

## What Is Stress Testing?

Checking the health of banks is crucial to financial stability

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**HOW DO WE KNOW** if a financial system is healthy? Can banks survive a recession if half of their mortgage clients lose their jobs and stop paying their debts? Do insurers have enough money to pay out claims if a magnitude 8 earthquake hits Tokyo? Answers to these types of questions lie in stress tests.

Attention to stress testing shot up during the 2008 global financial crisis, when banks and other financial firms lost vast sums of money. Major long-established institutions—such as Lehman Brothers—went belly-up. Others required multi-billion-dollar taxpayer-funded bailouts. People did not know if their bank would be around tomorrow. National authorities of crisis-hit economies started to use stress tests extensively to reduce uncertainty over bank health and decide what to do about vulnerable banks.

Stress tests typically cover solvency—whether banks have enough capital to absorb losses—and

liquidity, whether they have enough cash to pay out their deposits and other debts. Let's say a bank loses \$1 billion when house prices drop by 50 percent. The bank can survive—remain solvent—if its capital is \$10 billion but not if it is \$1 billion. What if a bank's depositors panic and suddenly withdraw \$50 million? If the bank is unable to borrow money to replace those deposits, it can survive if it owns assets, such as government bonds, that it can sell quickly.

### Severe but plausible

A key stress testing ingredient is an adverse scenario that is severe yet plausible. A severe scenario supposes a low-probability event that nevertheless has potentially catastrophic consequences. Examples include a once-in-a-century earthquake, a repeat of the 2008 financial crisis, or a government debt default. Plausible scenarios exclude absurd hypotheticals, such as a Martian invasion. Historical

scenarios are useful but may not capture novel risks. For example, major disruptions caused by new financial technology or climate change have not yet happened, but they are plausible.

Designing scenarios starts with a list of potential risks specific to a country. Examples include a major decline in manufacturing in an economy that relies heavily on factory production or a terrorist attack in a country dependent on tourism. Stress testers then develop a story line for the scenario and estimate how variables such as GDP and interest rates react.

To understand how an adverse scenario affects bank health, stress testers first gauge how bank clients would behave under such circumstances. To do that, they may need to calculate how many households and companies would continue paying their debts if the economy were to take a dive, and how they might draw down their bank deposits. Stress testers then measure how this behavior would affect banks' liquidity and capital.

Because of the connections among banks, the failure of some of them could ripple through the financial system, doing damage to the broader economy. What would happen, for example, if banks stopped lending? Companies might need to shrink their operations and lay off employees. Without mortgages, families might not be able to buy homes.

### Emerging risks

Stress tests often focus on banks because of their size and importance to the economy. But other financial service providers and sources of finance, such as bond sales, have been growing rapidly. So stress tests increasingly cover mutual funds, insurance companies, and other nonbank service providers as well as novel sources of risk. For example, recent IMF stress tests have examined how the rise of new financial technologies could squeeze the profits of existing financial service firms. Banks' growing dependence on third parties for services such as cloud computing raises new challenges for stress testing.

Another evolving challenge is climate change, which poses two types of risk, physical and transitional. Physical risks can already be seen in the increasing frequency and intensity of floods, droughts, and other natural disasters. Insurers selling building and disaster insurance could lose money. Or they may increase premiums so much that many households can no longer afford coverage.

Transitional risk could stem from the decline of the coal industry in response to the adoption of a carbon tax. As these companies lose money, they may default on their loans, reducing their banks' profits. Bonds and equities issued by these firms would lose value, inflicting losses on investors.

The IMF adopted stress testing in response to the Asian financial crisis of 1997 and was among the first institutions to do so. Stress tests figure in the Financial Sector Assessment Program for member countries run jointly by the IMF and the World Bank since 1999. A distinctive feature of IMF stress tests is their focus on the financial system as a whole rather than on individual institutions. Once identified, the assessment recommends ways national authorities can reduce risks before they materialize and control the damage if they come to pass.

When the global financial crisis struck in 2008, authorities in the United States, the euro area, and elsewhere adopted stress tests and made the results public as a way of bolstering confidence in the financial system. Unlike IMF tests, their main focus is to identify weaknesses in individual banks and consider measures to restore them to health or close them.

### Use only as directed

To be useful, stress tests must employ reliable, timely, and detailed data. Historical data should cover turbulent episodes as well as periods of calm. Incomplete or inaccurate data yield unreliable results that may provide a false sense of comfort.

Finally, stress tests are not stand-alone tools. Full-fledged risk analysis should combine stress tests with other quantitative and qualitative tools. Moreover, assessments of financial stability should be complemented by an examination of a country's financial sector policies, oversight framework, and financial safety nets (for example, the existence and scope of deposit insurance). When carried out as part of such a comprehensive, in-depth assessment, stress tests are quite powerful. **FD**

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*To learn more about stress testing, visit [www.elibrary.imf.org](http://www.elibrary.imf.org) and type "stress testing" in the search bar.*