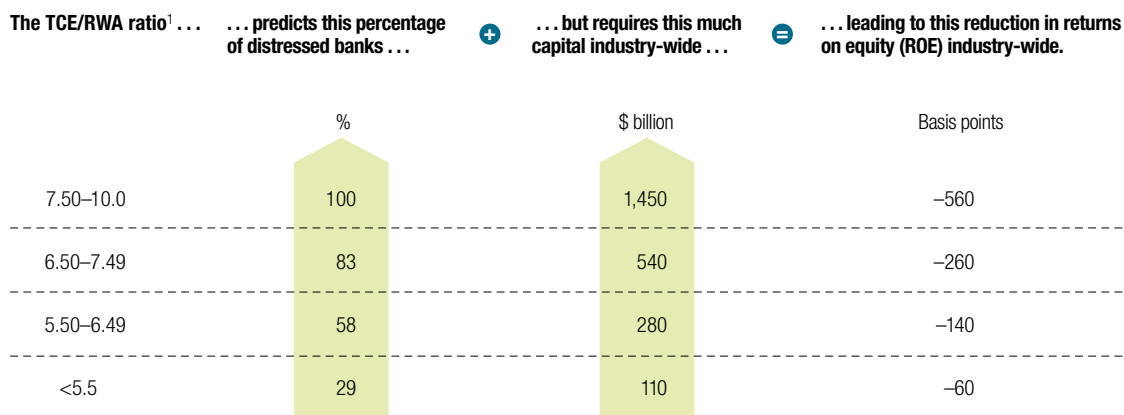
When a random sample predicted this percentage of distressed banks . . .	... the TCE/RWA <sup>1</sup> ratio predicted this:	The next-best predictor of distress was . . .
20%	33%	Tier 1 + Tier 2 Capital/RWA ratio predicted 33% (matching TCE/RWA here, but less predictive at every other level)
40%	67%	Tier 1 Capital/RWA predicted 54%
80%	100%	Tier 1 Capital/RWA predicted 96%

<sup>1</sup>TCE, or tangible common equity, is shareholders’ equity, less preferred shares, goodwill, and other intangibles; RWA is risk-weighted assets.

## Exhibit 2

**Costly security**

Higher capital ratios leave fewer banks at risk of distress but also come with a higher price tag—and lower returns for banks.



<sup>1</sup>TCE, or tangible common equity, is shareholders' equity, less preferred shares, goodwill, and other intangibles; RWA is risk-weighted assets.

This finding does not prove that regulating leverage ratios is a bad idea. It does suggest, however, that the rationale must be based on other considerations. For example, leverage ratios might protect the liability side of the balance sheet against greater-than-expected haircuts on repurchase (or repo) financing, which could precipitate a systemic crisis. They also might help prevent future errors in risk weighting and regulatory arbitrage of risk weightings. But the use of leverage ratios has also arguably created an incentive for the growth of off-balance-sheet activities, which remove certain assets from the leverage ratio calculation and increase risk while circumventing additional capital requirements.

**Lowering risk has a cost**

While it is possible to lower a bank's level of risk by increasing its TCE/RWA ratio, the trade-off is higher costs. Reducing the number of banks at risk through a higher capital base decreases the returns on equity (ROE) for the industry (Exhibit 2). For instance, a TCE/RWA ratio of 10 percent would have affected all of the banks that became distressed

during the recent crisis but would have required an incremental \$1.45 trillion in capital<sup>7</sup> and reduced industry-wide average ROEs by an extraordinarily high 560 basis points. In addition to the impact on ROEs, increasing the required capital levels would likely have macroeconomic costs, including the effects of a short-term contraction in the availability of credit and the potential long-term effects of reduced lending levels, which result in lower GDP growth.<sup>8</sup>

One test for regulators is wisely balancing the incremental benefits of higher capital requirements against the costs that they impose on financial institutions, borrowers, and society more broadly. For example, our analysis indicates that requiring banks to hold a TCE/RWA ratio in the range of 6.5 to 7.5 percent would have affected 83 percent of banks that became distressed while requiring \$540 billion in incremental capital and a decrease in ROE of 260 basis points.



In the effort to prevent future banking crises, regulators would do well to set minimum capital requirements by balancing the benefits of reduced distress with the costs that come from higher capital requirements. ○

<sup>1</sup> For example, the Basel Committee on Banking Supervision (an international consortium of banking regulators) proposed a major series of revisions to minimum capital standards in December 2009. The committee proposed regulating ratios that had not previously been regulated internationally, such as the ratio of tangible common equity (TCE) to risk-weighted assets (RWA) and the leverage ratio.

<sup>2</sup> Our approach was simply to take a snapshot of global bank balance sheets, including capital position as of December 31, 2007, and to estimate the relationship between initial capital and leverage ratios and subsequent bank performance in 2008–09. We analyzed 115 large global banks (minimum asset size, \$30 billion) representing \$62.2 trillion in total assets—about 85 percent of developed-market banking assets and 65 percent of global banking assets.

<sup>3</sup> We deemed a bank to be in distress if it met any of four conditions: (1) it had declared bankruptcy, (2) it had been taken over by the government or placed into government receivership, (3) it had merged with another bank under duress, or (4) it had received a government bailout of more than 30 percent of its Tier 1 capital as of December 31, 2007. Using this definition, 24 banks with \$18.5 trillion in assets were considered distressed.

<sup>4</sup> TCE is shareholders' equity, less preferred shares, goodwill, and other intangibles (for instance, deferred-tax assets and mortgage-servicing rights).

<sup>5</sup> Tier 1 capital includes issued and fully paid common stock, perpetual noncumulative preferred shares, reserves created out of retained earnings or surpluses related to share issuance, and minority interests in consolidated subsidiaries, less disallowed intangibles (for instance, goodwill).

<sup>6</sup> Tier 2 capital includes undisclosed reserves, unrealized gains on securities, asset revaluation reserves, general provisions and loan-loss reserves, hybrid capital instruments, and an allowable portion of subordinated debt.

<sup>7</sup> Incremental capital required is the estimated amount of additional capital required for all global banks below the maximum capital ratio in the range to reach that level. It is measured by the banks' capital position as of December 31, 2007.

<sup>8</sup> See, for example, Tamim Bayoumi and Ola Melander, "Credit matters: Empirical evidence on U.S. macro-financial linkages," International Monetary Fund working paper 08/169, July 2008; and David Greenlaw, Jan Hatzius, Anil K. Kashyap, and Hyun Song Shin, "Leveraged losses: Lessons from the mortgage market meltdown," US Monetary Policy Forum report number 2, Rosenberg Institute at the Brandeis International Business School and the Initiative on Global Markets, University of Chicago Booth School of Business, 2008.