

SPRING 2010
Volume 1 Number 2

Forefront

New Ideas on Economic Policy from the FEDERAL RESERVE BANK
of CLEVELAND

A Proposal: Using the CRA to Fight Vacancy and Abandonment

INSIDE:
Credit for
Small Businesses
Systemic Risk
Q&A with
Economist
Anil Kashyap

Forefront

New Ideas on Economic Policy from the FEDERAL RESERVE BANK
of CLEVELAND



The views expressed in Forefront are not necessarily those of the Federal Reserve Bank of Cleveland or the Federal Reserve System. Content may be reprinted with the disclaimer above and credited to Forefront. Send copies of reprinted material to the Public Affairs Department of the Cleveland Fed.

Forefront
Federal Reserve Bank of Cleveland
PO Box 6387
Cleveland, OH 44101-1387

forefront@clev.frb.org
clevelandfed.org/forefront

SPRING 2010

Volume 1 Number 2

CONTENTS

- 1 President's Message
- 2 Upfront
Land Bank Notches First-Year Win
- 4 The Fed's Exit Strategy Explained
- 6 **COVER STORY**
A Proposal:
Using the CRA to Fight Vacancy and Abandonment
- 10 The CRA and the Economics of
Lending in Lower-Income Neighborhoods
- 16 Spotting a Financial Crisis Before It Happens
 - Seeing the Forest *and* the Trees: A Systemic Risk Identification Model
 - Can a Stock Option Predict Financial System Chaos?
- 20 Small Businesses:
Credit Where Credit Is Due?
- 22 Interview with Anil K. Kashyap
- 28 View
Neighborhood Stabilization: Early Reports on Policymaking in Action

President and CEO: Sandra Pianalto

Editor-In-Chief: Mark Sniderman,
Executive Vice President and Chief Policy Officer

Managing Editor: Robin Ratliff

Editor: Doug Campbell

Associate Editors: Amy Koehnen, Michele Lachman

Art Director: Michael Galka

Designer: Natalie Bashkin

Web Managers: Stephen Gracey, David Toth

Contributors:

O. Emre Ergungor

Kyle Fee

Thomas Fitzpatrick

Lou Marich

Todd Morgano

Lisa Nelson

Anne O'Shaughnessy

AnnMarie Wiersch

Editorial Board:

Ruth Clevenger, Vice President, Community Development

Kelly Banks, Vice President, Community Relations

Stephen Ong, Vice President, Supervision and Regulation

James Savage, Vice President, Public Affairs

Mark Schweitzer, Senior Vice President, Research

James Thomson, Vice President, Research

Spotting a Financial Crisis Before It Happens

In the fall of 2008, as big-name financial institutions toppled, policymakers focused their efforts on saving the global economy from collapse. Now that the recovery is well under way, the nation is moving closer to establishing a new regime for monitoring systemic risk to make sure we don't repeat past mistakes. It is high time, then, to discuss how we intend to do that. What could we have done differently to spot—and then stop—the impending financial crisis of 2008?

Researchers are making headway in answering that question. Last fall, the Federal Reserve Bank of Cleveland and the National Bureau of Economic Research sponsored a research conference on Quantifying Systemic Risk. Viral Acharya, a research associate with the Reserve Bank, presented a paper at the conference that helped inform the New York University Stern School of Business's recently unveiled Systemic Risk Rankings service.

Cleveland Fed researchers are also studying a number of approaches to the systemic risk problem. Here are two of them. As always, we'd like to hear what you think. Contact us at forefront@clev.frb.org.

Seeing the Forest *and* the Trees: A Systemic Risk Identification Model



Stephen Ong,
Vice President,
Supervision and Regulation

Let's begin with the well-supported premise that financial crises happen when shocks to the financial system meet structural weaknesses within that system. If we have a strong shock but an equally strong financial system, the danger of a crisis is low. But if the system is fragile, even a moderate shock can wreak havoc.

To prevent a financial crisis, regulators must see both the big picture (the financial system as a whole) and the little picture (individual institutions). Only recently, however, have researchers looked at ways to combine "macroprudential" supervision of the entire financial system with "microprudential" supervision of individual institutions. By monitoring and analyzing both types of information, researchers can identify signs that potential shocks are building and compare them to potential structural weaknesses in the market.

Toward that end, Federal Reserve Bank of Cleveland researchers have been working on a systemic-risk identification model called SAFE, for Systemic Assessment of the Financial Environment. SAFE is being designed to identify early signs of emerging shocks and structural weaknesses—a highly useful feature that enables policymakers to prevent those conditions from becoming reality. (If policymakers had only a few days' notice of a financial system collapse, it would be far more difficult to develop an effective response.) This model's key innovation is its use of confidential supervisory information, gleaned from regular bank examinations, and data from supervisory tools to identify weaknesses in the institutions that make up the financial infrastructure.



Identifying the Shocks

Identifying a financial shock before it happens is difficult at best. Cleveland Reserve Bank researchers have approached this problem by thinking of a shock as a sudden change in investors' expectations. In the SAFE model, these expectations are based on three factors:

- **Return:** how much an investor may expect to make on a particular asset
- **Risk:** the chance that an asset may lose some or all of its value
- **Liquidity:** the ease with which an investor may sell or trade an asset

The model's central assumption is that investors are constantly making judgments about the return, risk, and liquidity of the assets they hold—the measures that determine the price of the assets. These measures are continuously compared to the historical norms for their assets. History shows that when significant, sustained gaps emerge between current measures and their norms, the likelihood of shocks increases.

Structural Weaknesses

The health of the financial market's infrastructure strongly determines the potential for systemic risk. It directly affects financial firms' ability to absorb shocks, which originate in gaps in investor expectations. To gauge the financial market's condition, the SAFE model uses information on the nation's largest financial institutions to assess three aspects of systemic structural fragility: connectivity, concentration, and contagion.

Connectivity indicators measure the volatility of each financial institution's balance sheet compared to the volatility of the wider financial system. When the balance sheets of several large institutions move in concert with the entire system, institutions and the system are considered highly correlated. In this case, an emerging financial-market shock will likely ripple through the country's largest financial institutions as well as its financial markets.

Concentration indicators measure the intensity of asset holdings and market making—the ability to dictate prices—within the financial system. In general, the more concentrated the financial system's asset holdings and the more narrow its market making, the more fragile the system. More specifically, when an institution or a small subset of institutions holds a large share of a market's assets, its trades increasingly “make” the market, that is, move prices. Thus, if an asset price shock occurs and these institutions sell concentrated assets, their disproportionately large holdings overwhelm buy orders, so that the market cannot function or does so only at very low prices. Likewise, if a single bank or a small group of institutions serves as the sole market maker, its failure would eliminate a liquid market for those assets.

Contagion indicators measure the relative ability of individual financial institutions to withstand a financial shock and remain solvent. If individual institutions can “internalize” the effects of a shock, it will not spill over into the larger financial system. On the other hand, if individual institutions cannot absorb the shock and remain solvent, the losses they sustain will probably affect other institutions' health and spill over into the larger financial system.

The Cleveland Approach

To derive these three indicators, Bank researchers are using confidential supervisory information, including details about loans and liabilities that aren't publicly available. Researchers are also tapping outputs from proprietary supervisory tools that are accessible to the Federal Reserve in its role of banking supervisor. It is this unique feature — the incorporation of supervisory information — that distinguishes SAFE from other models developed to identify systemic risk. Just as a weather forecaster uses radar tools to predict a coming storm, the SAFE model is being designed to help spot episodes of financial stress so as to head off a full-blown crisis.

Of course, policy actions don't exist in a vacuum, and it would be useful to know how they might affect the financial climate. The short-lag variant of the SAFE model

incorporates policy actions' effects on emerging conditions to see if they are working as intended or if different policy actions are required. Taken together, the long- and short-lag versions of the SAFE model are being developed to identify the advent of systemic risk and provide valuable feedback on policy actions that address those risks.

To validate the model's effectiveness, researchers are building a financial stress index to chart previous episodes of stress in the U.S. financial system. Think of the index as a thermometer that tells regulators how hot or cold stress in the economy is running.

The work continues. Bank researchers are circulating the SAFE model among economists and bank supervision professionals in the U.S. and abroad for comment. ■

Can a Stock Option Predict Financial System Chaos?



James B. Thomson,
Vice President
and Financial Economist

Calls for the establishment of a systemic risk supervisor presuppose several conditions: that systemic risk can be quantified; that it can be measured and tracked on a real-time basis; and that its changes can be reliably predicted. At present, none of these conditions exist.

Fortunately, a number of promising efforts to construct such a metric are under way. They draw on several academic areas, including risk management, economic forecasting, banking and finance, and what's known as contingent claims. Ultimately, identifying and predicting systemic risk is likely to rely on a combination of approaches.

Martin Zambrana, a visiting scholar at the Federal Reserve Bank of Cleveland, takes the contingent claims approach in his proposal for a forward-looking systemic risk indicator. Simply put, a contingent claim gives the holder the right to something, depending on what happens in the future. An option to buy a share of AIG at a certain price during a certain time period is a type of contingent claim. A credit default swap, in which the buyer collects a sum of money if an outcome such as default occurs, is another example. Contingent claim analysis can run all the way from defining the valuation of claims to backing out information from the price movements of a specific set of contingent claims.

These analyses can yield useful information. For example, UCLA economist Richard Roll developed weather forecasts for Orange County, Florida, using information gleaned from futures contracts for frozen orange juice (the very contracts that play a central role in John Landis's 1983 movie, *Trading Places*). Roll's forecasts outperformed those of the National Weather Service. In a similar vein, economist John Carlson at the Federal Reserve Bank of Cleveland has backed out market forecasts of Federal Open Market Committee policy actions using the prices of options on federal funds futures contracts.

Zambrana uses the option-based "distance-to-default" measure developed by Moody's KMV, a credit analysis firm. Distance to default is a measure of the probability that a firm will default, so this article uses the term "probability of default." This measure is based on estimates of the market value of a firm's assets, the volatility of the assets' value, and the bankruptcy threshold (that is, the point at which the firm will become insolvent). These estimates are typically backed out of observed accounting data and the price of the firm's traded equity using an option-pricing model.

Although it may sound skull-cracking (indeed, it typically involves sophisticated mathematics and analytic tools), it is a fairly straightforward procedure. The probability-of-default measure can be constructed for any firm if the minimum information requirements are met. Moreover, under certain assumptions, this measure can be constructed frequently, even daily, which makes it a promising tool for identifying systemic risk, where timeliness is paramount.

Zambrana computes probability of default both for a traded index of European bank stocks (DJ STOXX) and for each bank in the index. He then constructs an index using individual banks' probability-of-default measures. So, he now has two probability-of-default numbers that cover essentially the European banking system: one constructed from DJ STOXX and one from the aggregation of the probability-of-default numbers for individual bank stocks.

Zambrana's innovation is to use a well-known fact in finance: An option to buy or sell an entire portfolio of stocks is not worth the same amount as a portfolio of options on the individual stocks in the portfolio. (That's

simply because the option to buy or sell an entire portfolio of stocks does not come with the same inherent flexibility as having an entire portfolio of options to buy or sell stocks.) This means that his two probability-of-default measures for the European banking system will be different, except when there is perfect correlation between the stocks in the portfolios. So if returns on individual bank stocks in the DJ STOXX become more highly correlated, that is, their prices increasingly move in lockstep, their probability-of-default measures will converge.

Why is this important? One of the lessons learned from the demise of the Long-Term Capital Management hedge fund and from research by Andy Lo at MIT is that during periods of financial stress, asset returns in the financial system become more highly correlated. That makes increased correlation in financial markets a handy indicator of increased systemic risk. So tracking the differences between Zambrana's two probability-of-default measures for the European banking system provides a measure of increased systemic risk.

Of course, identifying and tracking changes in systemic risk is just the first step. The indicator must also be forward-looking, that is, it must reliably lead changes in market stress. A plot of each index, as well as the difference between the European banking system's two probability-of-default series, leads movements in the DJ STOXX index of European bank stocks. Hence, Zambrana's approach to measuring changes in systemic risk in the financial market holds promise. A similar measure could become an important part of the macro-prudential supervisor's regulatory toolkit. ■

Putting Systemic Risk on the Radar Screen



The Federal Reserve Bank of Cleveland's 2009 *Annual Report* essay tackles the problem of systemic risk. Economist Joseph Haubrich argues that the first step is a program to define and measure systemic risk. www.clevelandfed.org/about_us/Annual_Report/2009/

Measuring Systemic Risk



A Federal Reserve Bank of Cleveland Working Paper. www.clevelandfed.org/research/workpaper/2010/wp1002.pdf

Papers and Presentations



Systemic Risk Analysis Using Forward-Looking Distance-to-Default Series. A Federal Reserve Bank of Cleveland Working Paper by Martín Saldías Zambrana. www.clevelandfed.org/research/workpaper/2010/wp1005.pdf