

# crisisresponse

PUBLIC POLICY FOR THE PRIVATE SECTOR

## The Leverage Ratio

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*This is the 11th in a series of policy briefs on the crisis—assessing the policy responses, shedding light on financial reforms currently under debate, and providing insights for emerging-market policy makers.*

### A New Binding Limit on Banks

**Excessive leverage by banks is widely believed to have contributed to the global financial crisis. To address this, the international community has proposed the adoption of a non-risk-based capital measure, the leverage ratio, as an additional prudential tool to complement minimum capital adequacy requirements. Its adoption can reduce the risk of excessive leverage building up in individual entities and in the financial system as a whole. The leverage ratio has inherent limitations, however, and should therefore be considered as just one of a set of macro- and micro-prudential policy tools.**

Excessive leverage by banks is widely believed to have contributed to the global financial crisis (FSB 2009; FSA 2009). As a result, the G-20 and the Financial Stability Board have proposed the introduction of a leverage ratio to supplement risk-based measures of regulatory capital.<sup>1</sup>

#### What is leverage?

Leverage allows a financial institution to increase the potential gains or losses on a position or investment beyond what would be possible through a direct investment of its own funds. There are three types of leverage—balance sheet, economic, and embedded—and no single measure can capture all three dimensions simultaneously. The first definition is based on balance sheet concepts, the second on market-dependent future cash flows, and the third on market risk.

Balance sheet leverage is the most visible and widely recognized form. Whenever an entity's

assets exceed its equity base, its balance sheet is said to be leveraged. Banks typically engage in leverage by borrowing to acquire more assets, with the aim of increasing their return on equity.

Banks face economic leverage when they are exposed to a change in the value of a position by more than the amount they paid for it. A typical example is a loan guarantee that does not show up on the bank's balance sheet even though it involves a contingent commitment that may materialize in the future.

Embedded leverage refers to a position with an exposure larger than the underlying market factor, such as when an institution holds a security or exposure that is itself leveraged. A simple example is a minority investment held by a bank in an equity fund that is itself funded by loans. Embedded leverage is extremely difficult to measure, whether in an individual institution or in the financial system. Most structured



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credit products have high levels of embedded leverage, resulting in an overall exposure to loss that is a multiple of a direct investment in the underlying portfolio. Two-layer securitizations or resecuritizations, such as in the case of a collateralized debt obligation that invests in asset-backed securities, can boost embedded leverage to even higher levels.<sup>2</sup>

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### Measures of leverage

The most widely used measure of leverage for regulatory purposes is the leverage ratio. Leverage can also be expressed as a leverage multiple, which is simply the inverse of the leverage ratio.

The leverage ratio is generally expressed as Tier 1 capital as a proportion of total adjusted assets. Tier 1 capital is broadly defined as the sum of capital and reserves minus some intangible assets such as goodwill, software expenses, and deferred tax assets.<sup>3</sup> In calculating the leverage ratio, these intangibles have to be removed from the total asset base as well, to make it comparable to Tier 1 capital (figure 1).

The leverage ratio can thus be thought of as a measure of balance sheet or, to the extent that it also includes off-balance-sheet exposures (Breuer 2000), economic leverage. As a result of differences in accounting regimes, balance sheet presentation, and domestic regulatory adjustments, however, the measurement of leverage ratios varies across jurisdictions and banks. Accounting regimes lead to the largest variations. In particular, the use of International Financial Reporting Standards results in significantly higher total asset amounts, and therefore lower leverage ratios for similar exposures, than does the use of U.S. generally accepted accounting principles. The reason is that under International Financial Reporting Standards netting conditions are much stricter and the gross replacement value of derivatives is therefore generally shown on the balance sheet, even when positions are held under master netting agreements with the same counterparty.

As with regulatory capital measures, the leverage ratio generally applies at the level of the individual bank as well as on a consolidated basis. How the ratio is actually calculated and monitored will therefore usually be aligned with the scope of prudential consolidation practiced in a jurisdiction.

### Who uses a leverage ratio?

Three countries with large international banking systems are either using a leverage ratio or have announced plans to do so. The United States and Canada have maintained a leverage ratio alongside risk-based capital adequacy requirements, while Switzerland has announced the introduction of a leverage ratio that will become effective in 2013. Other countries will probably also adopt this tool. These countries may use a leverage ratio for both micro- and macro-prudential purposes—for example, as a maximum leverage limit for supervised entities, an indicator for monitoring vulnerability, or a trigger for increased surveillance or capital requirements under Pillar 2 of the Basel II capital accord.

Among the three countries, the United States has the simplest leverage ratio, expressed as a minimum ratio of Tier 1 capital to total average adjusted assets (defined as the quarterly average total assets less deductions that include goodwill, investments deducted from Tier 1 capital, and deferred taxes). The leverage ratio is set at 3 percent for banks rated “strong” (those that present no supervisory, operational, and managerial weaknesses and are therefore rated highly under the supervisory rating system) and at 4 percent for all other banks. Banks’ actual leverage ratios are typically higher than the minimum, however, because banks are also subject to prompt corrective action rules requiring them to maintain a minimum leverage ratio of 5 percent in order to be considered well capitalized. The U.S. leverage ratio applies on a consolidated basis (at the level of the bank holding company) as well as at the level of individual banks, but it does not take into account off-balance-sheet exposures. A higher ratio may be required for any institution if warranted by its risk profile or circumstances.

The larger U.S. investment bank holding companies and their subsidiaries were regulated by the Securities and Exchange Commission and thus were not subject to a leverage limit.<sup>4</sup> Instead, there were restrictions at the level of the individual firm

Figure How the leverage ratio is calculated

$$\begin{aligned}
 & \text{Equity} + \text{Reserves} - \text{Intangible assets} = \text{Tier 1 capital} \\
 & \text{Total assets} - \text{Intangible assets} = \text{Adjusted assets} \\
 \hline
 & \text{Tier 1 capital} / \text{Adjusted assets} = \text{Leverage ratio}
 \end{aligned}$$

Note: Intangible assets include goodwill, software expenses, and deferred tax assets.

on the amount of customer receivables the investment bank could hold as a multiple of capital (net capital rule). Only two of the five investment bank holding companies originally affected by this rule still exist (Goldman Sachs and Morgan Stanley), however, and they have now been converted into bank holding companies.

The Canadian “assets to capital multiple” is a more comprehensive leverage ratio because it also measures economic leverage to some extent. It is applied at the level of the consolidated banking group by dividing an institution’s total adjusted consolidated assets—including some off-balance-sheet items<sup>5</sup>—by its consolidated (Tier 1 and 2) capital. Under this requirement total adjusted assets should be no greater than 20 times capital, although a lower multiple can be imposed for individual banks by the Canadian supervisory agency, the Office of the Superintendent of Financial Institutions (OSFI). This is more conservative than the U.S. leverage ratio—and the inclusion of off-balance-sheet items strengthens the ratio even more. Indeed, the stringency of Canada’s leverage ratio has been cited as one factor—along with sound supervision and regulation, good cooperation between regulatory agencies, strict capital requirements, and conservative lending practices—contributing to the strong performance of its financial sector during the financial crisis (IMF 2009).

In 2008 the Swiss regulator FINMA, in strengthening capital adequacy requirements, introduced a minimum leverage ratio under Pillar 2 of Basel II solely for Credit Suisse and UBS. The Swiss leverage ratio is based on Tier 1 capital as a proportion of total adjusted assets and is set at a minimum of 3 percent at the consolidated level and 4 percent at the individual bank level. For the calculation of this new benchmark, the balance sheet under International Financial Reporting Standards is adjusted for a number of factors, the most noteworthy being the deduction of the entire domestic loan book (the Swiss authorities presumably wanted to ensure that introducing the leverage ratio would not hamper expansion of the domestic credit market). Other adjustments are more common, such as exclusion of the replacement values of derivatives to reduce the effects of the strict netting rules under International Financial Reporting Standards.

The Basel Committee on Banking Supervision has recently proposed the introduction of a lever-

age ratio, with an expansive definition of assets and a conservative definition of capital, as a supplementary binding measure to the Basel II risk-based framework (BCBS 2009).

### **Benefits of the leverage ratio**

Introducing the leverage ratio as an additional prudential tool has several potential benefits.

### **A countercyclical measure**

The financial crisis has illustrated the disruptive effects of procyclicality (amplification of the effects of the business cycle) and of the risk that can build up when financial firms acting in an individually prudent manner collectively create systemic problems. There is now broad consensus that micro-prudential regulation needs to be complemented by macro-prudential regulation that smooths the effects of the credit cycle (FSA 2009; Andritzky and others 2009). This has led to proposals for countercyclical capital requirements and loan loss provisions that would be higher in good times and lower in bad times.

The leverage ratio is versatile enough to be used both as a macro- or micro-prudential policy tool and as a countercyclical instrument. Intuitively, one would expect that in a fair-value environment a rise in asset prices would boost bank equity or net worth as a percentage of total assets. Stronger balance sheets would result in a lower leverage multiple. Conversely, in a downturn, asset prices and the net worth of the institution would fall and the leverage multiple would be likely to increase (table 1).

Contrary to intuition, however, empirical evidence has shown that bank leverage rises during boom times and falls during downturns. Leverage is said to be procyclical because the expansion and contraction of balance sheets amplify rather than counteract the credit cycle. The reason is that banks actively manage their leverage during the cycle using collateralized borrowing and lending. When monetary policy is “loose” relative to macroeconomic fundamentals, banks expand their balance sheets and, as a consequence, the supply of liquidity increases. In contrast, when monetary policy is “tight,” banks contract their balance sheets, reducing the overall supply of liquidity (see Adrian and Shin 2008).

To reduce procyclicality, banking supervisors can limit the buildup of leverage in an upturn by setting a floor on the leverage ratio or a ceiling

**Table Hypothetical movements of a leverage multiple or ratio in a fair-value environment**

	Leverage multiple	Leverage ratio (%)
<i>Starting point</i>		
Adjusted assets: 100		
Tier 1: 4	25	4
<i>Upturn in credit cycle</i>		
Adjusted assets: $100 + 3 = 103$		
Tier 1: $4 + 3 = 7$	14.7	6.8
<i>Downturn in credit cycle</i>		
Adjusted assets: $100 - 2 = 98$		
Tier 1: $4 - 2 = 2$	49	2.04

on the leverage multiple. The leverage ratio limit could also be expressed as a range with a long-term target level. Alternatively, there could be a mechanism to relax the limit during downturns, since constant fixed caps on the leverage ratio (or constant fixed floors on the leverage multiple) could amplify procyclicality by encouraging banks to deleverage during a downturn (and vice versa).

#### Less regulatory arbitrage

The greater risk sensitivity of Basel II capital requirements can result in a perverse incentive for financial institutions to structure products so that they qualify for lower capital requirements. When this incentive is collectively exploited, the system is likely to end up with high concentrations of structured exposures subject to low regulatory capital requirements. A minimum leverage ratio, among other measures, can help dampen this perverse incentive by acting as a backstop to risk-based capital requirements (Hildebrand 2008). Moreover, it can be customized to individual banks' risk profiles.

#### Simplicity

The leverage ratio is simple to apply and monitor. As a result, it can be adopted quickly and without leading to high costs or requirements for expertise for banks or their supervisors. Moreover, the leverage ratio can be applied regardless of the capital adequacy regime in a jurisdiction.

#### Limitations of the leverage ratio

While the leverage ratio offers benefits, it is also subject to several weaknesses that policy makers need to take into account.

#### Wrong incentives

The leverage ratio does not distinguish different types of bank assets by their riskiness and, in the absence of risk-based capital requirements such

as those under Basel I or II, may thus encourage banks to build up relatively riskier balance sheets or expand their off-balance-sheet activity. Moreover, because of the crude calculation of the leverage ratio, prudent banks holding substantial portfolios of highly liquid, high-quality securities may argue that they are being punished for their conservatism.

#### Limited to balance sheet leverage

One argument against the leverage ratio has been that the United States, despite having a leverage ratio in place, was at the epicenter of the global financial crisis. Why did the U.S. leverage ratio fail to provide the right warning signs? To answer this question, a good starting point is to analyze the evolution of leverage in the years running up to the financial crisis.

Over the past decades financial innovation has fundamentally changed the structure of the financial system. This trend is exemplified by credit risk transfer instruments such as structured credit products, through which portfolios of credit exposures can be sliced and repackaged to meet the needs of investors. Banks funded a growing amount of long-term assets with short-term liabilities in wholesale markets through the use of off-balance-sheet vehicles, exposing themselves to credit and liquidity risk by providing facilities to these vehicles. Moreover, they also held structured credit instruments on their own balance sheet, exposing themselves to embedded leverage and increasing their asset-liability mismatch and their funding liquidity risk.

For major European and U.S. investment banks, balance sheet leverage multiples (measured as total assets divided by equity) increased during the four years preceding the global financial crisis (figure 2). For Japanese and U.S. com-

mercial banks, by contrast, aggregate balance sheet leverage did not increase over this period, and in some instances it even fell.

As can be deduced, the balance sheet leverage ratio did not adequately reflect the trends in financial innovation because significant leverage was assumed through economic and embedded leverage, which is not recorded on the balance sheet. In addition, factors not captured by the leverage ratio or by risk-based capital requirements also contributed to the crisis, such as weak underwriting standards for securitized assets and the buildup of such risks as funding liquidity risk. As a result, the extent of leverage accumulated in the financial system in recent years has only recently become visible.

### Conclusion

There appears to be consensus that no single tool or measure would have prevented the financial crisis and that an adequate policy response requires a menu of macro- and micro-prudential policy tools. The leverage ratio can be a useful prudential tool, and one that can be relatively easy to implement, for jurisdictions that do not want to rely solely on risk-sensitive capital requirements—though it is no silver bullet. Combining the leverage ratio with Basel-type capital rules can reduce the risk of excessive leverage building up in individual entities and in the system as a whole. As the financial crisis showed, however, policy

makers need to be cognizant of the inherent limitations and weaknesses of the leverage ratio.

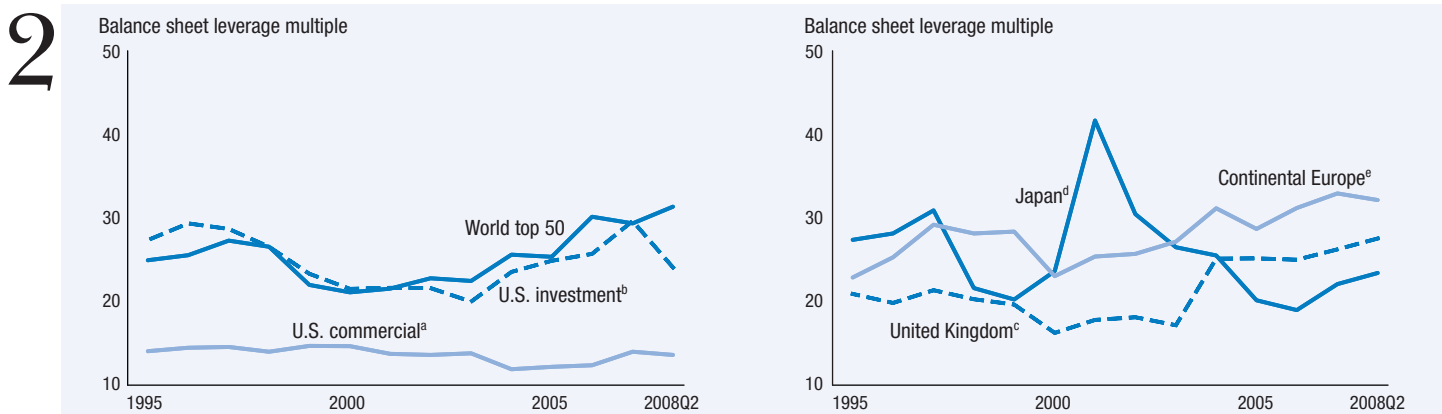
The proposals at an international level to supplement risk-based measures with an internationally harmonized and appropriately calibrated leverage ratio are welcome and could lead to its adoption by a wide range of countries in the future. A leverage ratio cannot do the job alone; it needs to be complemented by other prudential tools or measures to ensure a comprehensive picture of the buildup of leverage in individual banks or banking groups as well as in the financial system. Additional measures to provide a comprehensive view of aggregate leverage, including embedded leverage, and to trigger enhanced surveillance by supervisors need to be developed.

### Notes

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1. For example, the G-20 Declaration of April 2009 on Strengthening the Financial System states that “risk-based capital requirements should be supplemented with a simple, transparent, non-risk based measure which is internationally comparable, properly takes

Figure Bank balance sheet leverage multiples, 1995–2008 (second quarter)



Source: CGFS 2009.

Note: Balance sheet leverage multiple (total assets divided by total equity) of individual banks weighted by asset size.

a. Bank of America, Citigroup, JPMorgan Chase, Wachovia Corporation, Washington Mutual, and Wells Fargo & Company.

b. Bear Stearns, Goldman Sachs, Lehman Brothers, Merrill Lynch, and Morgan Stanley.

c. Barclays, HSBC, Lloyds TSB Group, and Royal Bank of Scotland.

d. Mitsubishi UFJ Financial Group, Mizuho Financial Group, and Sumitomo Mitsui Financial Group.

e. ABN AMRO Holding, Banco Santander, BNP Paribas, Commerzbank, Crédit Agricole, Credit Suisse, Deutsche Bank, Société Générale, UBS, and UniCredit SpA.

into account off-balance sheet exposures, and can help contain the build-up of leverage in the banking system.” Similarly, the Financial Stability Board report on procyclicality (FSB 2009, p. 2) recommends that “the Basel Committee should supplement the risk-based capital requirement with a simple, non-risk based measure to help contain the build-up of leverage in the banking system and put a floor under the Basel II Framework.”

2. The Joint Forum (2005) analyzed the embedded leverage in the tranches of a hypothetical collateralized debt obligation exposed to a portfolio of corporate bonds. In that example the leverage of the junior tranches was about 15 times that of the underlying portfolio, while the leverage of the most senior tranches was between a third and a tenth of that of the underlying portfolio.

3. The audited profit for the year can be included in Tier 1 capital, while the loss for the year must always be deducted, regardless of whether it is audited or not. Intangible assets are deducted from capital and reserves because of their more abstract and subjective nature.

4. A leverage restriction is in place for smaller broker dealers that, unlike the bigger investment banks, do not carry customer accounts. Such broker dealers must not have aggregate indebtedness exceeding 15 times their net capital. In addition, a broker dealer must file a notice with the Securities and Exchange Commission if its aggregate indebtedness exceeds 12 times its net capital.

5. Off-balance-sheet items for this ratio are direct credit substitutes, including letters of credit and guarantees, transaction- and trade-related contingencies, and sale and repurchase agreements. They are included at their notional amount. Securitized assets are not included as off-balance-sheet items of the sponsor or originator and thus would not be taken into account in the leverage ratio.

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