

# Shocks and Stress Tests

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In response to federal banking regulators' concern about community banks' increased participation in commercial real-estate lending, a University of Arkansas researcher has developed a system that allows banks to perform stress tests on their commercial real-estate portfolios.

Tim Yeager, an associate professor of finance, modeled how large losses within categories of commercial real-estate loans would affect a bank's overall losses, earnings and capital. His spreadsheet-based simulation tracked the effects of significant losses, or "shocks," in eight categories, including retail, industry and, most importantly, construction and land development.

"Nationwide, commercial real-estate loans at community banks have exploded from 23 percent of total loans in 1990 to 47 percent in 2005," said Yeager, who is also the Arkansas Bankers Association Chair in the Sam M. Walton College of Business. "It is not surprising, therefore, that bank supervisors have expressed concern at the growing concentration."

Yeager defines community banks as all banks that have less than \$5 billion in inflation-adjusted assets. Officials at various federal regulatory agencies - Office of the Comptroller of the Currency, the Federal Reserve System and the Federal Deposit Insurance Corporation - closely monitor lending at all banks to assess the level of risk associated with loan types, including residential real estate, consumer loans and commercial loans, in addition to commercial real estate. Red flags are raised when banks concentrate too much of their lending in one sector because a downturn in that sector could lead to large bank losses.

In 2006, regulators representing the above agencies responded to the trend of community banks' ever-increasing participation in commercial real-estate lending by releasing interagency guidance on risk-management practices. The guidelines stated that banks identified as having significant commercial real-estate concentration risk should perform portfolio-level stress tests to quantify the impact of changing economic conditions on assets, earnings and capital.

To develop his stress test, Yeager focused on Arkansas' community banks, many of which, according to criteria established by the regulatory agencies, would be identified as potentially exposed to commercial real-estate concentration risk. The researcher first obtained financial data from banks' regulatory filings - the so-called "call reports," which report commercial real-estate lending in four broad categories: construction and land development, multifamily, farmland and nonfarm nonresidential.

But Yeager needed more detailed information, so he designed a survey that classified commercial real-estate loans into eight categories: apartment, office, retail, hotel/motel, industrial, mixed, other and construction and land development. Fifteen Arkansas community banks from three metropolitan statistical areas - Fayetteville-Springdale-Rogers, Little Rock/North Little Rock and Jonesboro - participated in the survey. Yeager used these data and financial information from two other major databases to create the stress-test model.

Participant banks had an average of \$144.7 million in commercial real-estate loans, of which 45 percent was in construction and land development. A 20 percent shock - or rate of loss - to this category relative to the other loan types produced the largest negative effect due to its dominant proportion of the banks' loan portfolios. The 20 percent shock - an extremely rare event, and thus a worst-case scenario - reduced average capital ratios by 3 percentage points in the first year. One sample bank's capital ratio was reduced to 2 percent, which would

prompt regulators to close the bank.

The capital ratio is a bank's equity divided by assets. High capital ratios protect a bank from insolvency because shareholder equity absorbs the first losses, Yeager said. Currently, the typical capital ratio for banks is between 7 and 9 percent. A capital ratio of 2 percent is the threshold that bank regulators use to close a bank.

As a tool for any community bank, Yeager's simulation method allows users to "shock" each loan category separately and provides a five-year forecast of balance-sheet and income-statement effects. Each category receives an initial shock of 20 percent, and then the model decreases the loss rate over the next three years until it returns to its pre-shock level in the fifth year. Results of the simulation estimate the effects of a large and historically remote loss to banks' commercial real-estate portfolios.

"To prepare banks and provide the most useful information, our results are skewed toward a reasonable, worst-case scenario," Yeager said.

Prior to his appointment in the Walton College, Yeager was an economist at the Federal Reserve Bank of St. Louis.

Source: University of Arkansas

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